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April 30, 2018

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

Subject: *First Quarter 2018 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 2018 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 2018) 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 First Quarter 2018.

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
Karen Baker/DTSC
Pam Innis/DOI
Susan Young/CA-SLC
Bruce Campbell/AZ-SLD

Topock Project Executive Abstract

Document Title: First Quarter 2018 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, 2018 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 2018. 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, 2018 through March 31, 2018. The average pumping rate for the IM extraction system during First Quarter 2018 was 131.1 gallons per minute, and an estimated 51.5 pounds (23.4 kilograms) of chromium were removed in January and February 2018. To date, the IM extraction system has removed 9,150 pounds (4,150 kilograms) of chromium.

Written by: PG&E

Recommendations:
none

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

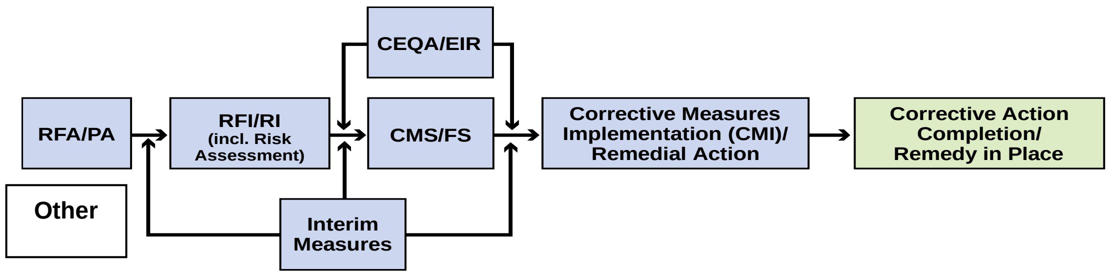
This report is required by DTSC as part of the Interim Measures Performance Monitoring Program.

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 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT

Topock Compressor Station,
Needles, California

April 30, 2018

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT

PG&E Topock Compressor Station,

Needles, California

Prepared for:

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Date:

April 30, 2018

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

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Arcadis Monitoring Project Manager

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ACRONYMS AND ABBREVIATIONS

µg/L	micrograms per liter
ADEQ	Arizona Department of Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMP	Compliance Monitoring Program
COPC	constituent of potential concern
Cr(VI)	hexavalent chromium
CWG	Consultative Working Group
DOI	U.S. Department of the Interior
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
ft/ft	foot or feet per foot
GMP	Groundwater Monitoring Program
gpm	gallons per minute
IM	interim measure
IM-3	Interim Measures number 3
IMCP	Interim Measures Contingency Plan
mg/L	milligrams per liter
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
RRB	Red Rock Bridge
TDS	total dissolved solids
USBR	United States Bureau of Reclamation
USEPA	United States Environmental Protection Agency
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 IM Performance Monitoring Program, the Groundwater Monitoring Program, and the 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 Toxic 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 2018. The average pumping rate for the IM extraction system during First Quarter 2018 was 131.1 gallons per minute, and an estimated 51.5 pounds (23.4 kilograms) of chromium were removed between January 1 and February 28, 2018. To date, the IM extraction system has removed 9,150 pounds (4,150 kilograms) of chromium.

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 located 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 No. 3 (IM-3) Performance Monitoring Program (PMP).

This report presents the monitoring data collected from PG&E's GMP, RMP, and PMP between January 1 and March 31, 2018 (hereafter referred to as First Quarter 2018). 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 2018 monitoring activities and site operations conducted in support of these programs.

Section 3 presents GMP and RMP monitoring results for the First Quarter 2018 reporting period.

Section 4 presents PMP monitoring results and the IM evaluation for the First Quarter 2018 reporting period.

Section 5 describes upcoming monitoring events for the Second Quarter 2018.

Section 6 lists the references cited throughout this report.

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

1.1 First Quarter 2018 Regulatory Communication

PG&E communications with DTSC in First Quarter 2018 that resulted in updates to the Topock GMP, RMP, or PMP programs are outlined below and described in appropriate sections throughout the report. Section 1.1 has been abbreviated compared to previous reports to focus on information from the current reporting cycle and to reduce redundancy throughout the report. A summary of communication with DTSC for calendar year 2017 was reported in the Fourth Quarter 2017 and Annual Interim Measures

Performance Monitoring and Site-Wide Groundwater and Surface Water Monitoring (herein referred to as "GMP/PMP") Report (Arcadis 2018).

Communication with DTSC in First Quarter 2018 included:

- Submittal to DTSC of the Fourth Quarter 2017 GMP/PMP Report (submitted March 15, 2018; Arcadis 2018).
- Submittal of required GMP/RMP/PMP notifications. Notifications submitted in First Quarter 2018 included:
  - Quarterly email notification was sent in advance of formal reporting from Arcadis (on behalf of PG&E) to DTSC for hexavalent chromium (Cr[VI]) and total dissolved chromium results at four subject floodplain wells (notification sent April 6, 2018).
  - As part of the conditional approval for the shutoff of PE-01, GMP monitoring results from wells listed in the July 20, 2015 DTSC approval letter (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 DTSC within 40 days after the end of the quarterly GMP sampling event. No wells met these criteria in First Quarter 2018, and no notification was required.

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 (CH2M Hill 2008), naturally occurring Cr(VI) in groundwater was calculated to exhibit an upper tolerance limit (UTL) concentration of 32 micrograms per liter (µg/L). 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

The Topock GMP and RMP were initiated as part of a Resource Conservation and Recovery Act (RCRA) and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) facility investigation/remedial groundwater investigation. The RCRA program is being regulated under a Corrective Action Consent Agreement issued by the DTSC in 1996 for the Topock site (United States Environmental Protection Agency [USEPA] ID No. CAT080011729).

Groundwater monitoring data collected to date have been documented in regular monitoring reports (available on the DTSC website). In addition, data from between July 1997 and October 2007 are summarized in the Revised Final RCRA Facility Investigation/Remedial Investigation Report, Volume 2–Hydrogeologic Characterization and Results of Groundwater and Surface Water Investigation, PG&E, Topock Compressor Station, Needles, California, dated February 11, 2009 (CH2M Hill 2009a). Additional groundwater and surface water monitoring data from November 2007 through September 2008 are presented in the Final RCRA Facility Investigation/Remedial Investigation Report, Volume 2, Addendum–Hydrogeologic Characterization and Results of Groundwater and Surface Water Investigation, PG&E, Topock Compressor Station, Needles, California, dated June 29, 2009 (CH2M Hill 2009b).

In compliance with the requirements for Groundwater and Surface Water Monitoring Program directive of April 2005 (DTSC 2005a), this report presents the First Quarter 2018 monitoring activities conducted from January 1 through March 31, 2018.

1.3.2 GMP and RMP Sampling Networks

The GMP monitoring well network and RMP surface water sampling network are shown on Figures 1-2 and 1-3, respectively, and summarized below. The complete GMP network includes more than 100 wells that monitor groundwater in the Alluvial Aquifer and bedrock, and the RMP includes 25 surface water monitoring locations.

GMP Groundwater Monitoring Wells	RMP Surface Water Monitoring Locations
129 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
2 water supply wells	2 other surface water sampling locations (adjacent to the shoreline)
2 IM-3 extraction wells	

The well construction and sampling methods for wells in the GMP and other monitoring wells at the site are summarized in Appendix A (Table A-1) of the GMP/PMP Report (Arcadis 2018).

1.4 Interim Measure Performance Monitoring Program

1.4.1 Basis for PMP Program

In compliance with the requirements for IM monitoring and reporting outlined in the DTSC IM performance directive of February 2005, and in subsequent directives from the DTSC in 2007 (DTSC 2005b; 2007a, 2007b, 2007c), this report presents the First Quarter 2018 PMP evaluation results for the IM monitoring activities from January 1 through March 31, 2018.

The Topock IM project consists of groundwater extraction for hydraulic control of the chromium plume boundaries in the Colorado River floodplain and management of extracted groundwater. The groundwater extraction, treatment, and injection systems are collectively referred to as IM-3. The IM monitors only the Alluvial Aquifer. Currently, the IM-3 facilities include 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. During First Quarter 2018, extraction wells TW-03D and PE-01 operated (with most of the flow from TW-03D) at a combined pumping rate of 131.1 gallons per minute (gpm), including periods of planned and unplanned downtime. Figure 1-1 shows the locations of the IM-3 extraction, conveyance, treatment, and injection facilities.

In a letter dated February 14, 2005, DTSC established the criteria for evaluating the performance of the IM (DTSC 2005c). As defined by DTSC, the performance standard for this IM is to *"establish and maintain a net landward hydraulic gradient, both horizontally and vertically, that ensures that hexavalent chromium [Cr(VI)] concentrations at or greater than 20 micrograms per liter [µg/L] in the floodplain are contained for removal and treatment"* (DTSC 2005b). A Draft Performance Monitoring Plan for Interim Measures in the Floodplain Area, PG&E, Topock Compressor Station, Needles, California (CH2M Hill 2005a; herein referred to as the "Performance Monitoring Plan") was submitted to DTSC on April 15, 2005.

The February 2005 DTSC directive also defined the monitoring and reporting requirements for the IM (DTSC 2005b, 2005c). In October 2007, DTSC approved modifications to the reporting requirements for the PMP (DTSC 2007a) to discontinue monthly performance monitoring reports (the quarterly and annual reporting requirements were unchanged). The DTSC approved additional updates and modifications to the PMP in letters dated October 12, 2007; July 14, 2008; July 17, 2008; March 3, 2010; April 28, 2010; July 23, 2010; and June 27, 2014 (DTSC 2007a, 2008a, 2008b, 2010a, 2010b, 2010c, 2014b). On July 20, 2015, DTSC conditionally approved the 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 (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.

PE-01 was not operated during First Quarter 2018 to help maintain groundwater gradients, except for brief periods to support IM-3 maintenance or sampling. TW-02S and TW-02D did not run during First Quarter 2018, except for a brief period of testing at TW-02D. TW-03D operated full time during First Quarter 2018.

1.4.2 PMP – Aquifer Hydraulics

The PMP monitors hydrogeologic conditions in the Alluvial Aquifer. The wells screened in the unconsolidated alluvial fan and fluvial deposits, which comprise the Alluvial Aquifer, have been separated into three depth intervals to present groundwater quality and groundwater level data. The depth intervals of the Alluvial Aquifer in the floodplain area—designated upper (shallow wells), middle (mid-depth wells), and lower (deep wells)—are based on grouping the monitoring wells screened at common elevations. These divisions do not correspond to any lithostratigraphic layers within the aquifer. The Alluvial Aquifer is considered to be hydraulically undivided. The subdivision of the aquifer into three depth intervals is an appropriate construct for presenting and evaluating spatial and temporal distribution of groundwater quality data in the floodplain. The three-interval concept is also useful for presenting and evaluating lateral gradients while minimizing effects of vertical gradients and observing the influence of pumping from partially penetrating wells.

1.4.3 PMP Monitoring Network

Figure 1-4 shows the locations of wells used for the PMP. The PMP includes data collection for IM groundwater extraction, hydraulic gradient measurements, the IM Contingency Plan (IMCP), and IM chemical performance monitoring. With approval from DTSC, the list of wells included in the PMP programs was modified beginning on August 1, 2008 (PG&E 2008). The PMP wells and monitoring locations are described in the table below.

PMP Wells and Monitoring Networks

IM Extraction Wells (4 Wells)

- TW-02D
- TW-03D
- TW-02S
- PE-01

Hydraulic Monitoring Network – 53 Wells Total (including 17 shallow, 14 intermediate, and 22 deep)

- Floodplain wells: monitoring wells on the Colorado River floodplain
- Intermediate wells: monitoring wells immediately north, west, and southwest of the floodplain
- Interior wells: monitoring wells upgradient of IM pumping

IMCP Wells (24 Wells)

- 6 Shallow Wells
- 5 Intermediate Wells
- 13 Deep Wells

Chemical Performance Monitoring Locations (11 Wells)

- 9 Annual Wells
- 1 River Sampling Location
- 1 Biennial Well

1.4.3.1 IM Extraction Wells

The PMP Program includes four IM extraction wells (Figure 1-4). Three wells (TW-02D, TW-03D, and TW-02S) are located on the MW-20 bench (Figure 1-1), and one well (PE-01) is located on the floodplain approximately 450 feet east of extraction well TW-03D. The MW-20 bench is a level area next to National Trails Highway, where some IM-3 facilities are located.

1.4.3.2 IM Hydraulic Monitoring Network

The IM Hydraulic Monitoring Network consists of 53 wells (shown on Figure 1-4) used to evaluate the performance of the IM and demonstrate compliance of required hydraulic gradients. Section 4.7 of this report presents a summary of the IM hydraulic monitoring results for First Quarter 2018.

In addition to the established IM Hydraulic Monitoring Network, groundwater monitoring wells installed on the Arizona side of the Colorado River (not formally part of the PMP) also provide groundwater elevation data and demonstrate hydraulic gradients on the Arizona side of the river (Figure 1-4).

1.4.3.3 IM Contingency Plan Wells

Twenty-four IMCP wells have been selected as part of an early detection system to detect any increases in chromium concentrations at areas of interest at the site. Following a sampling event, results from sampled IMCP wells are evaluated against their established trigger levels. If any exceedances are observed, a notification process is initiated, as outlined in the Revised Contingency Plan Flow Chart (Figure 1; PG&E 2008). Results of IMCP well evaluations following First Quarter 2018 sampling are presented in Section 4.3 of this report.

1.4.3.4 IM Chemical Performance Monitoring Wells

The well network is sampled annually or biennially for an expanded chemistry suite as part of the IM Chemical Performance Monitoring Network, which was most recently amended in 2008 (PG&E 2008). Currently, nine wells are sampled annually as part of this program, one well is sampled biennially, and one river location is sampled annually. Results of chemical performance monitoring were last reported in the Fourth Quarter 2017 and Annual GMP/PMP Report (Arcadis 2018). The next scheduled assessment is planned for Fourth Quarter 2018.

1.4.3.5 Wells Monitored for Conditional Shutdown of PE-01

As part of the conditional approval for PE-01 shutoff, GMP monitoring results from wells listed in the July 20, 2015 DTSC approval letter (i.e., wells within 800 feet of TW-03D) 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 DTSC within 40 days after the end of the quarterly GMP sampling event. Results for this evaluation for First Quarter 2018 are presented in Section 4.3.2.

1.5 Sustainability

The GMP, RMP, and PMP monitoring programs strive to use sustainable sampling and data collection practices. This section briefly describes some of the sustainability practices now in use.

- As approved by the California Regional Water Quality Control Board in 2006, groundwater sampling purge water is disposed via the on-site IM-3 treatment plant and injection process, eliminating off-site transport and disposal of sampling purge water.
- The RMP boat contractor has always been a local Lake Havasu City-based business. Benefits of employing local resources for sampling support are reduced fuel consumption and greenhouse gas emissions, and increased local business support.
- In 2012, the analytical laboratory services supporting Topock monitoring was changed from a Los Angeles-based lab to the current California-certified Las Vegas-based lab, reducing lab courier travel by more than half.
- In 2007, DTCS approved the use of USEPA Method 218.6, which has a 28-day holding time, in place of USEPA Method SW846 Method 7199 for Cr(VI) analysis, which has a 24-hour holding time. Subsequently, PG&E also adopted the 14-day holding time nitrate method (first used with the Compliance Monitoring Program [CMP]) for Topock GMP to replace the previous 48-hour holding time method. These method changes increased field efficiency by reducing the number of samples pickups needed and the overall courier travel time.
- The use of the DTSC website and electronic report submittal has reduced the number of report hard copies and conserved natural resources. The number of report hard copies has been reduced over the years from 16 to 10 for the quarterly reports to conserve resources.
- To reduce the potential for impacts to floodplain areas with nesting habitat for sensitive avian species, water level data telemetry systems were installed from 2011 through 2012 at the five key-gradient compliance well locations. The telemetry systems are still used. The solar-powered data telemetry systems eliminated the need for weekly download visits (reduced mobilizations of off-site technical support resources) and allows for monthly or less frequent visits for key well transducer calibrations and maintenance. A solar-powered telemetry system was installed at newly added key well MW-20-130 in Fourth Quarter 2017. Addition of this well expands the network of “key” wells in the program from five to six.
- The DTSC approved the provisional use of low-flow sampling on June 27, 2014 (DTSC 2014b) at most wells screened in the Alluvial Aquifer. Low-flow sampling reduced the volume of purge water and sampling footprint at most wells. For wells still using the three-volume purge sampling methods (primarily bedrock and long screened wells), pumps and tubing are sized for the optimum purge technique at each monitoring well.
- Utility vehicles (e.g., Polaris Ranger or Kawasaki Mule) and one 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. These best practices reduce generator use and impacts from well access to further decrease the monitoring footprint.

- On July 20, 2015, DTSC conditionally approved a modification to the IM-3 pumping regime that allows 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, thereby extending the benefit of additional mass removal by the existing system to the overall site cleanup while maintaining hydraulic control of the plume.

2 FIRST QUARTER 2018 MONITORING ACTIVITIES

This section summarizes the monitoring and sampling activities completed during First Quarter 2018 for the GMP, RMP, and PMP.

2.1 Groundwater Monitoring Program

2.1.1 Monthly Sampling

Groundwater was sampled from the IM extraction wells PE-01 and TW-03D in January, February, and March 2018 and analyzed for Cr(VI), dissolved chromium, total dissolved solids (TDS), pH, and several additional analytes.

2.1.2 Quarterly Sampling

The First Quarter 2018 GMP groundwater monitoring event was conducted from February 19 through 23, 2018 and included sampling from 23 groundwater monitoring wells. No samples were collected at highway median well MW-40D due to ongoing access concerns.

Samples from these wells were submitted for laboratory analysis of Cr(VI), dissolved chromium, and specific conductance. Additional field-measured parameters consisted of oxidation-reduction potential (ORP), pH, and turbidity.

In addition, groundwater samples were collected at selected GMP wells for analysis of:

- Arsenic from a subset of wells screened in fluvial sediments, as directed by DTSC in the Corrective Measures Study review comment No. 186 (DTSC 2009b)
- Arsenic from bedrock monitoring wells
- Contaminants of potential concern (COPCs), including molybdenum, nitrate/nitrite as nitrogen (herein referred to as “nitrate”), selenium, and potential in situ byproducts (manganese and arsenic) from a subset of wells (DTSC 2010b, 2011, 2015).

2.1.3 Flow in Bat Cave Wash

In early January 2018, PG&E was notified of a rainfall event that caused surface water flow in Bat Cave Wash. Therefore, additional sampling at MW-9, MW-10, and MW-11 was performed on February 23, 2018 as part of the First Quarter 2017 GMP sampling event. These samples were added in order to assess any potential effect on groundwater from the surface water flow. Results of this additional sampling are reported in Section 3.2.3.

2.1.4 Well Maintenance

PG&E performs quarterly inspections and takes corrective actions as necessary to ensure that the monitoring wells are in good working condition (DTSC 2013; CH2M Hill 2005a, 2005b). Table A-1 in Appendix A summarizes the quarterly inspection log, field observations, and mitigation actions, if any, for well maintenance.

2.1.5 Implementation of Alternative Sampling Methods

2.1.5.1 Site-wide Implementation of Low-flow Sampling Method

On June 27, 2014, the DTSC approved a change from the traditional three-volume purge sampling method to using a low-flow sampling method (DTSC 2014b). This approval applied to wells screened in alluvial/fluvial sediments with saturated screen lengths of 20 feet or less. Sample collection using the low-flow method at wells meeting the screen length criterion was initiated during the Third Quarter 2014 sampling event and has continued through First Quarter 2018. In October 2017 (DTSC 2017c), DTSC approved switching additional wells from three-volume purge to low-flow sampling as part of conditional approval for expanded well sampling trials. Two wells in the GMP program (bedrock well MW-61-110 and observation well OW-3S) were approved for switch from three-volume purge to low-flow sampling (with the rest of the wells approved for this switch included under the CMP Program – reported under separate cover). No wells were approved for or switched sampling methods in First Quarter 2018.

2.1.5.2 Sampling Method Trials at Select Wells

In addition to the low-flow sampling method change, and in conformance with the June 27, 2014 email from DTSC (DTSC 2014b), PG&E began conducting sampling method trials at MW-38S, MW-38D, MW-40S, and MW-40D during Fourth Quarter 2014. In August 2015, PG&E sent a letter to DTSC (PG&E 2015) recommending additional wells for low-flow sampling and proposing an additional sampling method trial for select bedrock wells. 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).

The purpose of the method trial is to directly compare two different sampling methods. The method trials are assessed annually following Fourth Quarter sampling, with the latest assessment included in the Fourth Quarter 2017 and Annual GMP/PMP report (Arcadis 2018). The latest annual report presented the results of existing method trials and made recommendations for updates to the trials (currently under agency review). Method trials have continued through First Quarter 2018 at the select wells. The current list of 10 wells in the sampling method trials is shown on Figure 1-2). The next assessment of the sampling method trials will be presented in the Fourth Quarter 2018 and Annual GMP/PMP Report (planned for March 2019).

2.2 Surface Water Monitoring Program

Quarterly surface water sampling for the First Quarter 2018 was conducted February 21 and 22, 2018 from the RMP monitoring network. In addition, the First Quarter period includes an additional “low river” surface water monitoring event, which was conducted January 3 and 4, 2018. Samples from both events were analyzed for Cr(VI), dissolved chromium, specific conductance, and pH. Samples were also analyzed for COPCs (molybdenum, nitrate, and selenium), in situ byproducts (manganese, iron [total and dissolved], and arsenic), and geochemical indicator parameters (barium and total suspended solids) to develop baseline concentrations for future remedy performance evaluations.

2.3 Performance Monitoring Program

Groundwater samples collected during the First Quarter 2018 GMP sampling event were evaluated as part of the PMP for compliance with requirements of the IMCP and "conditional approval" for PE-01 shutdown. Results of these evaluations, and any needed notifications to DTSC, are discussed in Section 4.3 of this report. In addition to sampling, PMP pressure transducers, which monitor hydraulic gradients of the Alluvial Aquifer, were downloaded in the first 2 weeks of each month (January, February, and March). The transducers in the key monitoring wells (MW-27-085, MW-31-135, MW-33-150, MW-34-100, MW-45-095, and MW-20-130; Figure 1-4) were also downloaded via a cellular telemetry system.

3 RESULTS FOR SITE-WIDE GROUNDWATER MONITORING AND SURFACE WATER SAMPLING

This section presents the analytical results for groundwater and surface water monitoring conducted during First Quarter 2018.

3.1 Groundwater Results for Cr(VI) and Dissolved Chromium

Table 3-1 presents the January 2017 through March 2018 groundwater sample results for Cr(VI) and dissolved chromium, among other parameters. The laboratory reports for samples analyzed during First Quarter 2018 are provided in Appendix B.

Figures 3-1a and 3-1b present the First Quarter 2018 Cr(VI) results in map view for wells monitoring the upper-depth (shallow wells) and lower-depth (deep wells) intervals, respectively, of the Alluvial Aquifer and bedrock (mid-depth wells not sampled during First Quarter 2018). 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 2009a).

During First Quarter 2018, the maximum detected Cr(VI) concentration was 24,000 µg/L in well MW-68-180. The maximum detected dissolved chromium concentration was also in MW-68-180 at 24,000 µg/L (Table 3-1).

3.2 Other Groundwater Monitoring Results

3.2.1 Contaminants of Potential Concern and In Situ Byproducts

Table 3-2 presents the COPCs and in situ byproducts sampling results for groundwater monitoring well samples collected in First Quarter 2018. The wells where maximum concentrations of these analytes were reported are summarized as follows:

- MW-46-175 with a molybdenum concentration of 190 µg/L
- MW-68-180 with a nitrate concentration of 20 milligrams per liter (mg/L)
- MW-68-180 with a selenium concentration of 13 µg/L
- MW-64BR with a manganese concentration of 1,100 µg/L

3.2.2 Arsenic Sampling in Monitoring Wells

Select Alluvial Aquifer and bedrock wells were sampled for arsenic during the First Quarter 2018 event. Selected arsenic results are presented with the COPCs and in situ byproducts results in Table 3-2. Additional arsenic results are presented in Appendix C, Table C-1. Arsenic concentrations were within expected ranges for the wells sampled. The maximum concentration of arsenic for the quarter was 15 µg/L at well MW-72BR-200.

3.2.3 Additional Analytes after Flow in Bat Cave Wash

Select Alluvial Aquifer wells (MW-9, MW-10, and MW-11) were sampled for dissolved calcium, dissolved magnesium, dissolved iron, dissolved sodium, dissolved boron, bromide, chloride, sulfate, TDS, and total alkalinity in the First Quarter 2018 after a rainfall event that caused water to flow in Bat Cave Wash (Appendix C, Table C-2). Analytical results were consistent with historical data for all three wells when compared to post-rainfall sampling in First Quarter 2017, Second Quarter 2016, and Third Quarter 2015 (see Appendix C, Table C-2 in previous versions of this report; Arcadis 2017c, 2016d; CH2M Hill 2015d). Results from samples collected during quarterly sampling following the surface water flow event do not provide evidence of any impact on general groundwater quality in the shallow aquifer beneath Bat Cave Wash. This conclusion is consistent with observations made following previous flow events.

3.2.4 Follow-up on Fourth Quarter 2017 Sampling Observations

Several observations made in Fourth Quarter 2017 were planned for follow-up in the First Quarter 2018 GMP/PMP report. These items are addressed below:

- Planned Fourth Quarter 2017 sampling at the MW-68 well cluster could not be performed due to temporarily blocked access to the wells. Sampling at these wells was completed during the First Quarter 2018 sampling event, and results are provided with this report. Results are consistent with previous sampling (e.g., Table 3-1).
- Cr(VI) results at MW-69-195 showed a steady increase through 2017. Sampling at this location in First Quarter 2018 showed a return of Cr(VI) values to below First Quarter 2017 values (Table 3-1; Figure D-17). Sampling at this well will continue in 2018 to evaluate for Cr(VI) concentration trends in the Fourth Quarter 2018 and Annual GMP/PMP Report.
- MW-60BR-245 is currently being evaluated for a switch from three-volume purge to low-flow sampling as part of the sampling method trials taking place in the GMP Program. In Fourth Quarter 2017, this well recorded an anomalously high three-volume purge Cr(VI) reading of 690 μg/L (Table 3-1; Figure D-14). A follow-up review for this well in First Quarter 2018 shows a three-volume purge Cr(VI) result (69 μg/L) that is an order of magnitude lower than the previous result, and closer to historical results (Figure D-14). The low-flow Cr(VI) sampling result at this location for First Quarter 2018 was 4.1 μg/L (well below the three-volume purge method). This well will continue to be monitored in 2018 to track fluctuating Cr(VI) levels, as well as collect additional information to help explain discrepancies observed between sampling methods in the last two Quarters. An evaluation of the sampling method trial at this well is scheduled for the Fourth Quarter 2018 and Annual GMP/PMP report.

3.3 Surface Water Results for Cr(VI) and Dissolved Chromium

During the First Quarter 2018 RMP sampling event, Cr(VI) and dissolved chromium were not detected at concentrations higher than reporting limits at any surface water monitoring locations (Table 3-3).

Table 3-4 presents results for the COPCs (molybdenum, nitrate, and selenium), in situ byproducts (manganese, iron, and arsenic), and other geochemical indicator parameters (barium, total suspended solids) for surface water samples from the First Quarter 2018 sampling event. The surface water locations where maximum concentrations of these analytes were reported in First Quarter 2018 are summarized below (results for these analytes were within expected ranges for First Quarter 2018):

- C-MAR-D with a dissolved molybdenum concentration of 5.7 µg/L
- C-TAZ-D with a nitrate concentration of 0.53 mg/L
- R-28, C-NR1-S, C-R22A-S, C-TAZ-D, and C-TAZ-S with a dissolved selenium concentration of 1.9 µg/L
- C-MAR-D with a dissolved manganese concentration of 24 µg/L
- C-MAR-S with a dissolved iron concentration of 89 µg/L
- C-MAR-D with a total iron concentration of 550 µg/L
- C-NR3-S with a dissolved arsenic concentration of 2.5 µg/L.

The C-MAR sample location is near the east side of the Colorado River at the mouth of the Topock Marsh area as shown on Figure 1-3. This location is outside of the main river channel and adjacent to an area of naturally reducing geochemical conditions in groundwater. Elevated manganese and iron concentrations are typical of reduced geochemical environments. These metals may also be occasionally detected in more oxidized environments due to the presence of suspended solids (colloids) in the filtered samples.

3.4 Data Validation and Completeness

Laboratory analytical data from the First Quarter 2018 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 2018:

- Seven Cr(VI) (USEPA Method 218.6) results exhibited a matrix interference issue that required a dilution to achieve satisfactory matrix spike recovery, resulting in an elevated reporting limit. No flags were applied.
- The nitrate/nitrite as nitrogen was qualified as an estimated detect and "J" flagged in sample MW-38S-Q118 due to a matrix spike and matrix spike duplicate recoveries greater than accuracy criteria.
- The iron result was qualified as an estimated detect and "J" flagged in sample C-BNS-Q118 due to a post-digestion spike recovered greater than accuracy criteria.
- Dissolved magnesium demonstrated a relative percent difference greater than quality control criteria for the field duplicate pair of sample C-NR4-S-Q118/MW-910-Q118. The associated results were qualified as estimated detects and flagged "J."
- 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 lab by Method SM4500-HB (pH) are analyzed outside the USEPA-recommended holding time. Therefore, the pH results for the First Quarter 2018 sampling event analyzed in a certified lab are considered estimated.

No other significant analytical deficiencies were identified in the First Quarter 2018 data. Additional details are provided in the data validation reports kept in the project file and available upon request.

In addition, PG&E identified no “suspect” detections of Cr(VI) in surface water samples or any other “suspect” samples requiring reanalysis at the laboratory; therefore, in conformance with the agencies’ April 4, 2014 direction letter (DTSC 2014a), no notifications were made to DTSC and the United States Department of the Interior (DOI).

4 FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING PROGRAM EVALUATION

This section presents the quarterly PMP evaluation summary for First Quarter 2018.

4.1 Water Quality Results for Performance Monitoring Program Floodplain Wells

The chemical performance monitoring wells are sampled annually (one well sampled biennially) during the Fourth Quarter sampling events. Figure 1-4 shows the locations of the monitoring wells sampled for the performance monitoring parameters.

In July 2008 and June 2014, DTSC approved modifications to the PMP IM chemical performance monitoring parameters (DTSC 2008b; 2014b). For the complete annual general chemistry results, see Table F-1 in Appendix F of the Fourth Quarter 2017 and Annual GMP/PMP Report (Arcadis 2018). The next round of Chemical Performance Monitoring sampling is planned for Fourth Quarter 2018.

4.2 Cr(VI) Distribution and Trends in Performance Monitoring Program Wells

The First Quarter 2018 distribution of Cr(VI) 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.[1] Figure 4-2 presents the First Quarter 2018 Cr(VI) results for cross-section B, oriented parallel to the Colorado River. The locations of cross-sections A and B are shown on Figure 4-1.

Analytical results for January 2017 through March 2018 are presented in Table 3-1. Appendix D includes graphs of Cr(VI) concentration vs time in selected monitoring well clusters through March 2018. Figure 4-3 presents graphs of Cr(VI) concentration vs time for the following deep monitoring wells in the floodplain area through March 2018: MW-34-100, MW-36-090, MW-36-100, MW-44-115, MW-44-125, and MW-46-175. The locations of these deep wells selected for performance evaluation are shown on Figure 4-1.

Wells showing marked decreases in concentration are generally located in the floodplain area where IM pumping is removing chromium in groundwater. Wells with historical detections near or at reporting limits remained at these levels during the First Quarter 2018 period. Cr(VI) concentrations have remained relatively steady with respect to historical trends or have decreased in many wells since IM and PE-01 pumping began in 2004 and 2005, respectively (Figure 4-3 and Appendix D).

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[1] On Figures 4-1 and 4-2, the Cr(VI) concentrations are color-coded based on the groundwater background Cr(VI) concentration, which is 32 µg/L (CH2M Hill 2009a). The 20 µg/L and 50 µg/L Cr(VI) concentration contours presented on Figures 4-1 and 4-2 are shown in accordance with DTSC's 2005 IM directive and are not based on the background Cr(VI) concentration for groundwater.

Key long-term Cr(VI) concentration trends through First Quarter 2018 include:

- Concentrations at the MW-20 cluster (located near the TW-03D pumping well) indicate generally decreasing concentrations at the shallow well MW-20-070 (since 2011), decreasing concentrations at MW-20-100 (since May 2007), and variable concentrations at MW-20-130, but overall decreasing since 2007 (Figure D-3).
- As shown on Figure 4-3 and Figure D-6, well MW-34-100 has shown a seasonally fluctuating trend in Cr(VI) concentration over the past 8 years; since June 2006, concentrations at this well have shown a general decreasing trend. Landward gradients have been present at this location since IM pumping began; therefore, the seasonal fluctuations in concentration observed at MW-34-100 (driven by river management at Davis Dam – see Section 4.6) are not considered an indication of any migration of the plume toward the river.
- Deep well MW-36-100 Cr(VI) concentrations initially increased upon the startup of PE-01 pumping, began to decrease in 2007, and have remained lower than 100 µg/L since late 2008, as shown on Figures 4-3 and D-7.
- Deep well MW-39-100 concentrations steadily declined since the start of IM pumping (Figure D-8).
- Deep well MW-44-115 has shown a downward trend since July 2006, as presented on Figures 4-3 and D-10. Well MW-44-125 has also shown an overall downward trend since November 2008, as presented on Figures 4-3 and D-10.
- Concentrations in deep well MW-46-175 have shown seasonal fluctuation (driven by river management at Davis Dam – see Section 4.6), but overall downward trend since 2006, as presented on Figures 4-3 and D-11.
- Well TW-04, a deeper well, has shown a declining trend since March 2007, as presented on Figure D-19.

4.3 Performance Monitoring Program Contingency Plan Cr(VI) Monitoring

4.3.1 Chromium Concentrations in IMCP Wells

The Topock IMCP was developed to detect and control possible migration of the Cr(VI) plume toward the Colorado River (DTSC 2005b). Currently, the IMCP consists of 24 wells that activate contingencies per criteria in the IMCP plan if their trigger levels are exceeded (IMCP wells shown on Figure 1-4). The IMCP well Cr(VI) results from the First Quarter 2018 reporting period were all lower than their trigger levels. Appendix D includes Cr(VI) concentration graphs for the IMCP wells and select other site monitoring wells.

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

On July 20, 2015, DTSC conditionally approved a proposal to evaluate a modification to the IM-3 pumping regime by allowing PE-01 to be shut off with pumping shifted to TW-03D and TW-02D or TW-02S so long as gradient targets are maintained and contingency is not triggered based on Cr(VI) concentrations in select floodplain wells. Conditional approval for shutdown of PE-01 included the requirement that PG&E notify DTSC if chromium from individual floodplain monitoring wells within 800 feet of TW-03D exhibited concentrations greater than the maximum detected chromium concentrations from 2014 (or the most recent year if a well was not sampled in 2014) when PE-01 is shut down (DTSC 2015).

During the First Quarter 2018, none of the four wells monitored (MW-34-100, MW-44-115, MW-46-175, and PE-01) met the criteria where either Cr(VI) or total dissolved chromium (or both) was detected at concentrations exceeding the notification levels (Appendix Table D-1).

4.4 Extraction Systems Operations

From January 1 through March 31, 2018, the volume of groundwater extracted and treated by the IM-3 system was 16,991,873 gallons, and an estimated 51.5 pounds (23.4 kilograms) of chromium were removed from the aquifer between January 1 and February 28, 2018 (Table 4-1). Groundwater extraction is reported on a different schedule than chromium removal reporting (i.e., January-March and January-February, respectively; see Tables 1-1 and 4-1).

During First Quarter 2018, extraction wells TW-03D and PE-01 (with mostly all the flow from TW-03D) operated at a combined average pumping rate of 131.1 gpm, including periods of planned and unplanned downtime. The average monthly pumping rates were 133.3 gpm (January 2018), 130.9 gpm (February 2018), and 129.1 gpm (March 2018) during the First Quarter 2018. Extraction wells TW-02S and TW-02D were not operated during First Quarter 2018, except a brief period for sampling at TW-02D. Table 4-1 shows the average pumping rate and total volume pumped for the system during First Quarter 2018, as well as monthly average pumping rates and total volumes pumped per extraction well during the quarter.

The operational runtime percentage for the IM extraction system was 96.9 percent during this reporting period. The operations log for the extraction system during First Quarter 2018, including planned and unplanned downtime, is included in Appendix E. Additional IM-3 operational data are presented in quarterly (and semiannual) IM-3 Treatment System Monitoring Reports (e.g., CH2M 2018).

The concentrate (i.e., saline water) from the reverse osmosis system was shipped off site as a non-hazardous waste and was transported to Liquid Environmental Solutions in Phoenix, Arizona for treatment and disposal. Five containers of solids from the IM-3 facility were disposed of at the U.S. Ecology Chemical Waste Management facility in Beatty, Nevada during First Quarter 2018. Daily IM-3 inspections included general facility inspections, flow measurements, and site security monitoring. Daily logs with documentation of inspections are maintained on site.

During the reporting period, Cr(VI) concentrations at primary extraction well TW-03D remained stable, with a value of 550 µg/L in January and February, and 530 µg/L in March 2018, as shown in Table 4-2. TDS concentrations in TW-03D for this reporting period also remained stable, as shown in Table 4-2.

During the reporting period, Cr(VI) concentrations at extraction well PE-01 (on the floodplain) were detected in February (0.7 µg/L) and March 2018 (2.3 µg/L); Cr(VI) was not detected in January 2018, as shown in Table 4-2. PE-01 was not operated during First Quarter 2018 to support hydraulic control, except for brief periods during the quarter to support IM-3 system maintenance and sampling. TDS concentrations in PE-01 for this reporting period remained relatively stable, with TDS lowest in January and higher in February and March.

With increased use of extraction well TW-02D during First Quarter 2016, PG&E increased sampling frequency at this well from annual to quarterly starting in Second Quarter 2016. TW-02D was not operated for gradient control in First Quarter 2018, and only operated for brief periods for sampling. Sampling results at this well during the quarter showed results of 140 µg/L Cr(VI) and 140 µg/L total dissolved chromium (Table 4-2). Results will continue to be monitored at this location quarterly while this well remains available for groundwater extraction.

Groundwater samples are currently collected annually at extraction well TW-02S, with the next round of sampling planned for Fourth Quarter 2018.

4.5 Hydraulic Gradient and River Levels during Quarterly Period

On August 18, 2017, PG&E received email approval from DTSC to use well MW-20-130 in place of well MW-45-090 in the central and southern gradient control well pairs during months when extraction well PE-01 is not pumped for gradient control at the site (DTSC 2017b). This change was implemented immediately. PE-01 was not pumped for gradient control in January, February, or March 2018, and thus, MW-20-130 was used in the gradient calculations for these months. Table 4-3 and Figure 4-6 of this report have been expanded to include these updates to the program. A solar powered telemetry system was installed at MW-20-130 in Fourth Quarter 2017. This addition of well MW-20-130 in gradient calculations expands the network of “key” wells in the program from five to six.

During the reporting period, water levels were recorded at intervals of 30 minutes with pressure transducers in 57 wells (including five Arizona locations) and two river monitoring stations (I-3 and RRB; Figures 4-4a, 4-4b, and 4-4c). The data are typically continuous, with only short interruptions for sampling or maintenance.

Hydraulic gradients were measured during the First Quarter 2018 for well pairs (shown on Figure 1-4) selected for performance monitoring of the extraction system. Table 4-3 presents the monthly average hydraulic gradients measured for each of the gradient well pairs in January, February, and March 2018 as well as the overall average of all well pairs. Landward gradients exceeding the 0.001 foot per foot (ft/ft) requirement were measured each month as shown in Table 4-3. Figure 4-6 presents graphs of the hydraulic gradients, monthly average pumping rates, and river levels for the quarterly period. The overall monthly average gradients for all well pairs were 0.0033, 0.0040, and 0.0043 ft/ft for January, February, and March 2018, respectively. This is 3.3, 4.0, and 4.3 times greater than the required gradient of 0.001 ft/ft, respectively. The monthly average gradients for the northern well pair were 2.6, 2.9, and 3.0 times the target gradient of 0.001 ft/ft. For the central well pair, the monthly average gradients were 4.1, 5.0, and 5.4 times the target gradient. The southern well pair average gradients were 3.3, 4.1, and 4.5 times the target gradient.

Daily average groundwater and river elevations, calculated from the pressure transducer data for the First Quarter 2018 reporting period, are summarized in Table F-1 in Appendix F. Groundwater elevations (or total hydraulic heads) are adjusted for temperature and salinity differences among wells (i.e., adjusted to a common freshwater equivalent). The elevation of the Colorado River measured at the I-3 gauging station (location shown on Figure 4-4a) is also shown on the hydrographs in Appendix F.

Average First Quarter 2018 groundwater elevations for the shallow, mid-depth, and deep wells are presented and contoured in plan view on Figures 4-4a, 4-4b, and 4-4c. Average groundwater elevations for wells on floodplain cross-section A are presented and contoured on Figure 4-5. Several monitoring wells are significantly deeper than other wells in the lower depth interval. Due to complex vertical gradients present at portions of the Topock site, water levels for some wells are not considered in the contouring on the plan view Figures 4-4a through 4-4c, or on the cross-section Figure 4-5.

Lower-zone water levels shown on Figure 4-4c indicate that potentiometric levels in monitoring wells in Arizona are higher than those in wells across the river on the California floodplain. This means 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.

For the First Quarter 2018 reporting period, transducer data were recorded in wells located on the Arizona side of the Colorado River. The quarterly average groundwater elevations for wells MW-55-120, MW-54-085, MW-54-140, and MW-54-195 are presented on Figure 4-4c, if available, and are used for contouring where appropriate. With the exception of 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 4-6 illustrates the measured hydraulic gradients during the First Quarter 2018 with the concurrent river elevations and IM-3 pumping rates.

4.6 Projected River Levels during Next Quarter

The Colorado River stage near the Topock Compressor Station is measured at the I-3 location and is 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 largest monthly releases typically in spring and early summer and 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 4-7 shows the river stage measured at 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 2018 is based on the March 2018 USBR projections of Davis Dam release and Lake Havasu level, not the actual release and level values. The variability between measured and projected river levels is due to the difference between measured and actual Davis Dam release and Lake Havasu levels. The more recent data (last 5 years; plotted on Figure 4-7) are summarized in Table 4-4. The future projections shown on Figure 4-7 (predicted data points and lines are in different color than actual measurements) are based on USBR long-range projections of Davis Dam releases and Lake Havasu levels from March 2018. There is more uncertainty in these projections at longer times in the future because water demand is based on various elements including climatic factors.

Current USBR projections, presented in Table 4-4, show that the projected Davis Dam release for March 2018 (14,400 cubic feet per second) was more than the actual release in March 2018 (13,600 cubic feet per second). Based on March 2018 USBR projections, it is anticipated that the Colorado River level at the I-3 gage location in April 2018 will be approximately 0.26 ft higher compared to the actual levels in March 2018.

4.7 Quarterly Performance Monitoring Program Evaluation Summary

The groundwater elevation and hydraulic gradient data from January, February, and March 2018 performance monitoring indicate that the minimum landward gradient target of 0.001 ft/ft was exceeded each month during the First Quarter 2018. The overall average landward gradients during First Quarter 2018 were 3.3, 4.0, and 4.3 times the required minimum magnitude, respectively, as shown in Table 4-3. The gradient analysis from designated well pairs are an approved line of evidence for assessing hydraulic containment of the Cr(VI) plume created by pumping from the extraction well network (primarily consisting of TW-03D, with other wells as needed). Based on the hydraulic and monitoring data and evaluation presented in this report, the IM performance standard has been met for the First Quarter 2018 reporting period.

A total of 16,991,873 gallons of groundwater were extracted during First Quarter 2018 by the IM-3 treatment facility. The average pumping rate for the IM extraction system during First Quarter 2018, including system downtime, was 131.1 gpm. An estimated 51.5 pounds (23.4 kilograms) of chromium were removed from groundwater during January, February, and March 2018, as presented in Table 4-1. Chromium removal is reported on a different schedule than groundwater extraction (i.e., January-February and January-March, respectively. See Table 1-1 and Table 4-1).

The wells monitored to detect trends in Cr(VI) in the IM pumping area (e.g., MW-36-100, MW-39-100, MW-44-115, MW-44-125, and MW-46-175) generally continue to show overall stable or declining Cr(VI) concentrations relative to prior monitoring results, as shown in Appendix D. The Cr(VI) trends observed in the performance monitoring area during the First Quarter 2018 reporting period are presented and evaluated in Section 4.2.

5 UPCOMING OPERATION AND MONITORING EVENTS

Reporting of the IM extraction and monitoring activities will continue as described in the PMP and under direction from DTSC. The next round of quarterly monitoring results, operations, and performance monitoring data will be reported in the Second Quarter 2018 GMP/PMP Report (planned for submittal by August 15, 2018).

5.1 Groundwater Monitoring Program

5.1.1 Monthly Monitoring

Monthly sampling of TW-03D and PE-01 will continue during the first 2 weeks of each month in coordination with IM-3 staff. Results will be reported in the Second Quarter 2018 GMP/PMP Report.

5.1.2 Quarterly Monitoring

Consistent with the July 23, 2010 DTSC sampling schedule approval (DTSC 2010a), the Second Quarter 2018 groundwater monitoring event is scheduled for late April 2018. This event includes groundwater sampling at 103 wells. Results will be reported in the Second Quarter 2018 GMP/PMP Report.

5.1.3 Well Inspections

Monitoring wells will be inspected during each regularly scheduled sampling event but not less frequently than quarterly (DTSC 2013; CH2M Hill 2005a, 2005b). Necessary repairs will be conducted in a timely manner.

5.2 Surface Water Monitoring Program

The Second Quarter 2018 surface water monitoring event is planned for late May 2018 at 25 locations in the RMP monitoring network. Results will be reported in the Second Quarter 2018 GMP/PMP Report.

5.3 Performance Monitoring Program

5.3.1 Extraction

The IM-3 extraction system will continue operating in compliance with the DTSC letter dated July 20, 2015 (DTSC 2015) giving conditional approval for PE-01 pumping modifications. PG&E will continue to operate both TW-03D and PE-01 (as needed) with a target combined pumping rate of 135 gpm, except for periods of planned or unplanned downtime, to maintain appropriate hydraulic gradients across the Alluvial Aquifer. Extraction will be primarily from TW-03D, coupled with PE-01 only if needed to maintain gradient control during low river stages. If TW-03D and PE-01 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.

In First Quarter 2018, PE-01 was not run to help maintain groundwater gradients. When PE-01 is shut off, pumping can be supplemented as needed by TW-02D to maintain total flow. During Second Quarter 2018, hydraulic gradients will continue to be monitored at key well pairs to ensure that 0.001 ft/ft landward gradients are met.

5.3.2 PMP Monitoring and Notifications

Quarterly GMP monitoring results from IMCP wells will continue to be compared to their respective Cr(VI) trigger levels. If any exceedances are observed, a notification process will be initiated as outlined in the Revised Contingency Plan Flow Chart (Figure 1, PG&E 2008).

Quarterly GMP monitoring results from wells listed in the July 20, 2015 DTSC approval letter for conditional PE-01 shutoff (DTSC 2015) will continue to be compared to maximum Cr(VI) and total dissolved chromium concentrations measured in 2014 (or for biennial sampling frequency, the 2013 maximum concentrations), and results that exceed the previous maximum will be reported to DTSC within 40 days after the end of the quarterly GMP sampling event.

The IM hydraulic monitoring network (shown on Figure 1-4) will continue to be used to evaluate the performance of the IM and demonstrate compliance of required hydraulic gradients.

5.3.3 Transducer Downloads

Downloads of the transducers in the key gradient control wells (MW-27-085, MW-31-135, MW-33-150, MW-34-100, MW-45-095, and MW-20-130) will continue during Second Quarter 2018 via telemetry at monthly or more frequent intervals, as needed, to support IM-3 pumping operations. Downloads of the remainder of the transducers will continue to occur monthly during the first 2 weeks of each month during Second Quarter 2018.

5.3.4 Monthly IM-3 Updates

As requested at the July 2015 Consultative Working Group (CWG) meeting, monthly IM-3 hydraulic performance data continue to be shared with agencies, Tribes, and stakeholders (i.e., CH2M 2018). The monthly data snapshot for March 2018 was submitted April 16, 2018.

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TABLES

Table 1-1

Topock Monitoring Reporting Schedule

First Quarter 2018 Interim Measures Performance Monitoring and
Site-wide Groundwater and Surface Water Monitoring Report,
PG&E Topock Compressor Station, Needles, California

Time Period	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Groundwater Monitoring Program	January - March	April - June	July - October	November - December
Surface Water Monitoring Program	January - March	April - June	July - October	November - December
Performance Monitoring Program	January - March	April - June	July - October	November - December
IM-3 Monitoring (Chromium removed)	January - February	March - May	June - September	October - December

Table 3-1

Groundwater Sampling Results, January 2017 through March 2018

First Quarter 2018 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 Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)	Total Chromium (µg/L)	Specific Conductance (µS/cm)	Selected Field Parameters: ORP (mV)	Selected Field Parameters: Field pH	Selected Field Parameters: Turbidity
MW-09	SA	2/9/2017		LF	160	150	---	---	-65	7.5	9
MW-09	SA	5/3/2017		LF	160	140	---	---	3.3	8.0	7
MW-09	SA	12/7/2017		LF	150	140	---	2,500	8.8	7.5	5
MW-09	SA	2/23/2018		LF	150	150	---	---	-140	7.5	5
MW-10	SA	2/9/2017		LF	160	150	---	---	-34	7.4	20
MW-10	SA	5/3/2017		LF	190	200	---	---	3.4	8.0	41
MW-10	SA	12/7/2017		LF	130	130	---	2,000	-2.1	7.4	28
MW-10	SA	12/7/2017	FD	LF	130	120	---	2,000	---	---	---
MW-10	SA	2/23/2018		LF	160	160	---	---	-130	7.5	10
MW-11	SA	2/9/2017		LF	60	60	---	---	-35	7.5	4
MW-11	SA	5/3/2017		LF	67	61	---	---	61	7.5	9
MW-11	SA	12/7/2017		LF	64	61	---	2,000	-0.10	7.5	33
MW-11	SA	2/23/2018		LF	57	56	---	---	28	7.5	5
MW-12	SA	5/1/2017		LF	1,900	2,000	---	---	-35	8.4	38
MW-12	SA	12/11/2017		LF	1,800	2,100	---	7,200	68	8.1	6
MW-13	SA	12/8/2017		LF	12	93	---	2,100	-28	7.5	47
MW-14	SA	5/1/2017		LF	13	13	---	---	67	7.6	21
MW-14	SA	5/1/2017	FD	3V	13	13	---	---	---	---	---
MW-14	SA	12/13/2017		LF	12	13	---	2,500	73	7.6	32
MW-15	SA	12/12/2017		LF	11	14	---	1,600	160	7.3	7
MW-16	SA	12/12/2017		LF	11	21	---	1,000	140	7.6	9
MW-17	SA	12/12/2017		LF	11	12	---	1,200	150	7.6	2
MW-18	SA	12/12/2017		LF	20	23	---	1,300	140	7.2	2
MW-19	SA	4/28/2017		LF	440	430	---	---	37	8.0	9
MW-19	SA	12/8/2017		LF	340	340	---	1,800	170	7.7	10
MW-20-070	SA	4/27/2017		LF	1,800	1,900	---	---	12	8.1	5
MW-20-070	SA	12/7/2017		LF	1,800	1,900	---	1,700	-6.4	7.7	6
MW-20-100	MA	4/27/2017		LF	2,000	2,100	---	---	15	7.8	9
MW-20-100	MA	12/8/2017		LF	1,500	1,400	---	1,800	13	7.4	10

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Groundwater Sampling Results, January 2017 through March 2018

First Quarter 2018 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 Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)	Total Chromium (µg/L)	Specific Conductance (µS/cm)	Selected Field Parameters ORP (mV)	Field pH	Turbidity
MW-20-100	MA	12/8/2017	FD	LF	1,500	1,400	---	1,800	---	---	---
MW-20-130	DA	4/27/2017		LF	7,300	8,000	---	---	-9.7	7.8	5
MW-20-130	DA	4/27/2017	FD	LF	7,400	7,600	---	---	---	---	---
MW-20-130	DA	12/7/2017		LF	4,100	4,400	---	7,100	35	7.3	5
MW-21	SA	5/3/2017		3V	2.1	2.7	---	---	150	7.2	10
MW-21	SA	12/12/2017		LF	2.3	2.7	---	14,000	83	7.4	12
MW-22	SA	4/28/2017		LF	ND (1)	ND (1)	---	---	-96	6.9	23
MW-22	SA	12/6/2017		LF	ND (1)	ND (1)	---	22,000	-59	6.8	41
MW-23-060	BR	4/28/2017		LF	38	34	---	---	-66	9.3	37
MW-23-060	BR	12/8/2017		LF	40	35	---	12,000	110	9.6	3
MW-23-080	BR	4/28/2017		LF	1.2	ND (1)	---	---	-180	10	4
MW-23-080	BR	12/8/2017		LF	1.5	1.9	---	12,000	54	10	4
MW-24A	SA	5/3/2017		LF	ND (0.2)	ND (1)	---	---	-210	8.4	2
MW-24A	SA	12/7/2017		LF	ND (0.2)	2.7 J	---	1,400	-30	8.3	7
MW-24A	SA	12/7/2017	FD	LF	ND (0.2)	8.7 J	---	1,400	---	---	---
MW-24B	DA	5/3/2017		LF	230	220	---	---	-66	7.8	3
MW-24B	DA	5/3/2017	FD	LF	230	210	---	---	---	---	---
MW-24B	DA	12/7/2017		LF	250	250	---	14,000	-59	7.8	2
MW-24BR	BR	12/8/2017		3V	ND (1)	ND (1)	---	11,000	-260	8.1	1
MW-25	SA	5/1/2017		LF	76	74	---	---	95	7.3	6
MW-25	SA	12/8/2017		LF	91	90	---	1,600	190	7.4	13
MW-26	SA	4/26/2017		LF	2,300	2,600	---	---	---	---	---
MW-26	SA	12/11/2017		LF	2,300	2,600	---	3,800	76	7.4	16
MW-26	SA	12/11/2017	FD	LF	2,400	2,500	---	3,800	---	---	---
MW-27-020	SA	12/4/2017		LF	ND (0.2)	ND (1)	---	1,000	46	7.7	4
MW-27-060	MA	12/4/2017		LF	ND (0.2)	ND (1)	---	990	-120	7.8	3
MW-27-085	DA	4/28/2017		LF	ND (1)	ND (1)	---	---	-87	7.4	2
MW-27-085	DA	4/28/2017	FD	LF	ND (1)	ND (1)	---	---	---	---	---
MW-27-085	DA	12/4/2017		LF	ND (1)	ND (1)	---	10,000	-32	7.3	2

Table 3-1

Groundwater Sampling Results, January 2017 through March 2018

First Quarter 2018 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 Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)	Total Chromium (µg/L)	Specific Conductance (µS/cm)	Selected Field Parameters: ORP (mV)	Field pH	Turbidity
MW-28-025	SA	4/26/2017		LF	ND (0.2)	ND (1)	---	---	-210	7.4	3
MW-28-025	SA	12/7/2017		LF	ND (0.2)	ND (1)	---	1,000	79	7.5	2
MW-28-090	DA	4/26/2017		LF	ND (0.2)	1.2	---	---	-170	7.1	43
MW-28-090	DA	12/7/2017		LF	ND (0.2)	ND (1)	---	5,400	-56	7.2	8
MW-29	SA	4/26/2017		LF	ND (0.2)	ND (1)	---	---	-180	7.3	4
MW-29	SA	12/7/2017		LF	ND (0.2)	ND (1)	---	1,400	-120	7.4	5
MW-30-030	SA	12/6/2017		LF	1.2	78	---	12,000	-170	7.8	23
MW-30-050	MA	12/6/2017		LF	ND (0.2)	ND (1)	---	950	77	7.8	2
MW-30-050	MA	12/6/2017	FD	LF	ND (0.2)	ND (1)	---	930	---	---	---
MW-31-060	SA	4/27/2017		LF	390	430	---	---	11	7.9	5
MW-31-060	SA	4/27/2017	FD	LF	400	430	---	---	---	---	---
MW-31-060	SA	12/12/2017		LF	390	410	---	2,900	150	7.1	2
MW-31-135	DA	12/12/2017		LF	13	13	---	11,000	69	7.3	3
MW-31-135	DA	12/12/2017	FD	LF	13	13	---	11,000	---	---	---
MW-32-020	SA	12/4/2017		LF	ND (1)	ND (5)	---	30,000	-130	7.1	5
MW-32-035	SA	4/27/2017		LF	ND (1)	ND (1)	---	---	-150	7.4	38
MW-32-035	SA	12/4/2017		LF	ND (1)	ND (1)	---	9,200	-120	7.3	4
MW-33-040	SA	4/26/2017		LF	ND (0.2)	ND (1)	---	---	200	8.0	32
MW-33-040	SA	12/7/2017		LF	ND (1)	1.7	---	11,000	180	8.0	25
MW-33-090	MA	4/26/2017		LF	5	4.9	---	---	170	7.1	4
MW-33-090	MA	12/7/2017		LF	5.5	5	---	7,700	200	7.5	2
MW-33-150	DA	4/26/2017		LF	6.2	5.6	---	---	140	7.5	3.6
MW-33-150	DA	4/26/2017	FD	LF	5.9	5.5	---	---	---	---	---
MW-33-150	DA	12/7/2017		LF	7	7.2	---	12,000	46	7.4	5
MW-33-210	DA	4/26/2017		LF	9.5	8.3	---	---	140	7.4	30
MW-33-210	DA	12/7/2017		LF	14	15	---	14,000	140	7.4	9
MW-34-055	MA	12/6/2017		LF	ND (0.2)	ND (1)	---	920	-62	7.8	5
MW-34-080	DA	4/27/2017		LF	ND (0.2)	ND (1)	---	---	-250	7.4	3.5
MW-34-080	DA	12/6/2017		LF	ND (0.2)	ND (1)	---	7,000	-10	7.3	4

Table 3-1

Groundwater Sampling Results, January 2017 through March 2018

First Quarter 2018 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 Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)	Total Chromium (µg/L)	Specific Conductance (µS/cm)	Selected Field Parameters ORP (mV)	Field pH	Turbidity
MW-34-100	DA	2/6/2017		LF	45	43	---	---	-47	7.8	4
MW-34-100	DA	2/6/2017	FD	LF	44	40	---	---	---	---	---
MW-34-100	DA	4/27/2017		LF	0.67	1.8	---	---	-66	7.4	1
MW-34-100	DA	10/2/2017		LF	ND (1)	ND (1)	---	10,000	-33	7.7	10
MW-34-100	DA	12/6/2017		LF	ND (1)	ND (1)	---	11,000	---	---	---
MW-34-100	DA	2/20/2018		LF	ND (1)	1.5	---	11,000	29	7.7	1
MW-35-060	SA	5/1/2017		LF	21	20	---	---	-28	7.5	31
MW-35-060	SA	12/8/2017		LF	21	20	---	5,300	120	7.4	5
MW-35-135	DA	5/1/2017		LF	25	22	---	---	100	7.7	9
MW-35-135	DA	12/8/2017		LF	29	29	---	8,100	130	7.7	7
MW-36-020	SA	12/6/2017		LF	ND (0.2)	ND (1)	---	4,800	-140	7.6	6
MW-36-040	SA	12/6/2017		LF	ND (0.2)	ND (1)	---	990	-160	7.9	9
MW-36-050	MA	12/6/2017		LF	ND (0.2)	ND (1)	---	970	-85	7.8	2
MW-36-070	MA	12/6/2017		LF	ND (0.2)	ND (1)	---	970	-25	7.7	3
MW-36-090	DA	4/27/2017		LF	ND (0.2)	ND (1)	---	---	-1.0	8.4	1
MW-36-090	DA	12/6/2017		LF	ND (0.2)	ND (1)	---	5,100	-38	7.7	2
MW-36-100	DA	4/27/2017		LF	32	32	---	---	-170	7.4	3.5
MW-36-100	DA	4/27/2017	FD	LF	31	33	---	---	---	---	---
MW-36-100	DA	12/6/2017		LF	12	14	---	7,200	-31	7.5	21
MW-36-100	DA	12/6/2017	FD	LF	12	15	---	7,200	---	---	---
MW-37D	DA	5/1/2017		LF	6.6	6.3	---	---	3.9	7.7	7
MW-37D	DA	12/8/2017		LF	5	6.4	---	11,000	-56	7.8	6
MW-37S	MA	12/8/2017		LF	12	12	---	5,300	-46	7.7	21
MW-38D	DA	5/3/2017		3V	17	15	---	---	-65	8.4	3
MW-38D	DA	5/3/2017		LF	16	14	---	---	-120	8.4	50
MW-38D	DA	12/7/2017		3V	21	18	---	16,000	-46	7.9	21
MW-38D	DA	12/7/2017		LF	20	18	---	16,000	-50	8.3	46
MW-38S	SA	2/9/2017		3V	3.8	3.6	---	---	-120	8.0	3
MW-38S	SA	2/9/2017		LF	0.57	ND (1)	---	---	-100	8.0	4

Table 3-1

Groundwater Sampling Results, January 2017 through March 2018

First Quarter 2018 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 Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)	Total Chromium (µg/L)	Specific Conductance (µS/cm)	Selected Field Parameters: ORP (mV)	Field pH	Turbidity
MW-38S	SA	5/3/2017		3V	1.2	1.2	---	---	-48	8.4	4
MW-38S	SA	5/3/2017		LF	0.34	ND (1)	---	---	-25	8.4	9
MW-38S	SA	9/26/2017		3V	3.8 J	4.2	---	1,500	-160	7.9	19
MW-38S	SA	9/26/2017		LF	3.1	3.6	---	1,500	-200	8.0	19
MW-38S	SA	9/26/2017	FD	LF	3.1 J	3.6	---	1,500	---	---	---
MW-38S	SA	12/7/2017		3V	2.9	3.1	---	1,400	-24	7.9	1
MW-38S	SA	12/7/2017		LF	2.3	2.5	---	1,400	-36	7.9	2
MW-38S	SA	2/23/2018		3V	2.8	2.4	---	1,700	-51	8.0	5
MW-38S	SA	2/23/2018		LF	2.8	2.5	---	1,700	-31	8.0	6
MW-39-040	SA	12/5/2017		LF	ND (0.2)	ND (1)	---	1,100	-190	8.2	38
MW-39-040	SA	12/5/2017	FD	LF	ND (0.2)	ND (1)	---	1,100	---	---	---
MW-39-050	MA	12/5/2017		LF	ND (0.2)	ND (1)	---	1,000	-54	7.6	3
MW-39-060	MA	12/5/2017		LF	ND (0.2)	1.8	---	1,100	-63	7.9	2
MW-39-070	MA	12/5/2017		LF	ND (0.2)	ND (1)	---	1,700	7.0	7.8	2
MW-39-080	DA	12/5/2017		LF	0.26	1.2	---	5,000	-78	7.5	4
MW-39-100	DA	4/27/2017		LF	71	67	---	---	-220	6.9	2
MW-39-100	DA	12/5/2017		LF	71	66	---	12,000	91	6.9	5
MW-41D	DA	5/1/2017		LF	ND (1)	ND (5)	---	---	69	7.7	1
MW-41D	DA	12/13/2017		LF	ND (1)	ND (1)	---	19,000	-60	7.2	2
MW-41D	DA	12/13/2017	FD	LF	ND (1)	1.2	---	19,000	---	---	---
MW-41M	DA	12/13/2017		LF	9.3	14	---	13,000	3.5	7.1	9
MW-41S	SA	12/13/2017		LF	12	12	---	5,600	31	7.8	36
MW-42-030	SA	12/4/2017		LF	ND (0.2)	ND (1)	---	2,800	-180	8.0	9
MW-42-030	SA	12/4/2017	FD	LF	ND (0.2)	ND (1)	---	2,800	---	---	---
MW-42-055	MA	4/28/2017		LF	ND (0.2)	1.3	---	---	-110	8.7	7
MW-42-055	MA	12/4/2017		LF	ND (0.2)	1.3	---	1,100	-99	8.6	4
MW-42-065	MA	4/28/2017		LF	ND (0.2)	ND (1)	---	---	92	7.4	8
MW-42-065	MA	12/4/2017		LF	ND (0.2)	ND (1)	---	2,700	59	7.9	2
MW-43-025	SA	12/5/2017		LF	ND (0.2)	ND (1)	---	1,200	-150	7.6	2

Table 3-1

Groundwater Sampling Results, January 2017 through March 2018

First Quarter 2018 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 Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)	Total Chromium (µg/L)	Specific Conductance (µS/cm)	Selected Field Parameters: ORP (mV)	Field pH	Turbidity
MW-43-075	DA	12/5/2017		LF	ND (1)	ND (1)	---	9,900	-120	7.2	5
MW-43-090	DA	12/5/2017		LF	ND (1)	ND (1)	---	15,000	-68	7.2	7
MW-44-070	MA	4/27/2017		3V	ND (0.2)	ND (1)	---	---	140	7.4	3
MW-44-070	MA	12/6/2017		LF	ND (0.2)	ND (1)	---	1,400	-130	7.6	30
MW-44-115	DA	2/6/2017		LF	18	16	---	---	-62	7.9	5
MW-44-115	DA	4/27/2017		LF	21	19	---	---	140	8.1	5
MW-44-115	DA	10/2/2017		LF	15	13	---	12,000	52	8.1	8
MW-44-115	DA	12/6/2017		LF	14	13	---	9,800	---	---	---
MW-44-115	DA	2/20/2018		LF	13	12	---	11,000	42	8.0	3
MW-44-115	DA	2/20/2018	FD	LF	13	12	---	11,000	---	---	---
MW-44-125	DA	4/27/2017		LF	ND (0.2)	ND (1)	---	---	140	7.5	2
MW-44-125	DA	12/6/2017		LF	2.9	4.8	---	11,000	-52	7.9	4
MW-46-175	DA	2/7/2017		LF	21	18	---	---	-26	8.4	5
MW-46-175	DA	4/26/2017		LF	10	9.7	---	---	230	8.2	44
MW-46-175	DA	10/2/2017		LF	7.9	7.2	---	19,000	90	8.4	9
MW-46-175	DA	12/7/2017		LF	11	11	---	14,000	---	---	---
MW-46-175	DA	2/20/2018		LF	13	12	---	18,000	51	8.4	2
MW-46-205	DA	4/26/2017		LF	1.2	1.1	---	---	210	8.4	5
MW-46-205	DA	12/7/2017		3V	ND (1)	ND (1)	---	17,000	140	8.5	2
MW-47-055	SA	4/26/2017		LF	15	15	---	---	-31	7.4	47
MW-47-055	SA	4/26/2017	FD	LF	15	15	---	---	---	---	---
MW-47-055	SA	12/7/2017		LF	18	20	---	3,600	99	7.7	11
MW-47-055	SA	12/7/2017	FD	LF	19	20	---	3,600	---	---	---
MW-47-115	DA	4/26/2017		LF	23	22	---	---	-110	7.4	9
MW-47-115	DA	12/7/2017		LF	18	16	---	10,000	59	7.5	9
MW-48	BR	5/3/2017		G	ND (1)	ND (1)	---	---	30	8.0	11
MW-48	BR	12/13/2017		LF	ND (1)	ND (1)	---	16,000	82	8.0	9
MW-49-135	DA	12/7/2017		3V	2.9	2.7	---	10,000	-39	7.8	9
MW-49-275	DA	12/7/2017		LF	ND (1)	3.5	---	18,000	-130	8.2	1

Table 3-1

Groundwater Sampling Results, January 2017 through March 2018

First Quarter 2018 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 Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)	Total Chromium (µg/L)	Specific Conductance (µS/cm)	Selected Field Parameters: ORP (mV)	Field pH	Turbidity
MW-49-365	DA	12/7/2017		LF	ND (1)	ND (1)	---	25,000	-110	7.7	1
MW-50-095	MA	4/28/2017		LF	10	10	---	---	30	8.3	8
MW-50-095	MA	12/8/2017		LF	13	14	---	4,500	100	8.0	11
MW-50-200	DA	4/28/2017		LF	7,000	7,400	---	---	39	8.2	37
MW-50-200	DA	12/8/2017		LF	4,100	4,300	---	15,000	170	7.9	42
MW-51	MA	4/26/2017		LF	4,000	4,100	---	---	-59	7.7	10
MW-51	MA	4/26/2017	FD	LF	4,000	4,200	---	---	---	---	---
MW-51	MA	12/11/2017		LF	3,700	4,100	---	12,000	66	7.5	3
MW-52D	DA	4/27/2017		LF	ND (1)	ND (5)	---	---	-230	7.8	1
MW-52D	DA	12/5/2017		LF	ND (1)	ND (1)	---	19,000	-92	7.5	2
MW-52M	DA	4/27/2017		LF	ND (1)	ND (1)	---	---	-190	6.6	2
MW-52M	DA	12/5/2017		LF	ND (1)	ND (1)	---	14,000	-69	6.8	3
MW-52M	DA	12/5/2017	FD	LF	ND (1)	ND (1)	---	14,000	---	---	---
MW-52S	MA	4/27/2017		LF	ND (1)	ND (1)	---	---	-210	6.9	2
MW-52S	MA	12/5/2017		LF	ND (1)	ND (1)	---	8,800	-80	6.9	7
MW-53D	DA	4/27/2017		LF	ND (1)	ND (1)	---	---	-130	7.8	2
MW-53D	DA	4/27/2017	FD	LF	ND (1)	ND (5)	---	---	---	---	---
MW-53D	DA	12/5/2017		LF	ND (1)	ND (5)	---	24,000	-100	7.4	2
MW-53M	DA	4/27/2017		LF	ND (1)	ND (5)	---	---	-240	7.9	2
MW-53M	DA	12/5/2017		LF	ND (0.2)	ND (1)	---	13,000	-140	7.8	2
MW-54-085	DA	5/4/2017	(a)	LF	ND (0.2)	ND (1)	---	---	-77	8.1	4
MW-54-085	DA	12/13/2017	(a)	LF	ND (1)	ND (1)	---	9,530	-55	7.6	9
MW-54-140	DA	5/4/2017	(a)	LF	ND (0.2)	ND (1)	---	---	-14	8.2	3
MW-54-140	DA	12/13/2017	(a)	LF	ND (1)	ND (1)	---	12,800	-80	7.9	10
MW-54-195	DA	5/4/2017	(a)	3V	ND (1)	ND (1)	---	---	-220	8.2	1
MW-54-195	DA	12/13/2017	(a)	LF	ND (1)	1.2	---	21,400	-160	7.6	4
MW-55-045	MA	5/2/2017	(a)	LF	ND (0.2)	ND (1)	---	---	-130	7.8	6
MW-55-045	MA	12/13/2017	(a)	LF	ND (0.2)	ND (1)	---	1,370	-110	7.9	8
MW-55-120	DA	2/10/2017	(a)	LF	7.5	8.3	---	---	-130	8.1	5

Table 3-1

Groundwater Sampling Results, January 2017 through March 2018

First Quarter 2018 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 Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)	Total Chromium (µg/L)	Specific Conductance (µS/cm)	Selected Field Parameters: ORP (mV)	Field pH	Turbidity
MW-55-120	DA	2/10/2017	FD(a)	LF	7.33	8.28	---	---	---	---	---
MW-55-120	DA	5/2/2017	(a)	LF	8.1	8.2	---	---	-1.2	8.0	8
MW-55-120	DA	12/13/2017	(a)	LF	7.11	9.03	---	8,160	78	7.5	4
MW-56D	DA	5/4/2017	(a)	LF	ND (1)	ND (1)	---	---	-160	7.3	1
MW-56D	DA	12/13/2017	(a)	LF	ND (1)	ND (1)	---	21,100	-41	6.9	2
MW-56M	DA	5/4/2017	(a)	LF	ND (1)	ND (1)	---	---	-110	7.2	1
MW-56M	DA	12/13/2017	(a)	LF	ND (1)	ND (1)	---	12,900	-97	7.2	2
MW-56S	SA	5/4/2017	(a)	LF	ND (0.2)	ND (1)	---	---	-110	7.6	7
MW-56S	SA	12/13/2017	(a)	LF	ND (0.2)	ND (1)	---	5,060	-120	6.9	2
MW-57-070	BR	5/1/2017		LF	350	340	---	---	-6.3	7.3	27
MW-57-070	BR	12/11/2017		LF	420	430	---	2,400	-96	7.2	20
MW-57-185	BR	5/1/2017		3V	5.9	5.2	---	---	-47	9.4	2
MW-57-185	BR	12/11/2017		3V	8.2	7.4	---	18,000	41	9.5	21
MW-57-185	BR	12/11/2017		LF	3.1	3.3	---	16,000	100	11	25
MW-58BR	BR	2/7/2017		LF	4.3	4	---	---	-24	7.7	4
MW-58BR	BR	5/2/2017		LF	5.4	5.2	---	---	-76	8.1	3
MW-58BR	BR	9/27/2017		LF	42	39	---	8,300	-150	7.5	17
MW-58BR	BR	12/11/2017		LF	39	41	---	7,900	130	8.0	35
MW-58BR	BR	2/19/2018		LF	13	11	---	6,500	140	7.6	1
MW-59-100	SA	5/1/2017		LF	2,500	2,600	---	---	120	7.1	8
MW-59-100	SA	12/7/2017		LF	3,600	3,900	---	10,000	-5.8	7.1	54
MW-60-125	BR	5/2/2017		LF	830	830	---	---	58	7.4	10
MW-60-125	BR	12/6/2017		LF	770	730	---	8,800	-37	7.5	20
MW-60BR-245	BR	2/8/2017		3V	ND (1)	ND (1)	---	---	-110	8.1	40
MW-60BR-245	BR	5/3/2017		3V	39	36	---	---	-200	8.0	1
MW-60BR-245	BR	9/26/2017		3V	ND (1)	ND (1)	---	16,000	-91	6.7	35
MW-60BR-245	BR	12/13/2017		LF	2.3	12	---	16,000	110	8.1	11
MW-60BR-245	BR	12/14/2017		3V	690	830	---	14,000	70	8.2	24
MW-60BR-245	BR	2/21/2018		3V	69	59	---	17,000	45	8.0	2

Table 3-1

Groundwater Sampling Results, January 2017 through March 2018

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PG&E Topock Compressor Station, Needles, California

Location ID	Aquifer Zone	Sample Date		Sample Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)	Total Chromium (µg/L)	Specific Conductance (µS/cm)	Selected Field Parameters ORP (mV)	Field pH	Turbidity
MW-60BR-245	BR	2/21/2018		LF	4.1	39	---	17,000	100	8.0	2
MW-61-110	BR	5/2/2017		3V	370	340	---	---	-23	7.4	5
MW-61-110	BR	12/6/2017		LF	410	380	---	15,000	-42	7.5	16
MW-62-065	BR	2/9/2017		3V	550	560	---	---	-52	7.4	16.5
MW-62-065	BR	5/2/2017		LF	580	590	---	---	62	7.4	4
MW-62-065	BR	9/25/2017		LF	430	520	---	6,200	-57	7.4	25
MW-62-065	BR	9/25/2017	FD	LF	450	500	---	6,100	---	---	---
MW-62-065	BR	12/6/2017		LF	510	500	---	5,800	-25	7.5	20
MW-62-065	BR	2/19/2018		LF	560	510	---	5,100	130	7.4	5
MW-62-065	BR	2/19/2018	FD	LF	550	530	---	5,100	---	---	---
MW-62-110	BR	2/8/2017		3V	0.45	ND (1)	---	---	-140	7.9	31
MW-62-110	BR	5/3/2017		Tap	ND (1)	1.7	---	---	-270	7.6	1
MW-62-110	BR	9/27/2017		Tap	ND (1)	ND (1)	---	11,000	-110	7.2	5
MW-62-110	BR	12/7/2017		Tap	ND (1)	3	---	7,400	-180	7.8	9
MW-62-110	BR	2/21/2018		Tap	ND (1)	ND (1)	---	11,000	64	8.0	10
MW-62-190	BR	5/3/2017		Tap	ND (1)	ND (1)	---	---	-270	7.6	1
MW-62-190	BR	12/7/2017		Tap	ND (1)	ND (1)	---	13,000	-200	7.8	10
MW-62-190	BR	12/7/2017	FD	Tap	ND (1)	ND (1)	---	13,000	---	---	---
MW-63-065	BR	2/9/2017		3V	1.2	1.7	---	---	-77	7.2	9.1
MW-63-065	BR	5/2/2017		LF	1.1	1.5	---	---	61	7.1	6.5
MW-63-065	BR	9/28/2017		LF	1.2	3.3	---	6,600	-28	7.1	19
MW-63-065	BR	12/12/2017		LF	1.2	2.6	---	5,800	73	6.9	6
MW-63-065	BR	2/21/2018		LF	0.53	1.6	---	6,800	110	7.2	7
MW-64BR	BR	2/7/2017		LF	ND (1)	ND (1)	---	---	-48	7.4	18
MW-64BR	BR	5/2/2017		LF	ND (1)	ND (1)	---	---	-110	7.9	24
MW-64BR	BR	9/25/2017		LF	ND (1)	ND (1)	---	13,000	-110	7.3	38
MW-64BR	BR	12/6/2017		LF	ND (1)	ND (1)	---	12,000	-83	7.5	9
MW-64BR	BR	2/19/2018		LF	ND (1)	ND (1)	---	10,000	110	7.5	5
MW-64BR	BR	2/19/2018	FD	LF	ND (1)	ND (1)	---	10,000	---	---	---

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									Selected Field Parameters		
Location ID	Aquifer Zone	Sample Date		Sample Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)	Total Chromium (µg/L)	Specific Conductance (µS/cm)	ORP (mV)	Field pH	Turbidity
MW-65-160	SA	2/8/2017		LF	170	170	---	---	-63	7.2	20
MW-65-160	SA	5/4/2017		LF	99	99	---	---	-69	7.1	5.4
MW-65-160	SA	9/26/2017		LF	120	150	---	3,300	-81	7.0	44
MW-65-160	SA	12/5/2017		LF	160	190	---	3,500	-3.2	7.1	21
MW-65-160	SA	2/22/2018		LF	190	170	---	3,600	12	7.2	2
MW-65-225	DA	2/8/2017		LF	530	550	---	---	-18	7.3	5
MW-65-225	DA	5/4/2017		LF	530	540	---	---	120	7.3	19
MW-65-225	DA	5/4/2017	FD	LF	520	520	---	---	---	---	---
MW-65-225	DA	9/26/2017		LF	480	520	---	7,900	-83	7.2	25
MW-65-225	DA	12/5/2017		LF	210	220	---	13,000	-37	7.6	25
MW-65-225	DA	2/22/2018		LF	510	520	---	7,800	14	7.3	9
MW-66-165	SA	4/25/2017		LF	430	460	---	---	-20	7.7	49
MW-66-165	SA	12/5/2017		LF	500	520	---	3,600	74	7.5	8
MW-66-230	DA	4/25/2017		LF	6,800	7,100	---	---	-110	7.8	4.6
MW-66-230	DA	12/5/2017		LF	6,500	6,900	---	17,000	66	8.1	3
MW-66BR-270	BR	5/4/2017		3V	ND (0.2)	ND (1)	---	---	-290	9.2	20
MW-66BR-270	BR	12/14/2017		3V	ND (0.2)	ND (1)	---	2,900	-160	7.4	23
MW-67-185	SA	5/3/2017		LF	1,600	1,700	---	---	96	7.2	28
MW-67-185	SA	12/4/2017		LF	1,500	1,700	---	7,400	100	7.0	5
MW-67-225	MA	5/4/2017		LF	2,700	3,000	---	---	67	7.5	37
MW-67-225	MA	12/4/2017		LF	3,100	3,100	---	7,200	77	7.5	38
MW-67-260	DA	5/3/2017		LF	440	400	---	---	-150	11	9
MW-67-260	DA	12/4/2017		LF	590	630	---	17,000	-53	11	5
MW-68-180	SA	2/8/2017		LF	35,000	37,000	---	---	0.20	7.5	44
MW-68-180	SA	2/8/2017	FD	LF	36,000	37,000	---	---	---	---	---
MW-68-180	SA	5/3/2017		LF	12,000	12,000	---	---	-120	7.4	7.2
MW-68-180	SA	9/26/2017		LF	20,000	24,000	---	3,700	-60	7.4	44
MW-68-180	SA	2/22/2018		LF	24,000	24,000	---	4,100	29	7.7	7
MW-68-240	DA	5/3/2017		LF	2,100	2,200	---	---	-100	7.3	2

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Location ID	Aquifer Zone	Sample Date		Sample Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)	Total Chromium (µg/L)	Specific Conductance (µS/cm)	Selected Field Parameters: ORP (mV)	Field pH	Turbidity
MW-68-240	DA	2/22/2018		LF	2,100	2,000	---	16,000	23	7.4	6
MW-68BR-280	BR	5/4/2017		3V	ND (1)	ND (5)	---	---	-170	9.1	42
MW-68BR-280	BR	5/4/2017	FD	3V	ND (1)	ND (5)	---	---	---	---	---
MW-68BR-280	BR	2/22/2018		LF	ND (1)	ND (1)	---	20,000	-88	9.9	2
MW-69-195	BR	2/9/2017		LF	180	160	---	---	-47	7.3	5
MW-69-195	BR	5/3/2017		LF	270	270	---	---	110	7.2	7
MW-69-195	BR	9/26/2017		LF	350	360	---	2,900	-69	7.4	23
MW-69-195	BR	12/4/2017		LF	470	440	---	3,500	-5.0	7.3	5
MW-69-195	BR	2/22/2018		LF	120	110	---	3,200	60	7.4	4
MW-70-105	BR	5/2/2017		LF	130	120	---	---	-45	8.2	7
MW-70-105	BR	12/11/2017		LF	160	150	---	3,500	140	7.6	5
MW-70BR-225	BR	5/2/2017		3V	1,800	1,800	---	---	-36	7.9	1
MW-70BR-225	BR	12/11/2017		3V	1,700	1,800	---	13,000	130	7.2	1
MW-70BR-225	BR	12/11/2017		LF	1,400	1,600	---	12,000	180	7.3	9
MW-71-035	SA	5/3/2017		LF	ND (1)	ND (1)	---	---	190	6.8	15
MW-71-035	SA	12/12/2017		LF	ND (1)	1.5	---	15,000	79	7.4	49
MW-72-080	BR	2/7/2017		3V	120	110	---	---	-0.60	7.8	23
MW-72-080	BR	5/2/2017		LF	71	61	---	---	30	7.7	11
MW-72-080	BR	9/28/2017		LF	110	99	---	16,000	-120	7.7	23
MW-72-080	BR	9/28/2017	FD	Tap	110	97	---	16,000	---	---	---
MW-72-080	BR	12/7/2017		LF	94	95	---	12,000	-10	7.7	5
MW-72-080	BR	2/20/2018		LF	90	78	---	15,000	120	7.8	8
MW-72BR-200	BR	2/8/2017		3V	6.1	6.7	---	---	-110	8.3	35
MW-72BR-200	BR	5/2/2017		3V	2.9	2.6	---	---	-170	8.2	5
MW-72BR-200	BR	9/27/2017		3V	3.8	3.6	---	16,000	-230	8.3	15
MW-72BR-200	BR	12/6/2017		3V	4.2	3.8	---	15,000	-170	8.2	1
MW-72BR-200	BR	12/6/2017		LF	1.5	1.7	---	15,000	-170	8.2	9
MW-72BR-200	BR	2/20/2018		3V	4.5	4.4	---	15,000	100	8.3	1
MW-72BR-200	BR	2/20/2018		LF	1.6	2.1	---	15,000	90	8.3	5

Table 3-1

Groundwater Sampling Results, January 2017 through March 2018

First Quarter 2018 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 Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)	Total Chromium (µg/L)	Specific Conductance (µS/cm)	Selected Field Parameters ORP (mV)	Field pH	Turbidity
MW-73-080	BR	2/8/2017		3V	31	29	---	---	-70	7.5	20
MW-73-080	BR	5/2/2017		LF	30	27	---	---	59	7.3	15
MW-73-080	BR	9/27/2017		LF	41	41	---	12,000	-64	7.3	17
MW-73-080	BR	12/6/2017		LF	28	29	---	11,000	-35	7.4	34
MW-73-080	BR	2/20/2018		LF	22	21	---	10,000	110	7.4	6
MW-74-240	BR	4/27/2017		LF	ND (0.2)	ND (1)	---	---	-21	8.8	9
MW-74-240	BR	12/6/2017		LF	ND (0.2)	5.3	---	860	-18	8.3	80
OW-03D	DA	12/8/2017		LF	7.9	8.1	---	7,200	72	7.5	2
OW-03D	DA	12/8/2017	FD	LF	7.9	8.4	---	7,100	---	---	---
OW-03M	MA	12/8/2017		LF	16	16	---	5,200	85	8.0	3
OW-03S	SA	12/8/2017		LF	18	18	---	1,300	75	7.7	2
PE-01	DA	1/4/2017		Tap	ND (0.2)	ND (1)	---	4,500	---	---	---
PE-01	DA	2/7/2017		Tap	1.9	1.8	---	4,600	-9.6	7.7	24
PE-01	DA	2/7/2017	FD	Tap	1.9	1.9	---	4,500	---	---	---
PE-01	DA	3/8/2017		Tap	1.7	2.1	---	4,300	70	7.8	4.39
PE-01	DA	4/25/2017		Tap	0.53	ND (1)	---	3,900	---	---	---
PE-01	DA	5/4/2017		Tap	ND (0.2)	ND (1)	---	4,100	---	---	---
PE-01	DA	6/7/2017		Tap	ND (0.2)	ND (1)	---	4,500	210	7.5	3
PE-01	DA	7/18/2017		Tap	ND (0.2)	ND (1)	---	4,000	-44	7.8	12
PE-01	DA	8/2/2017		Tap	ND (0.2)	ND (1)	---	3,900	73	7.3	2
PE-01	DA	9/7/2017		Tap	9	4.5	---	4,300	---	---	---
PE-01	DA	10/3/2017		Tap	ND (0.2)	ND (1)	---	3,200	---	---	---
PE-01	DA	11/2/2017		Tap	0.52	ND (1)	---	4,800	110	7.3	3
PE-01	DA	12/7/2017		Tap	ND (0.2)	ND (1)	---	3,700	-54	7.3	10
PE-01	DA	1/4/2018		Tap	ND (0.2)	ND (1)	---	1,400	-140	8.0	8
PE-01	DA	2/7/2018		Tap	0.7	ND (1)	---	4,100	-91	7.0	8.13
PE-01	DA	3/7/2018		Tap	2.3	2	---	4,200	---	---	---
PGE-07BR	BR	12/8/2017		3V	ND (1)	ND (5)	---	14,000	-230	7.0	20
PGE-08	BR	12/14/2017		3V	ND (1)	ND (1)	---	17,000	-85	8.4	9

Table 3-1

Groundwater Sampling Results, January 2017 through March 2018

First Quarter 2018 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 Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)	Total Chromium (µg/L)	Specific Conductance (µS/cm)	Selected Field Parameters: ORP (mV)	Field pH	Turbidity
PM-03	---	12/14/2017		Tap	9.4	9.6	10	1,300	---	---	---
PM-04	---	12/14/2017		Tap	18	18	18	2,000	---	---	---
PM-04	---	12/14/2017	FD	Tap	18	18	18	2,000	---	---	---
R-28	0	1/24/2017		G	ND (0.2)	ND (1)	---	970	-48	8.6	8
R-28	0	2/21/2017		G	ND (0.2)	ND (1)	---	940	53	8.6	8
R-28	0	5/11/2017		G	ND (0.2)	ND (1)	---	950	-21	8.2	3
R-28	0	8/16/2017		G	ND (0.2)	ND (1)	---	980	100	8.0	3
R-28	0	11/15/2017		G	ND (0.2)	ND (1)	---	1,000	120	8.3	2
R-28	0	1/3/2018		G	ND (0.2)	ND (1)	---	940	190	8.3	2
R-28	0	2/21/2018		G	ND (0.2)	ND (1)	---	960	140	8.6	2
TW-01	SA	5/3/2017		LF	2,200	2,400	---	---	110	7.5	1
TW-01	SA	12/13/2017		3V	2,200	2,300	---	7,100	-77	7.3	4
TW-01	SA	12/13/2017	FD	LF	2,200	2,400	---	7,000	---	---	---
TW-02D	DA	3/8/2017		Tap	0.44	110	---	5,900	---	---	---
TW-02D	DA	4/28/2017		Tap	530	540	---	7,600	16	8.0	10
TW-02D	DA	4/28/2017	FD	Tap	520	530	---	7,500	---	---	---
TW-02D	DA	10/24/2017		Tap	200	190	---	3,700	160	7.3	9
TW-02D	DA	12/7/2017		Tap	110	93	---	4,800	---	---	---
TW-02D	DA	2/23/2018		LF	140	140	---	5,200	15	7.7	8
TW-02D	DA	2/23/2018	FD	LF	150	140	---	5,400	---	---	---
TW-02S	SA	12/7/2017		Tap	250	260	---	2,000	-44	7.2	9
TW-03D	DA	1/4/2017		Tap	620	620	---	7,800	---	---	---
TW-03D	DA	2/7/2017		Tap	600	630	---	7,800	-3.7	7.4	9
TW-03D	DA	3/8/2017		Tap	560	630	---	7,600	---	---	---
TW-03D	DA	3/8/2017	FD	Tap	570	580	---	7,800	---	---	---
TW-03D	DA	5/4/2017		Tap	550	540	---	7,600	140	7.3	2
TW-03D	DA	6/7/2017		Tap	550	550	---	7,800	79	7.2	3
TW-03D	DA	7/18/2017		Tap	560	570	---	7,400	-40	7.9	18
TW-03D	DA	8/2/2017		Tap	540	520	---	7,300	89	7.9	18

Table 3-1

Groundwater Sampling Results, January 2017 through March 2018

First Quarter 2018 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 Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)	Total Chromium (µg/L)	Specific Conductance (µS/cm)	Selected Field Parameters: ORP (mV)	Field pH	Turbidity
TW-03D	DA	9/7/2017	Tap	550	540	---	7,300	---	---	---
TW-03D	DA	10/3/2017	Tap	560	580	---	7,500	---	---	---
TW-03D	DA	11/2/2017	Tap	550	570	---	7,600	100	7.3	2
TW-03D	DA	12/7/2017	Tap	550	570	---	6,100	-34	7.1	26
TW-03D	DA	1/4/2018	Tap	550	590	---	7,600	-130	7.9	5
TW-03D	DA	2/7/2018	Tap	550	540	---	7,300	-99	7.1	12.7
TW-03D	DA	3/7/2018	Tap	530	520	---	7,800	---	---	---
TW-04	DA	12/14/2017	3V	8.2	8.3	---	19,000	94	8.1	9
TW-04	DA	12/14/2017	LF	2.8	4	---	22,000	150	8.2	44
TW-05	DA	12/14/2017	3V	14	12	---	12,000	41	7.3	1
TW-05	DA	12/14/2017	LF	10	13	---	12,000	3.5	7.4	9

Notes:

(a) = ADHS approved lab
--- = data were either not collected, not available or were rejected
ADHS = Arizona Department of Health Services
FD = field duplicate sample.
J = concentration or reporting limit (RL) estimated by laboratory or data validation.
mV = millivolts.
ND = not detected at listed RL.
ORP = oxidation-reduction potential.
RL = reporting limit.
UF = unfiltered.
µg/L = micrograms per liter.
µS/cm = microSiemens per centimeter.

Sample Methods:
3V = three volume.
Flute = flexible liner underground technologies sampling system.

Table 3-1

Groundwater Sampling Results, January 2017 through March 2018

First Quarter 2018 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 Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)	Total Chromium (µg/L)	Specific Conductance (µS/cm)	Selected Field Parameters: ORP (mV)	Selected Field Parameters: Field pH	Selected Field Parameters: Turbidity

G = Grab sample.
H = HydraSleeve
LF = Low Flow (minimal drawdown)
Slant = slant (non vertical) wells MW-52, MW-53, MW-56 are sampled from dedicated Barcad screens, using a peristaltic pump.
SS = System Sample
Tap = sampled from tap or port of extraction or supply well.

Wells are assigned to separate aquifer zones for results reporting:
SA = shallow interval of Alluvial Aquifer.
MA = mid-depth interval of Alluvial Aquifer.
DA = deep interval of Alluvial Aquifer.
PA = perched aquifer (unsaturated zone).
BR = well completed in bedrock (Miocene Conglomerate or pre-Tertiary crystalline rock).

Beginning February 1, 2008, hexavalent chromium samples are field-filtered per DTSC-approved change from analysis Method SW7199 to E218.6.

The RLs for certain hexavalent chromium results from Method E218.6 analyses have been elevated above the standard RL of 0.2 ug/L due to required sample dilution to accommodate matrix interferences.

Starting in Third Quarter 2014, the groundwater sample collection method was switched from the traditional three-volume purge method (3V) to the low flow (LF) method at many short screen wells screened in alluvial sediments. The method for purging prior to sample collection is indicated in the sample method column of this table.

ORP is reported to two significant figures. Specific conductance is reported to three significant figures.

Table 3-2

Groundwater COPCs and In Situ Byproducts Sampling Results, First Quarter 2018

First Quarter 2018 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 Method	Arsenic Dissolved (µg/L)	Molybdenum Dissolved (µg/L)	Selenium Dissolved (µg/L)	Manganese Dissolved (µg/L)	Nitrate as N (mg/L)
MW-09	SA	2/23/2018		LF	1.6	4.2	5.1	ND (0.5)	12
MW-10	SA	2/23/2018		LF	--	22	6.3	--	11
MW-11	SA	2/23/2018		LF	1.4	4.7	5.2	ND (0.5)	5.3
MW-34-100	DA	2/20/2018		LF	1.2	49	ND (0.5)	120	ND (0.05)
MW-38S	SA	2/23/2018		3V	6.8	32	2.3	37	3.7 J
MW-38S	SA	2/23/2018		LF	6.9	34	2.5	36	3.3
MW-44-115	DA	2/20/2018		LF	5.7	84	ND (0.5)	5.7	0.084
MW-44-115	DA	2/20/2018	FD	LF	5.6	83	ND (0.5)	6	0.061
MW-46-175	DA	2/20/2018		LF	--	190	0.85	--	1.2
MW-58BR	BR	2/19/2018		LF	1.7	24	2.1	290	1
MW-60BR-245	BR	2/21/2018		3V	7.6	57	2.8	11	0.17
MW-60BR-245	BR	2/21/2018		LF	4.6	58	2.7	22	0.21
MW-62-065	BR	2/19/2018		LF	1.6	14	4	1.5	4.6
MW-62-065	BR	2/19/2018	FD	LF	1.6	14	3.8	1.8	4.7
MW-62-110	BR	2/21/2018		Tap	6.7	66	ND (2.5)	120	ND (0.05)
MW-63-065	BR	2/21/2018		LF	1.5	20	0.69	35	0.87
MW-64BR	BR	2/19/2018		LF	4.3	67	ND (0.5)	1,100	ND (0.05)
MW-64BR	BR	2/19/2018	FD	LF	4.1	66	ND (0.5)	1,100	ND (0.05)
MW-65-160	SA	2/22/2018		LF	0.8	62	8.5	48	12
MW-65-225	DA	2/22/2018		LF	2.1	29	7.7	6.3	9.2
MW-68-180	SA	2/22/2018		LF	2.7	42	13	1	20
MW-68-240	DA	2/22/2018		LF	1.7	23	4	24	4
MW-68BR-280	BR	2/22/2018		LF	0.89	41	ND (0.5)	22	0.052
MW-69-195	BR	2/22/2018		LF	2.1	67	11	3.3	14
MW-72BR-200	BR	2/20/2018		3V	15	80	ND (0.5)	13	0.11
MW-72BR-200	BR	2/20/2018		LF	15	78	ND (2.5)	59	0.093
MW-73-080	BR	2/20/2018		LF	1.7	27	4.2	4.9	3.4
PE-01	DA	1/4/2018		Tap	--	--	--	280	0.097
PE-01	DA	2/7/2018		Tap	--	--	--	74	0.25
PE-01	DA	3/7/2018		Tap	--	--	--	5.1	0.28
TW-02D	DA	2/23/2018		LF	--	12	1.8	23	--
TW-02D	DA	2/23/2018	FD	LF	--	12	1.5	20	--
TW-03D	DA	1/4/2018		Tap	--	--	--	12	2.8
TW-03D	DA	2/7/2018		Tap	--	--	--	13	2.5
TW-03D	DA	3/7/2018		Tap	--	--	--	13	2.8

Notes:

(a) = data were analyzed by an Arizona certified laboratory.
--- = data were either not collected, not available or were rejected
COPC = contaminants of potential concern.
FD = field duplicate sample.
J = concentration or reporting limit estimated by laboratory or data validation.
mg/L = milligrams per liter.
ND = not detected at listed reporting limit.
ug/L = micrograms per liter.
USEPA = United States Environmental Protection Agency

Sample Methods:
3V = three volume.
Flute = flexible liner underground technologies sampling system.
G = Grab sample.
LF = Low Flow (minimal drawdown)
Slant = slant (non vertical) wells MW-52, MW-53, MW-56 are sampled from dedicated Barcad screens, using a peristaltic pump.
Tap = sampled from tap or port of extraction or supply well.

Wells are assigned to separate aquifer zones for results reporting:
SA = shallow interval of Alluvial Aquifer.
MA = mid-depth interval of Alluvial Aquifer.
DA = deep interval of Alluvial Aquifer.
PA = perched aquifer (unsaturated zone).
BR = well completed in bedrock (Miocene Conglomerate or pre-Tertiary crystalline rock).

Nitrate samples were analyzed using USEPA Method 4500NO3, except for TW-3D and PE-1, which were analyzed using USEPA Method 300.0. USEPA Method 4500NO3 reports a combination of nitrate and nitrite as nitrogen. The contribution of nitrite to the reported result of nitrate plus nitrite as nitrogen is expected to be negligible; therefore, sample results for USEPA

Table 3-2

Groundwater COPCs and In Situ Byproducts Sampling Results, First Quarter 2018

First Quarter 2018 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 Method	Arsenic Dissolved (µg/L)	Molybdenum Dissolved (µg/L)	Selenium Dissolved (µg/L)	Manganese Dissolved (µg/L)	Nitrate as N (mg/L)

Method 4500NO3 are expected to be essentially the same as previous samples analyzed using USEPA Method 300.0 and reported as nitrate as nitrogen.

Starting in Third Quarter 2014, the groundwater sample collection method was switched from the traditional three-volume purge method (3V) to the low flow (LF) method at many short screen wells screened in alluvial sediments. The method for purging prior to sample collection is indicated in the sample method column of this table.

The background study upper tolerance limit (UTL) for arsenic is 24.3 µg/L.
The USEPA and California maximum contaminant level (MCL) for arsenic is 10 µg/L.
The background study UTL for molybdenum is 36.3 µg/L.
There is no USEPA or California MCL for molybdenum.
The background study UTL for selenium is 10.3 µg/L.
The USEPA and California MCL for selenium is 50.0 µg/L.
The secondary USEPA and California MCL for manganese is 50 ug/L.
The background study UTL for nitrate as nitrogen is 5.03 mg/L.
The USEPA and California MCL for nitrate as nitrogen is 10 mg/L.
The background study UTL for fluoride is 7.1 mg/L.
The USEPA MCL for fluoride is 4 mg/L, and the California MCL for fluoride is 2 mg/L.

Table 3-3

Surface Water Sampling Results, First Quarter 2018

First Quarter 2018 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles, California

Location ID	Sample Date		Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)	Specific Conductance (µS/cm)	Lab pH*
In-channel Locations						
C-BNS	1/3/2018		ND (0.2)	ND (1)	1,060	8.3
C-BNS	2/21/2018		ND (0.2)	ND (1)	1,010	8.3
C-CON-D	1/4/2018		ND (0.2)	ND (1)	1,050	8.3
C-CON-D	2/22/2018		ND (0.2)	ND (1)	1,000	8.3
C-CON-S	1/4/2018		ND (0.2)	ND (1)	1,040	8.3
C-CON-S	2/22/2018		ND (0.2)	ND (1)	1,000	8.2
C-I-3-D	1/3/2018		ND (0.2)	ND (1)	1,060	8.3
C-I-3-D	2/21/2018		ND (0.2)	ND (1)	1,010	8.3
C-I-3-S	1/3/2018		ND (0.2)	ND (1)	1,060	8.3
C-I-3-S	2/21/2018		ND (0.2)	ND (1)	1,000	8.3
C-MAR-D	1/4/2018		ND (0.2)	ND (1)	1,190	8.2
C-MAR-D	2/22/2018		ND (0.2)	ND (1)	1,000	8.4
C-MAR-D	2/22/2018	FD	ND (0.2)	ND (1)	--	8.4
C-MAR-S	1/4/2018		ND (0.2)	ND (1)	1,180	8.2
C-MAR-S	2/22/2018		ND (0.2)	ND (1)	1,000	8.4
C-NR1-D	1/4/2018		ND (0.2)	ND (1)	1,040	8.4
C-NR1-D	1/4/2018	FD	ND (0.2)	ND (1)	--	8.4
C-NR1-D	2/22/2018		ND (0.2)	ND (1)	1,000	8.2
C-NR1-S	1/4/2018		ND (0.2)	ND (1)	1,050	8.3
C-NR1-S	2/22/2018		ND (0.2)	ND (1)	1,000	8.2
C-NR3-D	1/4/2018		ND (0.2)	ND (1)	1,050	8.3
C-NR3-D	2/22/2018		ND (0.2)	ND (1)	1,010	8.2
C-NR3-S	1/4/2018		ND (0.2)	ND (1)	1,050	8.3
C-NR3-S	2/22/2018		ND (0.2)	ND (1)	1,010	8.2
C-NR4-D	1/4/2018		ND (0.2)	ND (1)	1,050	8.3
C-NR4-D	2/22/2018		ND (0.2)	ND (1)	1,000	8.2
C-NR4-S	1/4/2018		ND (0.2)	ND (1)	1,050	8.3
C-NR4-S	2/22/2018		ND (0.2)	ND (1)	1,000	8.2
C-NR4-S	2/22/2018	FD	ND (0.2)	ND (1)	--	8.2
C-R22A-D	1/3/2018		ND (0.2)	ND (1)	1,070	8.3
C-R22A-D	2/21/2018		ND (0.2)	ND (1)	1,010	8.3
C-R22A-S	1/3/2018		ND (0.2)	ND (1)	1,070	8.2
C-R22A-S	2/21/2018		ND (0.2)	ND (1)	1,010	8.3
C-R27-D	1/3/2018		ND (0.2)	ND (1)	1,070	8.3
C-R27-D	1/3/2018	FD	ND (0.2)	ND (1)	--	8.3
C-R27-D	2/21/2018		ND (0.2)	ND (1)	1,000	8.2
C-R27-S	1/3/2018		ND (0.2)	ND (1)	1,070	8.3
C-R27-S	2/21/2018		ND (0.2)	ND (1)	1,000	8.3
C-TAZ-D	1/3/2018		ND (0.2)	ND (1)	1,060	8.2
C-TAZ-D	2/21/2018		ND (0.2)	ND (1)	1,000	8.3
C-TAZ-S	1/3/2018		ND (0.2)	ND (1)	1,060	8.2
C-TAZ-S	2/21/2018		ND (0.2)	ND (1)	1,000	8.3
C-TAZ-S	2/21/2018	FD	ND (0.2)	ND (1)	--	8.3
Shoreline Samples						
R-19	1/4/2018		ND (0.2)	ND (1)	1,070	8.3
R-19	2/22/2018		ND (0.2)	ND (1)	1,000	8.4
R-28	1/3/2018		ND (0.2)	ND (1)	1,070	8.3

Table 3-3

Surface Water Sampling Results, First Quarter 2018

First Quarter 2018 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report,
PG&E Topock Compressor Station, Needles, California

Location ID	Sample Date		Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)	Specific Conductance (µS/cm)	Lab pH*
R-28	2/21/2018		ND (0.2)	ND (1)	1,010	8.2
R63	1/3/2018		ND (0.2)	ND (1)	1,080	8.2
R63	2/21/2018		ND (0.2)	ND (1)	1,010	8.3
RRB	1/4/2018		ND (0.2)	ND (1)	1,080	8.3
RRB	2/22/2018		ND (0.2)	ND (1)	1,000	8.3
SW1	1/3/2018		ND (0.2)	ND (1)	1,170	8.4
SW1	1/3/2018	FD	ND (0.2)	ND (1)	--	8.4
SW1	2/21/2018		ND (0.2)	ND (1)	1,230	7.6
SW2	1/3/2018		ND (0.2)	ND (1)	1,130	7.2
SW2	2/21/2018		ND (0.2)	ND (1)	1,050	7.7

Notes:

* Lab pH Values were all J flagged by the lab for being out of holding time.
FD = field duplicate sample.
J = concentration or reporting limit estimated by laboratory or data validation.
ND = not detected at listed reporting limit.
USEPA = United States Environmental Protection Agency
µg/L = micrograms per liter.
µS/cm = microSiemens per centimeter.

Hexavalent chromium analytical Method USEPA 218.6 (reporting limit 0.2 ug/L for undiluted samples).

Other analytical methods: dissolved chromium - Method SW6020A; specific conductance - USEPA 120.1; pH -SM4500-HB.

pH is reported to two significant figures.

Table 3-4

COPCs, In Situ Byproducts, and Geochemical Indicator Parameters in Surface Water Samples, First Quarter 2018

First Quarter 2018 Interim Measures Performance Monitoring and Site-wide
Groundwater and Surface Water Monitoring Report,
PG&E Topock Compressor Station, Needles, California

Location ID	Sample Date		Arsenic, Dissolved (µg/L)	Barium, Dissolved (µg/L)	Iron, Total (µg/L)	Iron, Dissolved (µg/L)	Manganese, Dissolved (µg/L)	Molybdenum, Dissolved (µg/L)	Nitrate/Nitrite as Nitrogen (mg/L)	Selenium, Dissolved (µg/L)	Total Suspended Solids (mg/L)
In-channel locations											
C-BNS	1/3/2018		2.3	130	20	25	3	5	0.39	1.8	ND (10)
C-BNS	2/21/2018		2.1	110	38 J	ND (20)	ND (0.5)	4.8	0.49	1.6	ND (10)
C-CON-D	1/4/2018		2.3	130	20	ND (20)	ND (0.5)	5.3	0.44	1.6	ND (10)
C-CON-D	2/22/2018		2.4	120	24	ND (20)	ND (0.5)	5.2	0.44	1.7	ND (10)
C-CON-S	1/4/2018		2.3	120	22	ND (20)	ND (0.5)	5.2	0.38	1.7	ND (10)
C-CON-S	2/22/2018		2.1	110	ND (20)	ND (20)	ND (0.5)	5	0.44	1.7	ND (10)
C-I-3-D	1/3/2018		2.2	130	22	ND (20)	1.2	5	0.38	1.5	ND (10)
C-I-3-D	2/21/2018		2.2	120	29	ND (20)	0.65	4.9	0.5	1.6	ND (10)
C-I-3-S	1/3/2018		2.2	120	21	ND (20)	1.3	5	0.39	1.7	ND (10)
C-I-3-S	2/21/2018		2.3	120	37	35	ND (0.5)	5	0.47	1.8	ND (10)
C-MAR-D	1/4/2018		2.4	140	550	45	24	5.7	0.35	1.4	14
C-MAR-D	2/22/2018		2.3	120	33	28	ND (0.5)	5.1	0.45	1.7	ND (10)
C-MAR-D	2/22/2018	FD	2.3	120	41	ND (20)	0.76	5	0.47	1.5	ND (10)
C-MAR-S	1/4/2018		2.3	130	390	89	20	5.5	0.35	1.4	13
C-MAR-S	2/22/2018		2.4	120	45	28	ND (0.5)	5	0.42	1.6	ND (10)
C-NR1-D	1/4/2018		2.2	120	ND (20)	ND (20)	ND (0.5)	5	0.38	1.6	ND (10)
C-NR1-D	1/4/2018	FD	2.2	120	ND (20)	ND (20)	ND (0.5)	4.9	0.36	1.4	ND (10)
C-NR1-D	2/22/2018		2.2	110	26	ND (20)	ND (0.5)	5	0.46	1.5	ND (10)
C-NR1-S	1/4/2018		2.3	120	ND (20)	ND (20)	ND (0.5)	5.1	0.37	1.7	ND (10)
C-NR1-S	2/22/2018		2.2	120	23	ND (20)	ND (0.5)	4.9	0.49	1.9	ND (10)
C-NR3-D	1/4/2018		2.3	120	23	20	ND (0.5)	5.1	0.36	1.5	ND (10)
C-NR3-D	2/22/2018		2.1	120	24	ND (20)	ND (0.5)	5	0.41	1.8	ND (10)
C-NR3-S	1/4/2018		2.5	130	29	ND (20)	0.5	5.4	0.34	1.6	ND (10)
C-NR3-S	2/22/2018		2.3	120	48	ND (20)	ND (0.5)	4.9	0.45	1.5	ND (10)
C-NR4-D	1/4/2018		2.2	120	21	ND (20)	ND (0.5)	4.9	0.38	1.6	ND (10)
C-NR4-D	2/22/2018		2.1	110	20	ND (20)	3.7	4.8	0.45	1.3	ND (10)
C-NR4-S	1/4/2018		2.2	120	ND (20)	ND (20)	ND (0.5)	5	0.42	1.6	ND (10)
C-NR4-S	2/22/2018		2.2	110	ND (20)	ND (20)	5.7 J	4.8	0.45	1.5	ND (10)
C-NR4-S	2/22/2018	FD	2.2	120	27	ND (20)	4.2 J	5.1	0.44	1.7	ND (10)
C-R22A-D	1/3/2018		2.3	130	31	ND (20)	3.9	5.2	0.36	1.5	ND (10)
C-R22A-D	2/21/2018		2.2	120	55	30	ND (0.5)	4.8	0.51	1.7	ND (10)
C-R22A-S	1/3/2018		2.2	120	21	ND (20)	3.7	5.1	0.4	1.9	ND (10)
C-R22A-S	2/21/2018		2.2	120	51	ND (20)	ND (0.5)	4.8	0.49	1.8	ND (10)
C-R27-D	1/3/2018		2.3	120	ND (20)	ND (20)	2.9	5.1	0.35	1.7	ND (10)
C-R27-D	1/3/2018	FD	2.2	130	27	ND (20)	2.8	5.1	0.36	1.7	ND (10)
C-R27-D	2/21/2018		2.1	110	43	34	ND (0.5)	4.7	0.49	1.5	ND (10)
C-R27-S	1/3/2018		2.2	120	21	ND (20)	2.6	5	0.33	1.4	ND (10)
C-R27-S	2/21/2018		2.1	110	50	ND (20)	ND (0.5)	4.8	0.46	1.6	ND (10)
C-TAZ-D	1/3/2018		2.2	120	ND (20)	ND (20)	1.9	5.1	0.34	1.9	ND (10)

Table 3-4

COPCs, In Situ Byproducts, and Geochemical Indicator Parameters in Surface Water Samples, First Quarter 2018

First Quarter 2018 Interim Measures Performance Monitoring and Site-wide
Groundwater and Surface Water Monitoring Report,
PG&E Topock Compressor Station, Needles, California

Location ID	Sample Date		Arsenic, Dissolved (µg/L)	Barium, Dissolved (µg/L)	Iron, Total (µg/L)	Iron, Dissolved (µg/L)	Manganese, Dissolved (µg/L)	Molybdenum, Dissolved (µg/L)	Nitrate/Nitrite as Nitrogen (mg/L)	Selenium, Dissolved (µg/L)	Total Suspended Solids (mg/L)
C-TAZ-D	2/21/2018		2.2	120	83	ND (20)	ND (0.5)	4.8	0.53	1.7	ND (10)
C-TAZ-S	1/3/2018		2.2	130	ND (20)	ND (20)	1.6	5.2	0.34	1.9	ND (10)
C-TAZ-S	2/21/2018		2.2	110	43	ND (20)	ND (0.5)	4.7	0.51	1.8	ND (10)
C-TAZ-S	2/21/2018	FD	2.2	120	58	ND (20)	ND (0.5)	4.8	0.48	1.6	ND (10)
Shoreline Samples											
R-19	1/4/2018		2.3	130	22	ND (20)	1.7	5.2	0.35	1.5	ND (10)
R-19	2/22/2018		2.2	120	23	ND (20)	3.3	5	0.47	1.6	ND (10)
R-28	1/3/2018		2.3	130	49	ND (20)	3.9	5	0.34	1.9	ND (10)
R-28	2/21/2018		2.2	120	36	ND (20)	ND (0.5)	5	0.48	1.9	ND (10)
R63	1/3/2018		2.2	130	37	ND (20)	4.4	5	0.32	1.6	ND (10)
R63	2/21/2018		2.2	120	64	ND (20)	ND (0.5)	4.9	0.48	1.5	ND (10)
RRB	1/4/2018		2.3	130	110	24	23	5.2	0.36	1.6	18
RRB	2/22/2018		2.3	120	41	21	ND (0.5)	5	0.45	1.7	ND (10)

Notes:

--- = data were either not collected, not available or were rejected
COPC = contaminants of potential concern (molybdenum, selenium, and nitrate).
J = concentration or reporting limit estimated by laboratory or data validation.
mg/L = milligrams per liter.
ND = not detected at listed reporting limit.
TSS = total suspended solids.
ug/L = micrograms per liter.
USEPA = United States Environmental Protection Agency.

Geochemical indicator parameters (TSS and alkalinity).
In situ byproducts (arsenic, iron and manganese).

USEPA Methods:
Alkalinity - SM2320B.
Metals - SW6010B/SW6020A.
Nitrate - SM4500NO3.
Total Suspended Solids - SM2540D.

TABLE 4-1
Pumping Rate and Extracted Volume for IM System, First Quarter 2018
First Quarter 2018 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report,
PG&E Topock Compressor Station, Needles, California

Extraction Well ID	January 2018		February 2018		March 2018		First Quarter 2018	
	Average Pumping Rate[a] (gpm)	Volume Pumped (gal)	Average Pumping Rate[a] (gpm)	Volume Pumped (gal)	Average Pumping Rate[a] (gpm)	Volume Pumped (gal)	Average Pumping Rate[a] (gpm)	Volume Pumped (gal)
TW-02S	0.00	0	0.00	0	0.00	0	0.00	0
TW-02D	0.00	38	0.00	36	0.00	0	0.00	75
TW-03D	133.29	5,950,063	130.84	5,275,611	129.14	5,764,831	131.09	16,990,505
PE-01	0.01	530	0.01	477	0.01	285	0.01	1,293
TOTAL	**133.3**	**5,950,632**	**130.9**	**5,276,125**	**129.1**	**5,765,116**	**131.1**	**16,991,873**

Chromium Removed This Quarter (kg)	23.4
Chromium Removed Project to Date (kg)	4150
Chromium Removed This Quarter (lb)	51.5
Chromium Removed Project to Date (lb)	9150

Notes:
DTSC = Department of Toxic Substances Control.
gal = gallons.
gpm = gallons per minute.
IM = Interim Measures.
kg = kilograms.
lb = pounds.

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

Chromium removed includes the period of January 1, 2018 through February 28, 2018. 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, 2018 through February 28, 2018.

Table 4-2

Analytical Results for Extraction Wells, First Quarter 2018

First Quarter 2018 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report,
PG&E Topock Compressor Station, Needles, California

Location ID	Sample Date	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)	Total Dissolved Solids (mg/L)	Lab pH*
PE-01	1/4/2018	ND (0.2)	ND (1)	950	7.7
PE-01	2/7/2018	0.7	ND (1)	2,600	7.4
PE-01	3/7/2018	2.3	2	2,300	7.4
TW-02D	2/23/2018	140	140	3,200	--
TW-03D	1/4/2018	550	590	4,500	7.3
TW-03D	2/7/2018	550	540	4,500	7.3
TW-03D	3/7/2018	530	520	4,300	7.2

Notes:

* Lab pH Values were all J flagged by the lab for being out of holding time.
--- = data were either not collected, not available or were rejected
FD = sample is a field duplicate.
J = concentration or reporting limit estimated by laboratory or data validation.
LF = lab filtered.
mg/L = milligrams per liter.
µg/L = micrograms per liter.

Groundwater samples from active extraction wells are taken at sample taps in Valve Vault 1 on the MW-20 bench.

Dissolved chromium was analyzed by Method SW6020A or USEPA200.8 or USEPA200.7, hexavalent chromium analyzed by Method SM3500-CrB or USEPA218.6, and total dissolved solids were analyzed by Method SM2540C.

Table 4-3

Average Hydraulic Gradients Measured at Well Pairs, First Quarter 2018

First Quarter 2018 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report,
PG&E Topock Compressor Station, Needles, California

Well Pair[a]	Reporting Period	Mean Landward[b] Hydraulic Gradient (feet/foot)	Days in[c] Monthly Average	PE-01 Run for Gradient Control?
Overall Average	January	0.0033	NA	no
	February	0.0040	NA	no
	March	0.0043	NA	no
Northern Gradient Pair MW-31-135 / MW-33-150	January	0.0026	31	no
	February	0.0029	28	no
	March	0.0030	31	no
Central Gradient Pair (used when PE-01 is run for gradient control)[d] MW-45-095[e] / MW-34-100	January	---	31	no
	February	---	28	no
	March	---	31	no
Central Gradient Pair (used when PE-01 is not run for gradient control)[d] MW-20-130[e] / MW-34-100	January	0.0041	31	no
	February	0.0050	28	no
	March	0.0054	31	no
Southern Gradient Pair (used when PE-01 is run for gradient control)[d] MW-45-095[e] / MW-27-085	January	---	31	no
	February	---	28	no
	March	---	31	no
Southern Gradient Pair (used when PE-01 is not run for gradient control)[d] MW-20-130[e] / MW-27-085	January	0.0033	31	no
	February	0.0041	28	no
	March	0.0045	31	no

Notes:

NA = Not Applicable

--- = Monthly gradient not applicable for gradient complaince

[a] Refer to Figure 1-4 for location of well pairs.

[b] For IM pumping, the target landward gradient for the selected well pairs is 0.001 feet/foot.

[c] Number of days transducers in both wells were operating correctly / total number of days in month.

[d] Beginning August 2017, MW-20-130 approved for gradient compliance (instead of MW-45-95) at central and southern well pairs during months when PE-01 is not run for gradient control.

[e] MW-45-095 is also known as MW-45-095a.

TABLE 4-4
Predicted and Actual Monthly Average Davis Dam Discharge and Colorado River Elevation at I-3
First Quarter 2018 Interim Measures Performance Monitoring and
Sitewide Groundwater and Surface Water Monitoring Report,
PG&E Topock Compressor Station, Needles, California

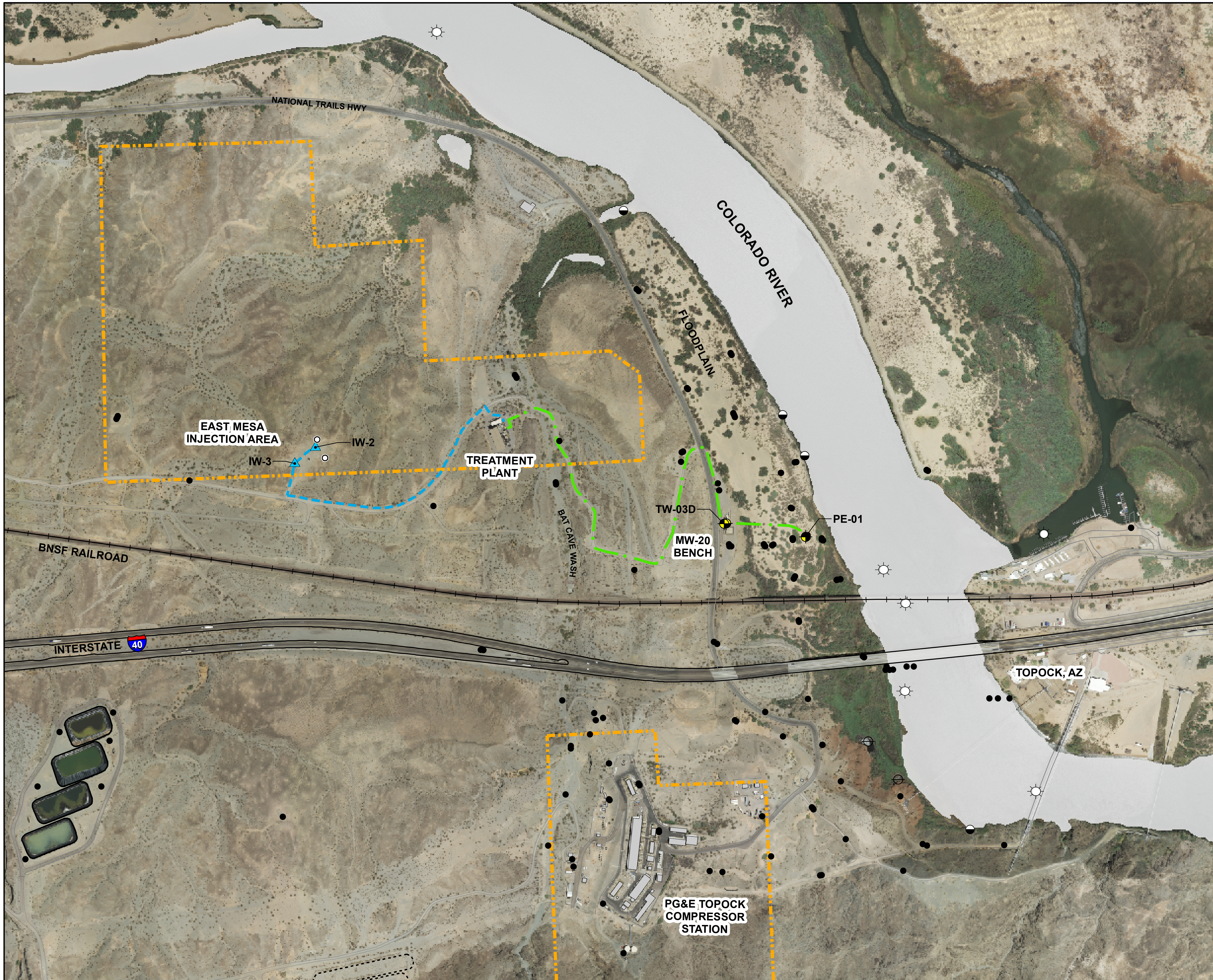
	Davis Dam Release			**Colorado River Elevation at I-3**		
Month	Projected (cfs)	Actual (cfs)	Difference (cfs)	Predicted (ft amsl)	Actual (ft amsl)	Difference (feet)
January 2013	8,300	8,299	1	453.2	453.28	0.04
February 2013	10,600	10,972	-372	454.3	454.63	0.4
March 2013	15,200	15,545	-345	456.0	456.29	0.3
April 2013	17,600	17,090	510	456.9	456.74	-0.1
May 2013	15,800	15,592	208	456.4	456.44	0.0
June 2013	15,700	15,588	112	456.5	456.47	0.0
July 2013	14,400	13,165	1,235	456.0	455.79	-0.2
August 2013	13,100	12,185	915	455.4	455.43	0.0
September 2013	11,700	11,446	254	454.8	455.02	0.2
October 2013	12,300	12,497	-197	454.9	455.09	0.2
November 2013	9,700	8,918	782	454.0	453.98	0.0
December 2013	6,400	7,636	-1,236	452.4	452.81	0.4
January 2014	8,300	8,970	-670	452.8	453.27	0.5
February 2014	11,600	11,850	-250	454.3	454.67	0.3
March 2014	16,600	17,473	-873	456.4	456.70	0.3
April 2014	18,200	17,718	482	457.1	457.08	0.0
May 2014	16,700	16,622	78	456.8	456.68	-0.1
June 2014	15,900	15,917	-17	456.6	456.64	0.1
July 2014	15,100	14,640	460	456.3	456.24	0.0
August 2014	12,300	11,336	964	455.2	455.26	0.1
September 2014	13,100	12,211	889	455.3	455.30	0.0
October 2014	10,700	10,434	266	454.3	454.81	0.5
November 2014	10,700	10,575	125	454.3	454.22	-0.1
December 2014	6,400	7,235	-835	452.4	452.93	0.5
January 2015	10,600	10,740	-140	454.3	454.39	0.1
February 2015	10,500	11,252	-752	454.2	454.52	0.3
March 2015	14,900	15,658	-758	455.9	456.29	0.4
April 2015	18,000	17,170	830	457.1	456.82	-0.3
May 2015	16,000	13,890	2110	456.5	456.06	-0.5
June 2015	14,500	13,616	884	456.1	455.94	-0.2
July 2015	13,400	12,411	989	455.6	455.50	-0.1
August 2015	12,100	12,627	-527	455.1	455.45	0.4

TABLE 4-4
Predicted and Actual Monthly Average Davis Dam Discharge and Colorado River Elevation at I-3
First Quarter 2018 Interim Measures Performance Monitoring and
Sitewide Groundwater and Surface Water Monitoring Report,
PG&E Topock Compressor Station, Needles, California

	Davis Dam Release			**Colorado River Elevation at I-3**		
Month	Projected (cfs)	Actual (cfs)	Difference (cfs)	Predicted (ft amsl)	Actual (ft amsl)	Difference (feet)
September 2015	13,300	12,734	566	455.4	INC	NA
October 2015	11,300	10,653	647	454.7	454.80	0.1
November 2015	10,000	10,066	-66	454.2	453.87	0.29
December 2015	6,200	8,556	-2,356	453.3	453.48	-0.18
January 2016	9,400	9,000	400	453.4	454.05	-0.60
February 2016	11,300	11,700	-400	454.4	454.95	-0.57
March 2016	15,800	15,000	800	455.9	456.51	-0.65
April 2016	15,400	16,400	-1,000	456.8	457.17	-0.40
May 2016	15,800	14,700	1,100	456.0	456.76	-0.78
June 2016	14,400	14,100	300	456.0	456.64	-0.62
July 2016	13,300	13,100	200	455.7	456.38	-0.65
August 2016	11,500	11,600	-100	455.0	455.70	-0.69
September 2016	12,200	11,900	300	455.2	455.83	-0.63
October 2016	10,400	10,400	0	454.2	455.23	-0.98
November 2016	9,900	9,600	300	453.7	454.40	-0.70
December 2016	8,300	7,800	500	453.4	453.55	-0.18
January 2017	8,000	6,600	1,400	453.2	453.36	-0.14
February 2017	9,500	8,700	800	453.9	454.15	-0.24
March 2017	13,900	13,700	200	455.5	456.10	-0.57
April 2017	15,900	16,100	-200	456.4	456.97	-0.57
May 2017	14,000	13,800	200	455.7	456.39	-0.66
June 2017	13,600	14,300	-700	456.0	456.46	-0.51
July 2017	13,300	13,300	0	455.6	456.22	-0.59
August 2017	11,500	11,500	0	454.9	455.59	-0.68
September 2017	12,700	11,100	1,600	454.4	455.32	-0.93
October 2017	12,000	10,900	1,100	454.0	455.15	-1.14
November 2017	10,400	10,000	400	454.2	454.70	-0.45
December 2017	8,800	9,000	-200	453.5	454.09	-0.58
January 2018	8,100	7,100	1,000	452.5	453.05	-0.55
February 2018	11,100	11,000	100	454.4	454.82	-0.42
March 2018	14,400	13,600	800	455.4	455.94	-0.56
April 2018	16,000			456.2		

NOTES:
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 data set
Projected river level for each month in the past is calculated based on the preceding months USBR projections of Davis Dam release and stage in Lake Havasu.
These data are reported monthly by the US Department of Interior, at http://www.usbr.gov/lc/region/g4000/24mo.pdf.
The difference in I-3 elevation is the difference between the I-3 elevation predicted and the actual elevation measured at I-3.
The source of this difference is differences between BOR projections and actual dam releases/Havasu reservoir levels, rather than the multiple regression error.

FIGURES



ARCADIS Design & Consultancy for natural and built assets

LEGEND

- IM-3 Extraction Well (Active)
- IM-3 Injection Well
- Monitoring Well in Site-Wide Groundwater Monitoring Program (GMP)
- Monitoring Well in IM-3 Compliance Monitoring Program
- 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.

N

0 300 600
Feet

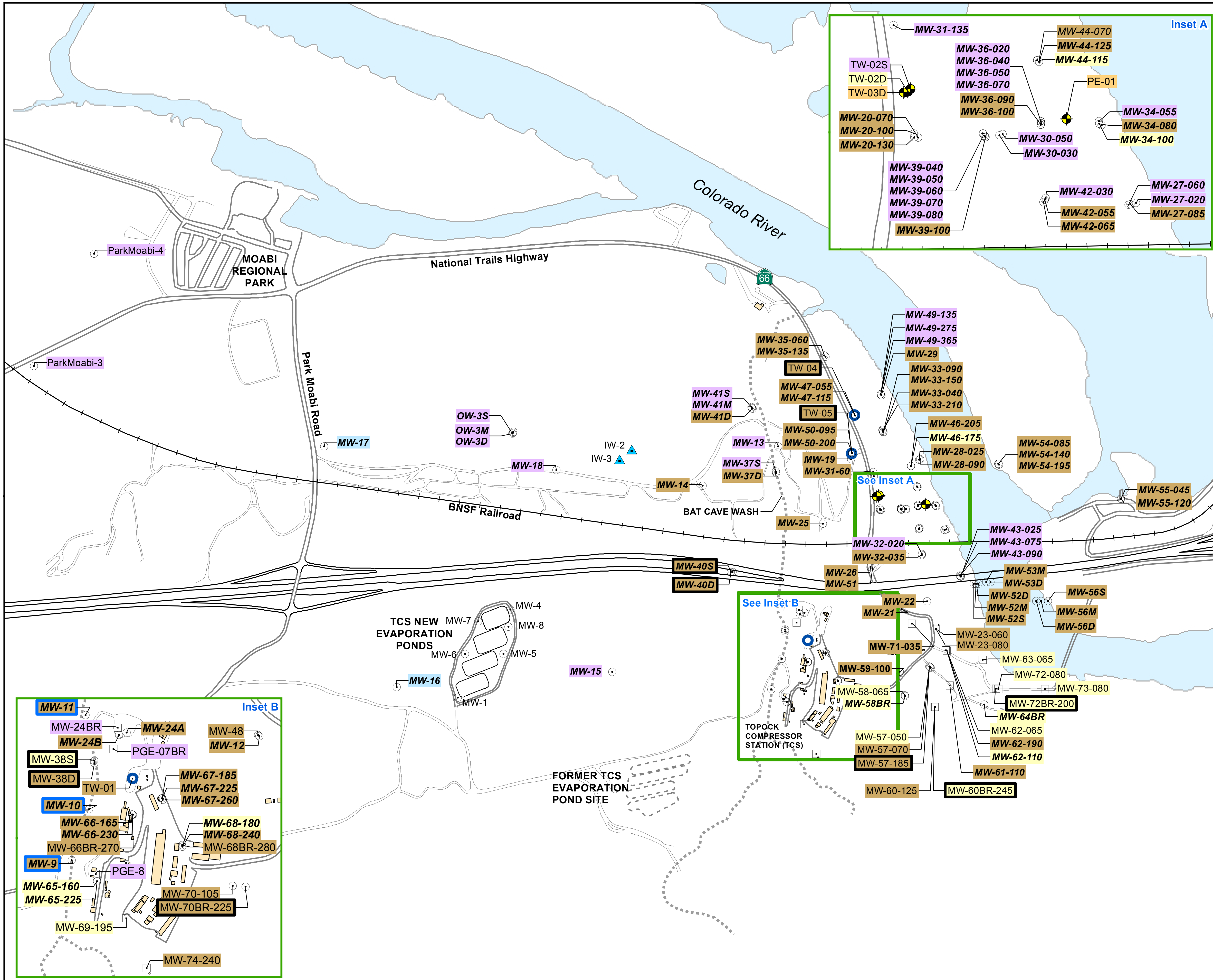
Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, NRCAN, METI, iPC, TomTom

FIGURE 1-1
LOCATIONS OF IM-3 FACILITIES AND MONITORING LOCATIONS

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

Created by: CRITIGEN

R:\GIS\TOPOCKGIS_2017\MAPFILES\2018\GMP\2018Q1\FIGURE1-1_IM3_GMP_LOCS_2018Q1.MXD 4/16/2018 6:40:51 PM



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LEGEND

- Groundwater Monitoring Well Completed in Bedrock
- Injection Well
- Groundwater Monitoring Well
- 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.
- TW-05 Monitoring well currently being evaluated in Sampling Method Trail.
- MW-21 Semiannual sampling
- MW-38S Quarterly sampling
- TW-3D Monthly sampling

Notes:
Bold/Italicized labels indicate sample collected using low-flow sampling method; otherwise, sample collected using the three-volume purge sampling method.

FIGURE 1-2
MONITORING LOCATIONS AND SAMPLING FREQUENCY FOR GMP

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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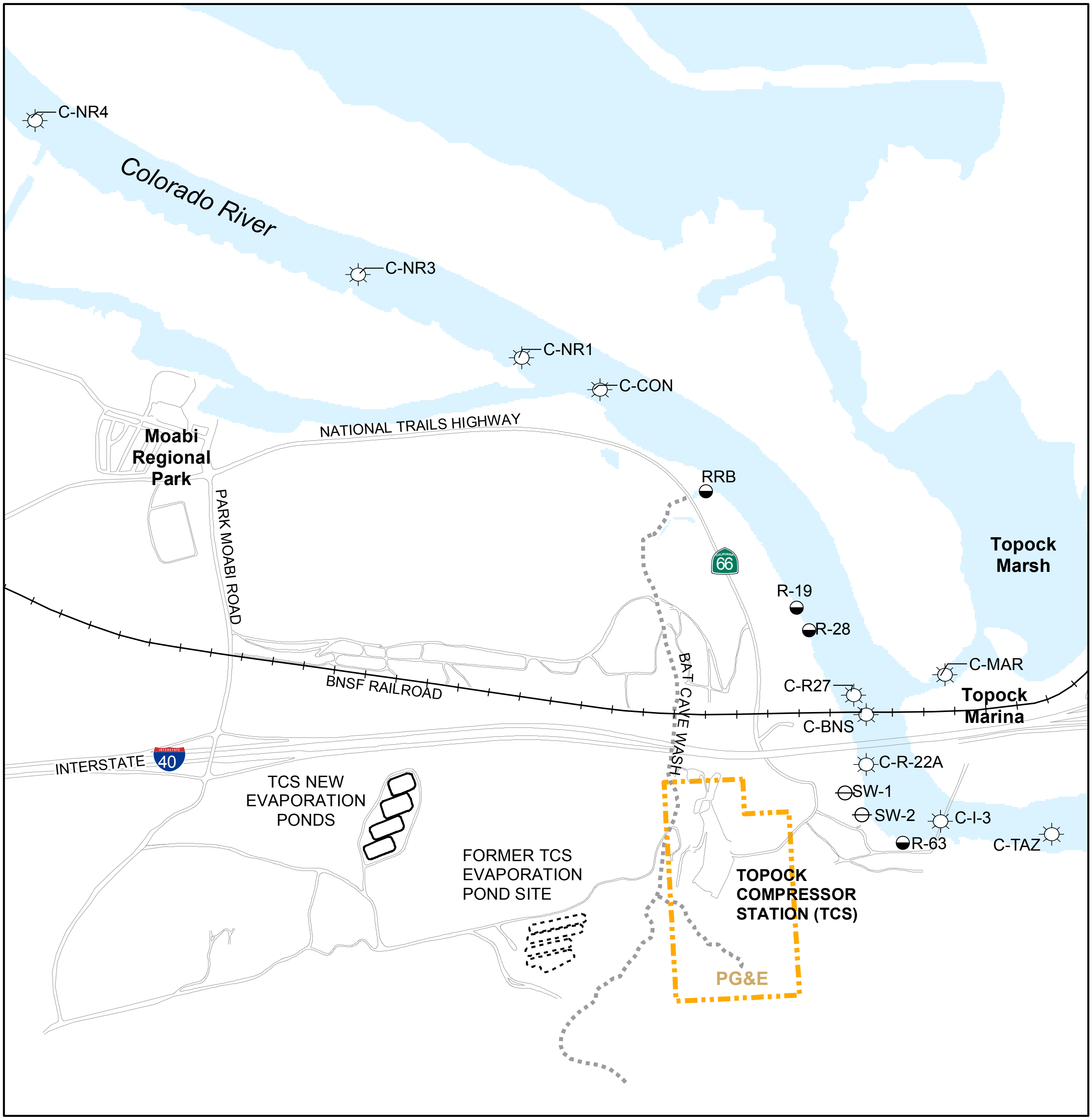
R:\GIS\TOPOCKGIS_2017\MAPFILES\2018\GMP\2018Q1\FIGURE1-2_GMP_SAMPLING_FREQUENCY_2018Q1.MXD 4/25/2018 10:38:53 AM



LEGEND

Shoreline Surface Water Monitoring Location

River Channel Surface Water Monitoring Location

Other Surface Water Monitoring Location

PG&E Property Line

N

0 800 1,600

Feet

Notes:

1. Shoreline, river channel, and other surface water monitoring locations are sampled quarterly and twice 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

FIGURE 1-3
MONITORING LOCATIONS AND SAMPLING FREQUENCY FOR RMP

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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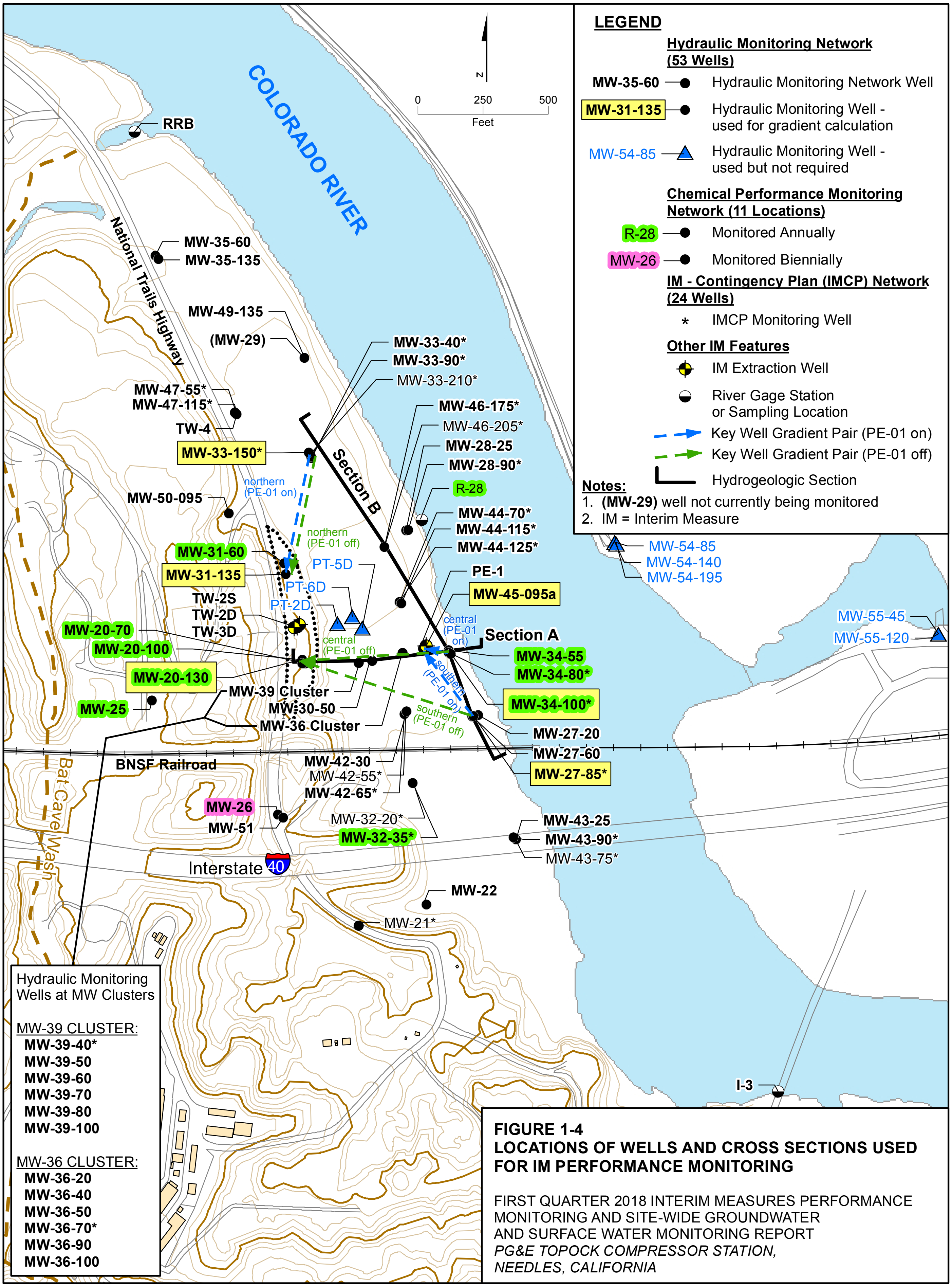
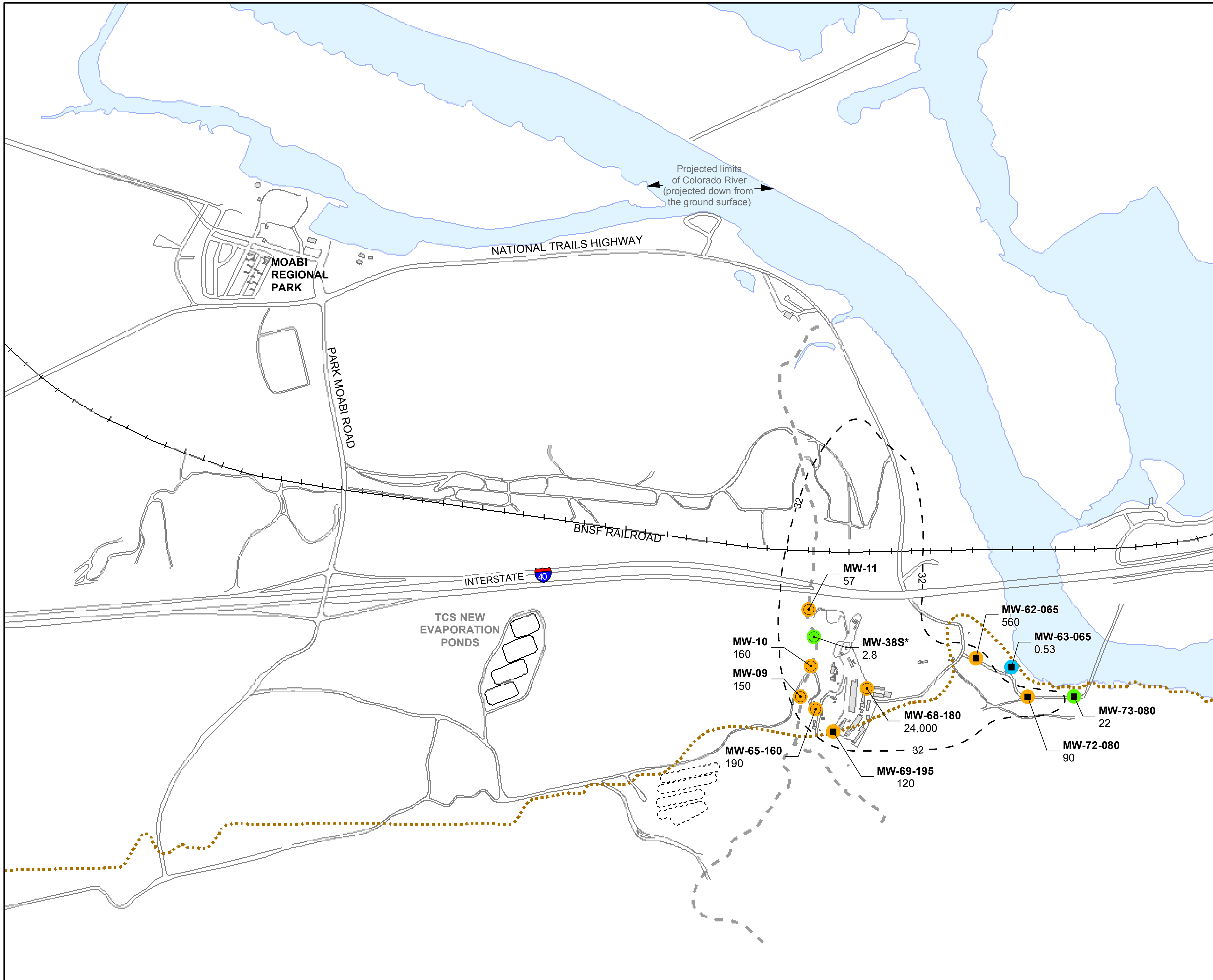


FIGURE 1-4
LOCATIONS OF WELLS AND CROSS SECTIONS USED FOR IM PERFORMANCE MONITORING

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA



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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 outline of "shallow" wells with Cr(VI) concentrations ≥ 32 µg/L
- Approximate bedrock contact at 455 feet above mean sea level.

MW-63-065 —— Sampling Location
1.1 —— Groundwater Concentration (µg/L)

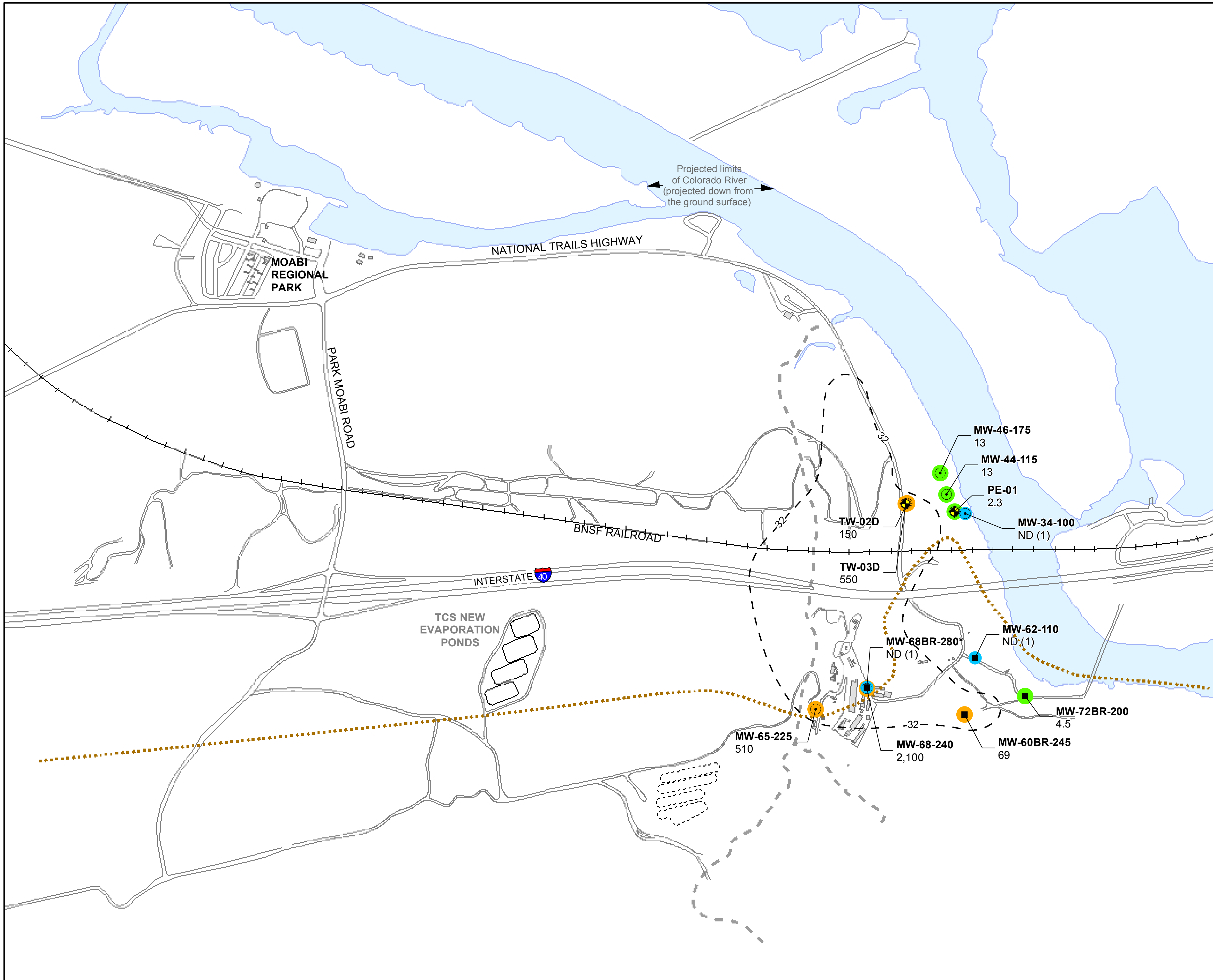
Notes:
1. "ND" = Cr(VI) not detected at listed reporting limit.
2. "J" = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
3. µg/L = micrograms per liter
4. Cr(VI) = Hexavalent Chromium
5. TCS = Topock Compressor Station
6. * = Wells with sampled values < 32 µg/L shown within footprint of 32 µg/L boundary.
7. Results plotted are maximum concentration from primary and duplicate samples, see Table 3-1 for complete results.
8. The 32 µg/L line for Cr(VI) is estimated based on available groundwater sampling, hydrogeologic and geochemical data.
9. Long-screened wells and wells screened across more than one depth interval are generally not posted on this map. See Table 3-1 for complete results.

FIGURE 3-1a
Cr(VI) SAMPLING RESULTS, SHALLOW WELLS IN ALLUVIAL AQUIFER AND BEDROCK, FIRST QUARTER 2018

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

Created by: CRITIGEN

R:\GIS\TOPOCKGIS_2017\MAPFILES\2018\GMP\2018Q1\FIGURE3-1A_CRVI_SHALLOW_2018Q1.MXD KDOLAN 4/11/2018 1:49:58 PM



ARCADIS Design & Consultancy for natural and built assets

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 or above the analytical reporting limit
- Concentration between reporting limit and 32 µg/L
- Concentration ≥ 32 µg/L
- Approximate outline of "deep" wells with Cr(VI) concentrations ≥ 32 µg/L
- Approximate bedrock contact at 395 feet above mean sea level.

MW-44-115 —— Sampling Location
21 —— Groundwater Concentration (µg/L)

Notes:

1. "ND" = Cr(VI) not detected at listed reporting limit.
2. µg/L = micrograms per liter
3. Cr(VI) = Hexavalent Chromium
4. * = Wells with sampled values < 32 µg/L shown within footprint of 32 µg/L boundary.
5. Results plotted are maximum concentration from primary and duplicate samples, see Table 3-1 for complete results.
6. The 32 µg/L line for Cr(VI) is estimated based on available groundwater sampling, hydrogeologic and geochemical data. There are no data confirming the existence of Cr(VI) under the Colorado River.
7. Long-screened wells and wells screened across more than one depth interval are generally not posted on this map. See Table 3-1 for complete results.
8. TCS = Topock Compressor Station

N

0 500 1,000
Feet

FIGURE 3-1b
Cr(VI) SAMPLING RESULTS, DEEP WELLS IN ALLUVIAL AQUIFER AND BEDROCK, FIRST QUARTER 2018

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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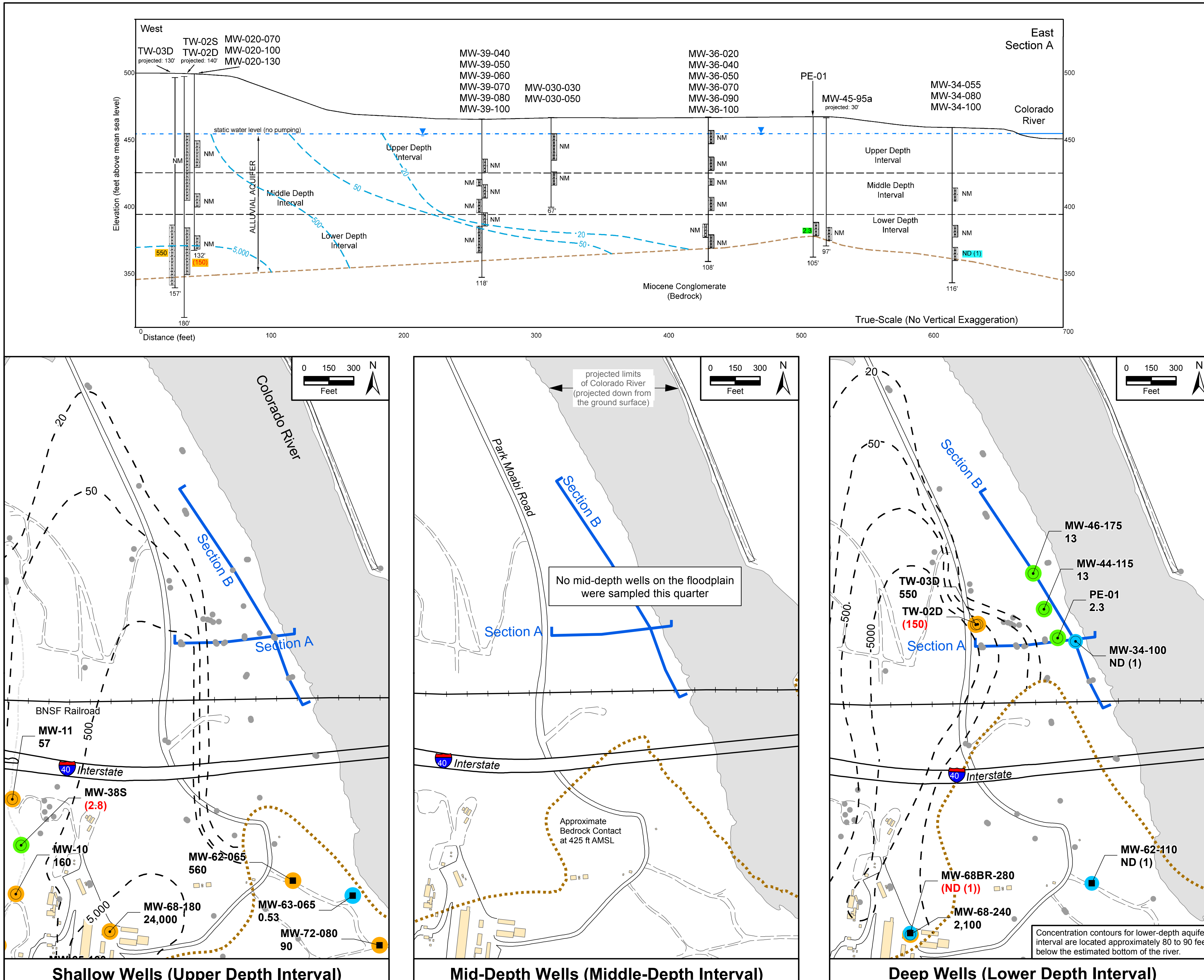
R:\GIS\TOPOCKGIS_2017\MAPFILES\2018\GMP\2018Q1\FIGURE3-1B_CRVI_DEEP_2018Q1.MXD KDOLAN 4/11/2018 1:45:22 PM



ARCADIS Design & Consultancy for natural and built assets

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 45
boring depth (feet) 103'

MW-38S — Sampling Location
3.8 — Groundwater Concentration (µg/L)
(3.8) — Groundwater concentration (µg/L) not used for contouring

Notes:

1. "ND" = Cr(VI) not detected at listed reporting limit.
2. "J" = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
3. " * " = Deep interval "ND" samples screened vertically above detect sample.
4. µg/L = micrograms per liter
5. Cr(VI) = Hexavalent Chromium
6. 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. The Interim Measure performance standard was established for containment of Cr(VI) concentrations greater than 20 µg/L in the floodplain portion of the Alluvial Aquifer.
7. The 20 and 50 µg/L lines for Cr(VI) are estimated based on available groundwater sampling, hydrogeologic and geochemical data. There are no data confirming the existence of Cr(VI) under the Colorado River.
8. 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.
9. Long-screened wells and wells screened across more than one depth interval are generally not posted on this map. See Table 3-1 for complete results.

FIGURE 4-1
CR(VI) CONCENTRATIONS IN ALLUVIAL AQUIFER AND BEDROCK, FIRST QUARTER 2018

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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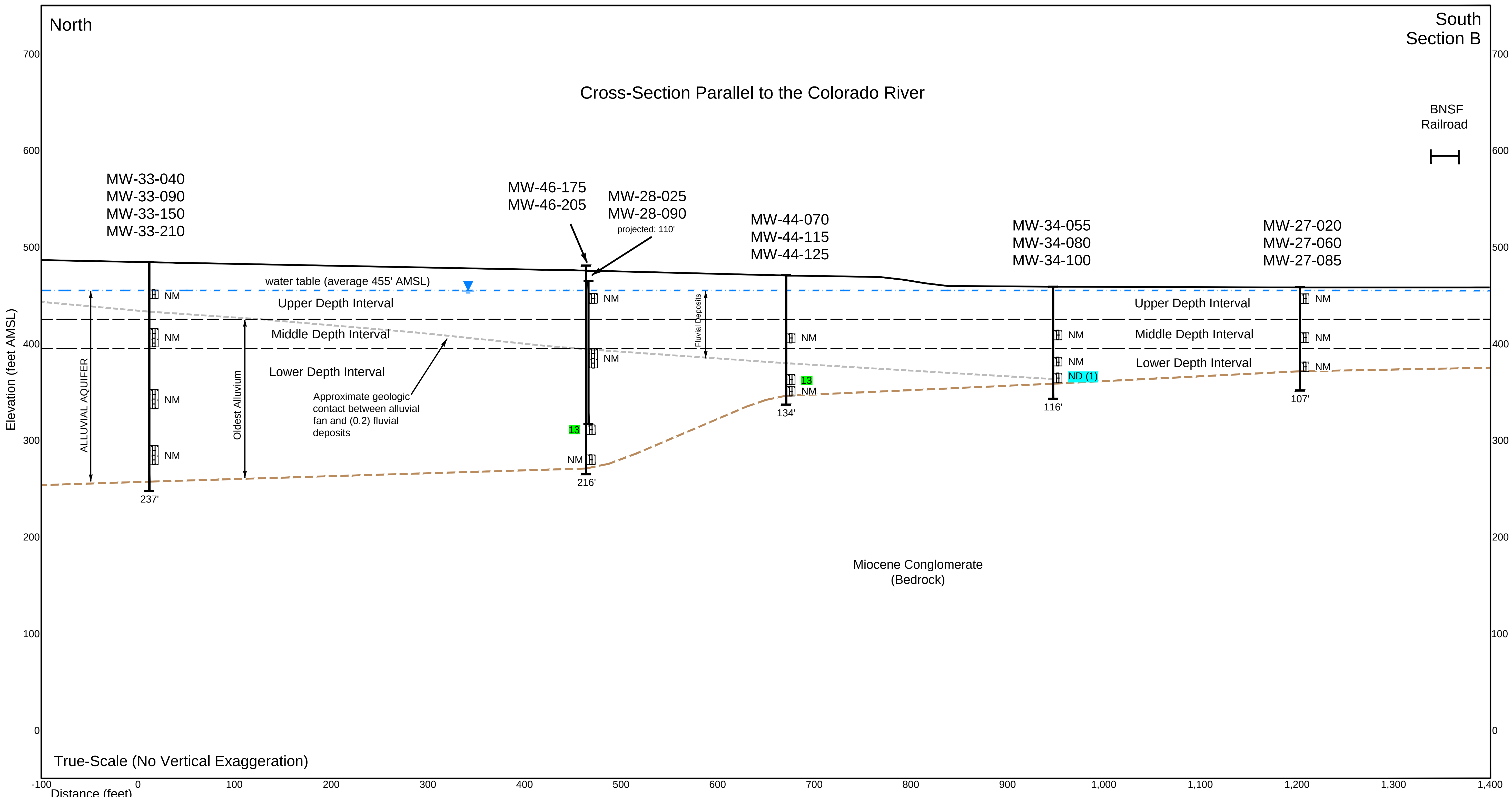
R:\GIS\TOPOCKGIS_2017\MAPFILES\2018\GMP\2018Q1\FIGURE4-1_GMP_CR6_2018Q1_MAX.MXD 4/26/2018 10:28:19 AM



Notes:
AMSL = above mean sea level.
NM = not measured.
µg/L = micrograms per liter.
ND = not detected at listed reporting limit

1. See Table 3-1 for additional sampling data and prior results for wells on this figure.

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

Legend

water level

well screen 14

boring depth (feet) 103'

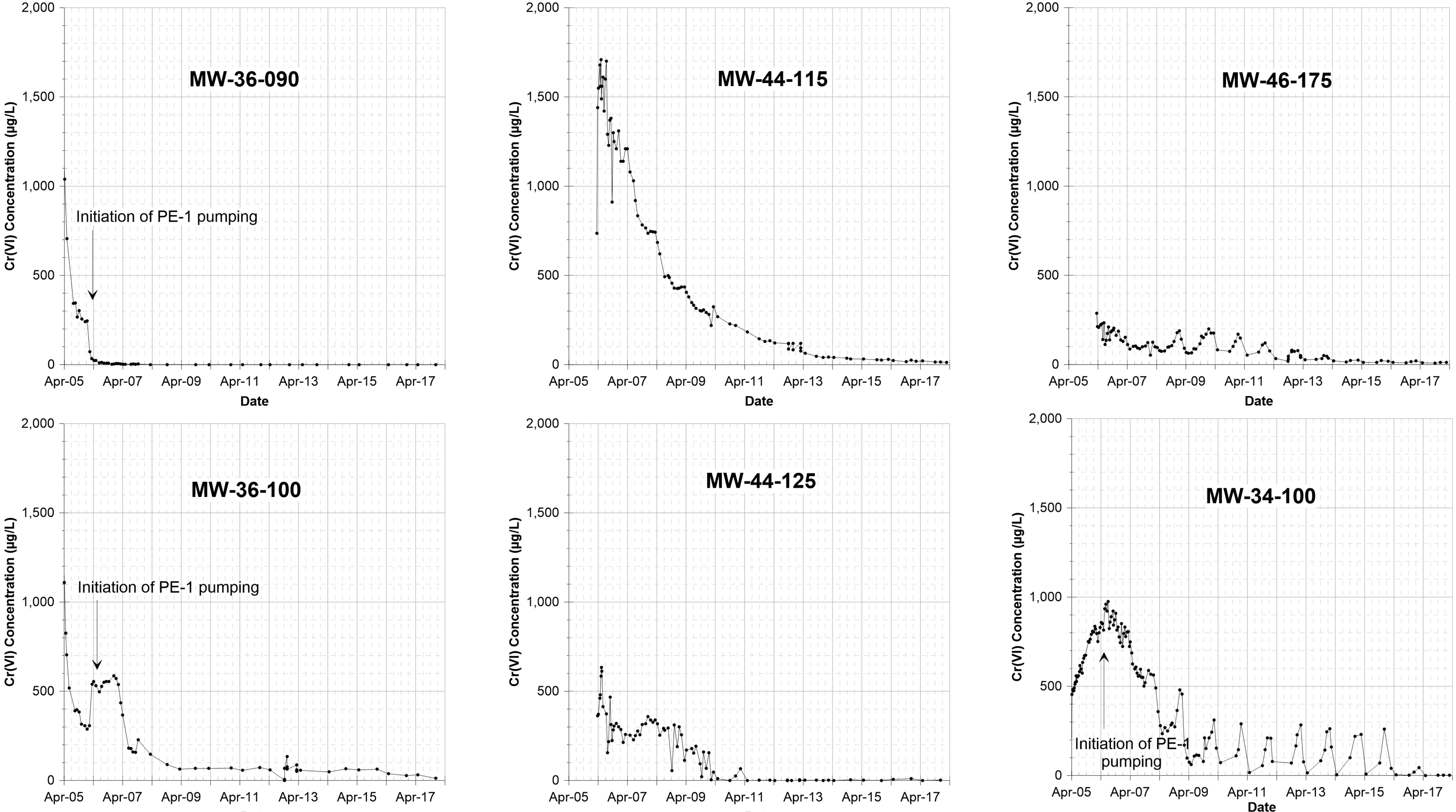
— 20 — Inferred hexavalent chromium contours (µg/L) in Alluvial Aquifer.

Cr(VI) Concentrations

- Not detected at analytical reporting limit
- Concentration between reporting limit and 32 µg/L
- Concentration ≥ 32 µg/L

FIGURE 4-2
Cr(VI) CONCENTRATIONS FLOODPLAIN CROSS-SECTION B
FIRST QUARTER 2018
FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS



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-1 pumping on plume west of PE-1. MW-44 wells, MW-46-175, and MW-34-100 selected to monitor concentrations within the plume.

FIGURE 4-3
Cr(VI) CONCENTRATION TRENDS IN SELECTED PERFORMANCE MONITORING WELLS, APRIL 2005 THROUGH MARCH 2018

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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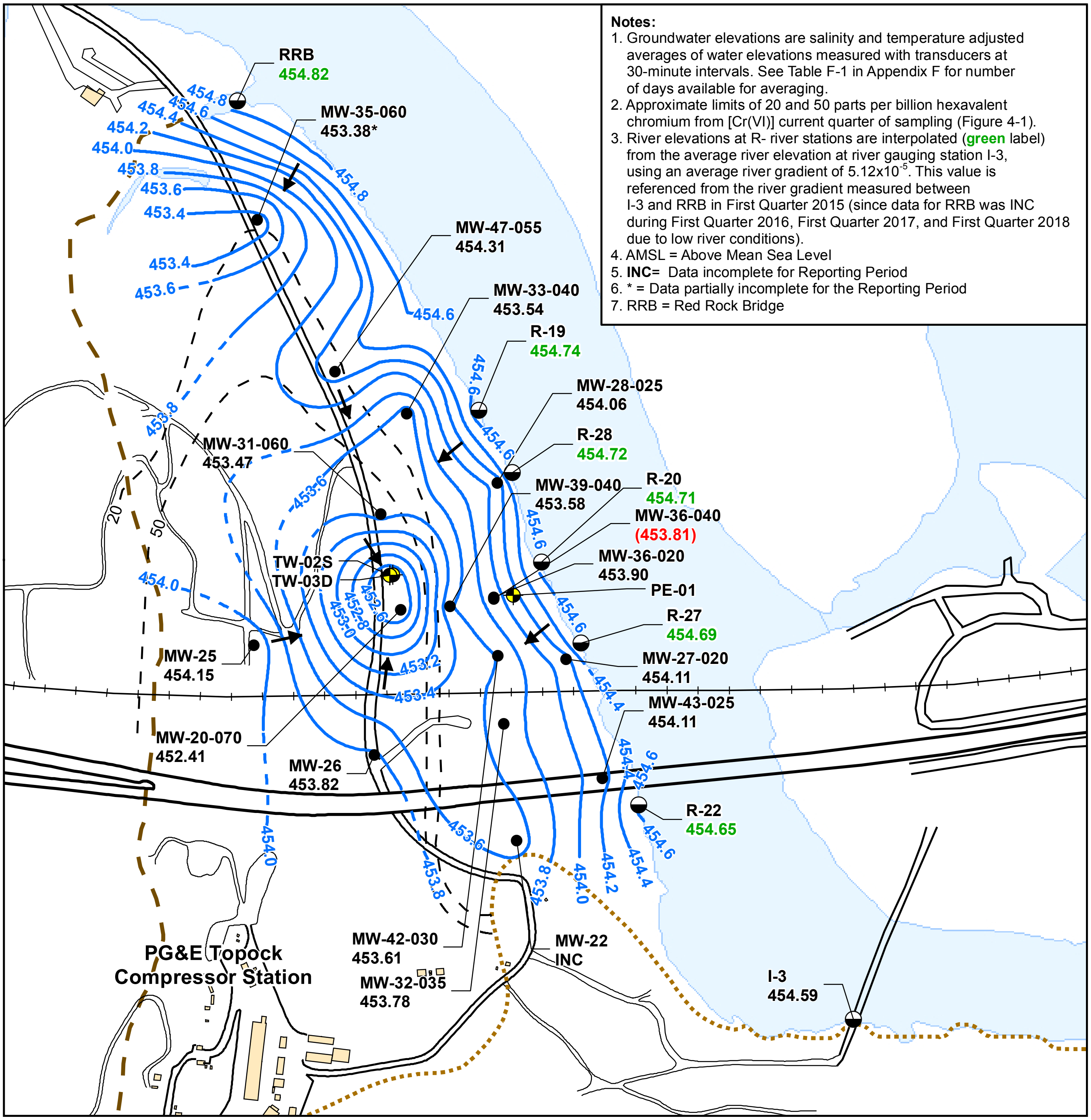

Notes:

1. Groundwater elevations are salinity and temperature adjusted averages of water elevations measured with transducers at 30-minute intervals. See Table F-1 in Appendix F for number of days available for averaging.
2. Approximate limits of 20 and 50 parts per billion hexavalent chromium from [Cr(VI)] current quarter of sampling (Figure 4-1).
3. River elevations at R- river stations are interpolated (**green** label) from the average river elevation at river gauging station I-3, using an average river gradient of 5.12x10^{-5}. This value is referenced from the river gradient measured between I-3 and RRB in First Quarter 2015 (since data for RRB was INC during First Quarter 2016, First Quarter 2017, and First Quarter 2018 due to low river conditions).
4. AMSL = Above Mean Sea Level
5. **INC**= Data incomplete for Reporting Period
6. * = Data partially incomplete for the Reporting Period
7. RRB = Red Rock Bridge

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 Contour (see note 2)

MW-43-025 — Gauging Location
456.13 — Average Groundwater Elevation (ft AMSL)
456.15 — Elevation in red parentheses not used for contouring

R-27 — River Station (see note 3)
456.80 — River Elevation (ft AMSL) Interpolated Average

0 300 600
Feet
N

FIGURE 4-4a
AVERAGE GROUNDWATER ELEVATIONS IN SHALLOW WELLS AND RIVER ELEVATIONS, FIRST QUARTER 2018

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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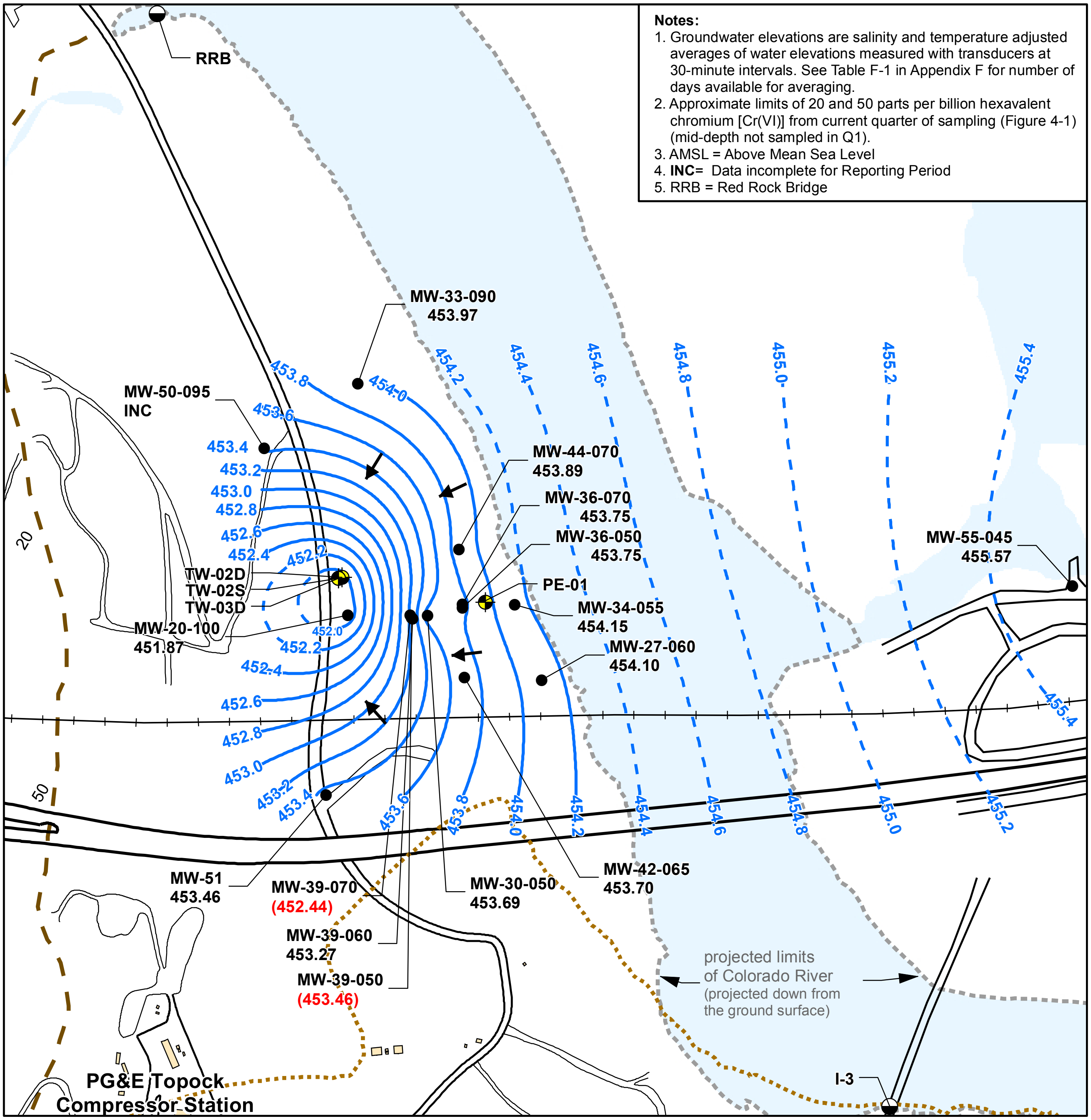


Notes:

1. Groundwater elevations are salinity and temperature adjusted averages of water elevations measured with transducers at 30-minute intervals. See Table F-1 in Appendix F for number of days available for averaging.
2. Approximate limits of 20 and 50 parts per billion hexavalent chromium [Cr(VI)] from current quarter of sampling (Figure 4-1) (mid-depth not sampled in Q1).
3. AMSL = Above Mean Sea Level
4. **INC**= Data incomplete for Reporting Period
5. RRB = Red Rock Bridge

LEGEND

- Monitoring Well
- River Station
- 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 Contour (see note 2) (mid-depth not sampled in Q1)

0 250 500
Feet

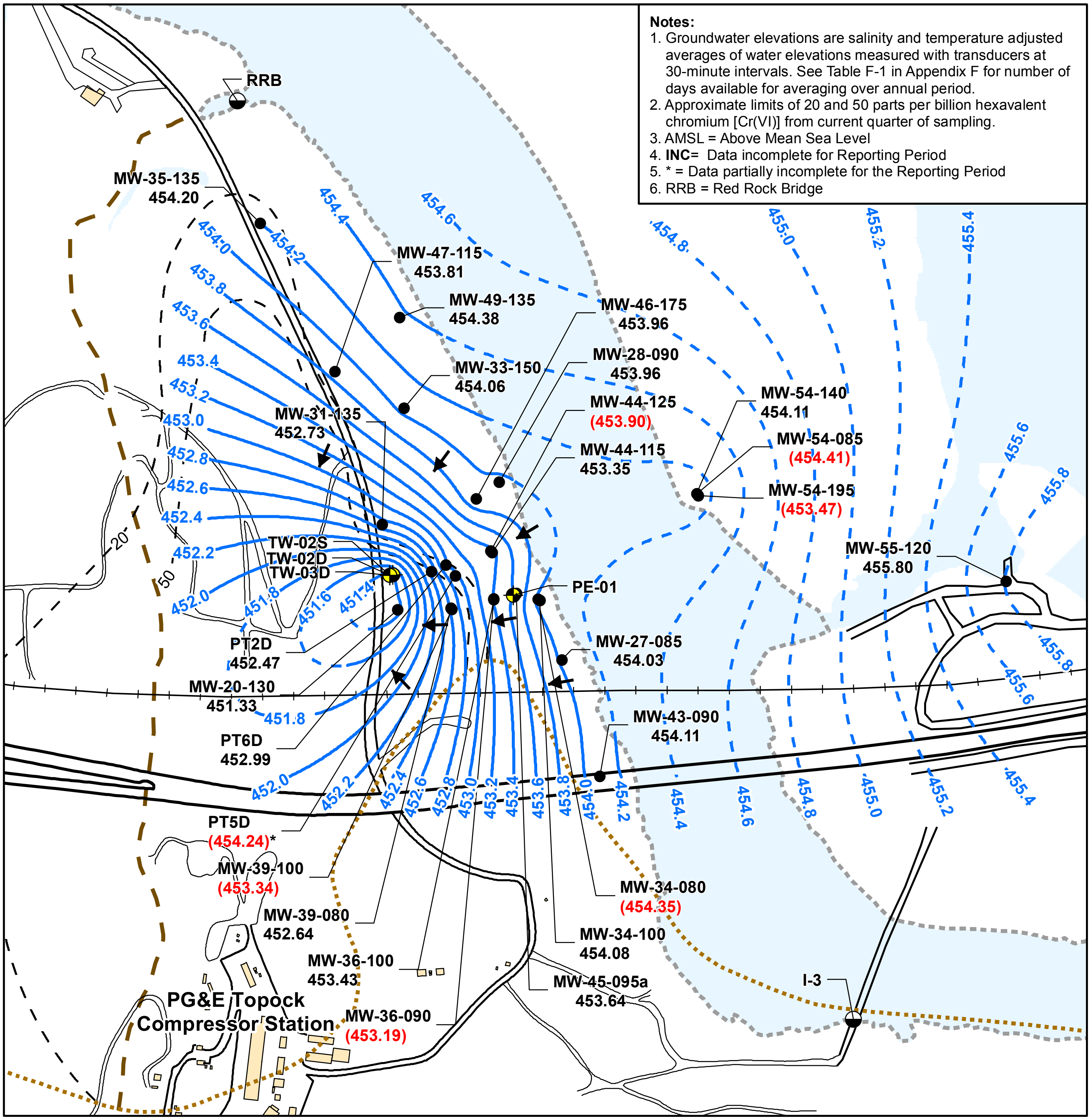
N

MW-39-060 Gauging Location
455.18 Average Groundwater Elevation (ft AMSL)
(455.37) Elevation in red parentheses not used for contouring

FIGURE 4-4b
AVERAGE GROUNDWATER ELEVATIONS IN MID-DEPTH WELLS, FIRST QUARTER 2018

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

Created by: CRITIGEN



Notes:

1. Groundwater elevations are salinity and temperature adjusted averages of water elevations measured with transducers at 30-minute intervals. See Table F-1 in Appendix F for number of days available for averaging over annual period.
2. Approximate limits of 20 and 50 parts per billion hexavalent chromium [Cr(VI)] from current quarter of sampling.
3. AMSL = Above Mean Sea Level
4. **INC**= Data incomplete for Reporting Period
5. * = Data partially incomplete for the Reporting Period
6. RRB = Red Rock Bridge

LEGEND

- Monitoring Well
- River Station
- 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 Contour (see note 2)

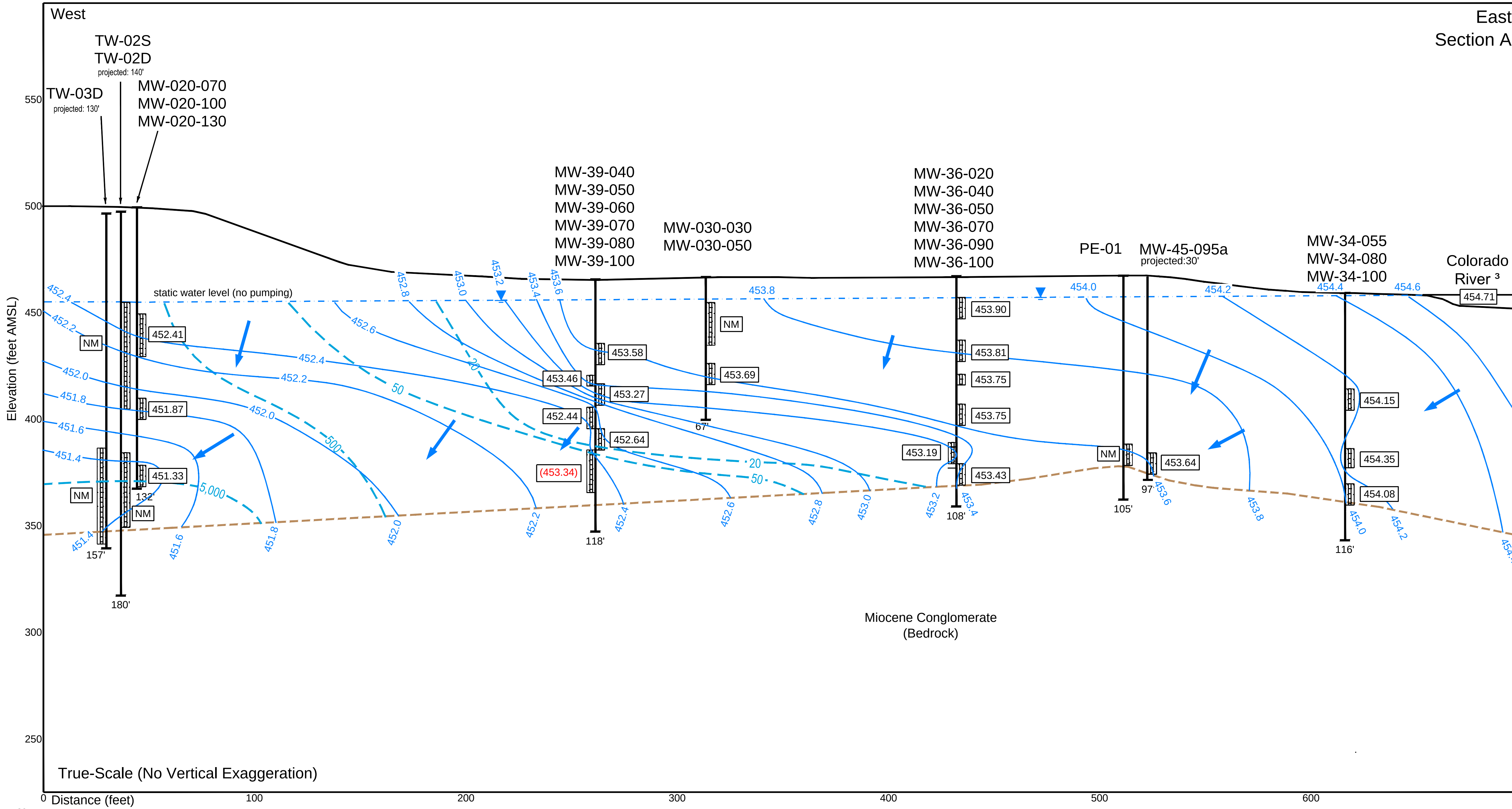
0 300 600
Feet

N

MW-36-090——Gauging Location
455.03——Average Groundwater Elevation (ft AMSL)
(455.85)——Elevation in red parentheses not used for contouring

FIGURE 4-4c
AVERAGE GROUNDWATER ELEVATIONS IN DEEP WELLS, FIRST QUARTER 2018

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA



Notes:

1. Results show average groundwater elevations for January 2018 through March 2018 measured with transducers at 30-minute intervals.
2. Groundwater elevations adjusted for salinity and temperature.
3. Colorado River elevation shown as interpolated First Quarter 2018 average from R-20 gauge.
4. The hexavalent chromium contour lines are from Figure 4-1.

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

Legend

MW-030-050

Inferred water table

well screen 453.69

boring depth (feet) 67'

20 Inferred hexavalent chromium contour (ppb) in Alluvial Aquifer.

Groundwater head contour

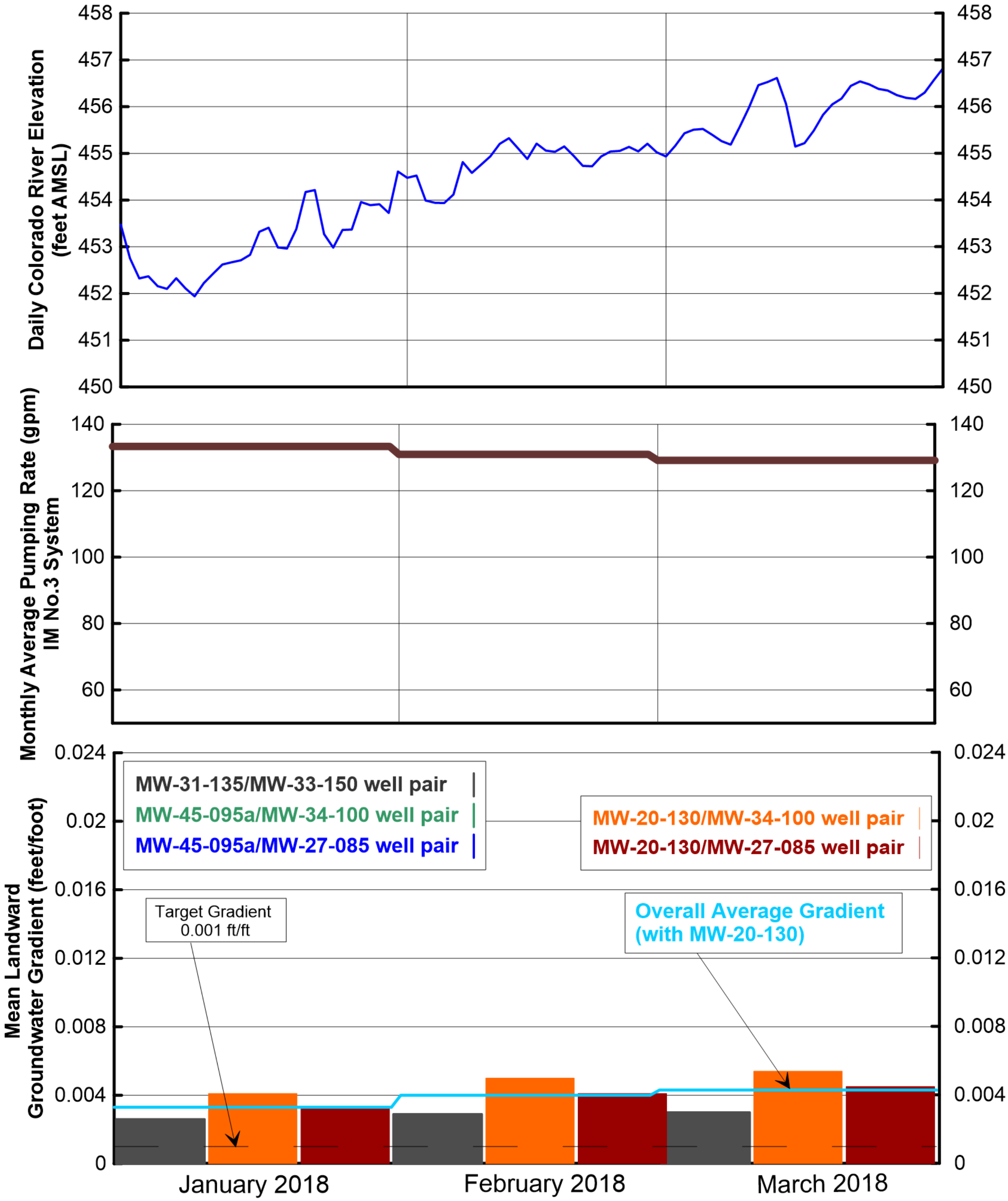
453.4 Inferred groundwater head contour

Interpreted groundwater flow direction

Average groundwater head (ft AMSL)

FIGURE 4-5
AVERAGE GROUNDWATER ELEVATIONS FOR WELLS IN FLOODPLAIN CROSS-SECTION A, FIRST QUARTER 2018
FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS



Notes:

1. For Interim Measure (IM) pumping, the target landward gradient for well pairs is 0.001 feet/foot.
2. Refer to Table 4-1 and Section 4.4 for discussion of pumping data.
3. Pumping rate plotted is the combined rate of extraction wells TW-3D and PE-1 in operation each month.
4. Refer to Table 4-3 and Section 4.5 for discussion of gradient data.
5. 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.
6. AMSL = above mean sea level.
7. gpm = gallons per minute

FIGURE 4-6
MEASURED HYDRAULIC GRADIENTS, RIVER ELEVATION, AND PUMPING RATE, FIRST QUARTER 2018

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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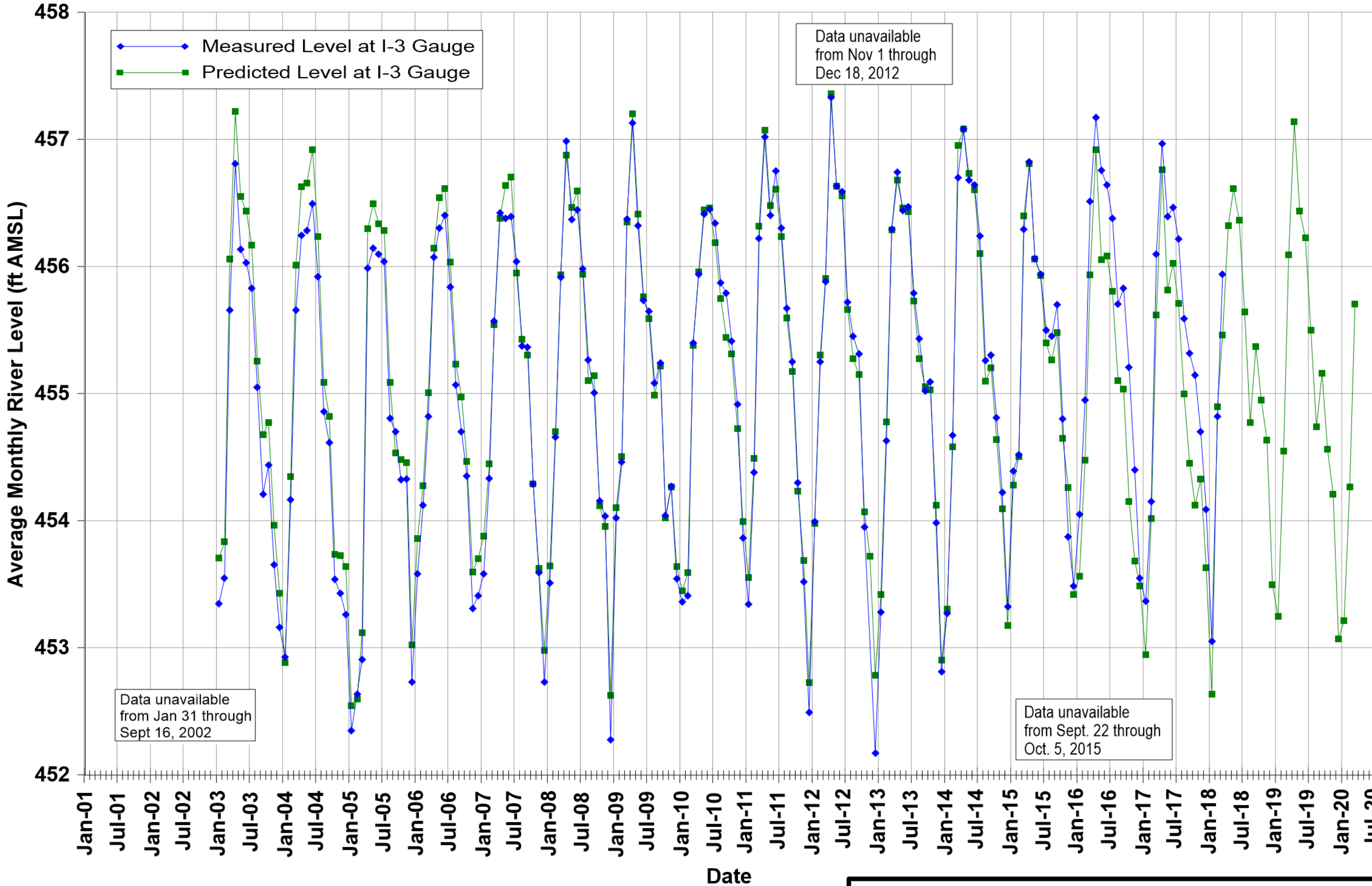

Note:
Projected river level for each month in the past is calculated based on the preceding months United States Bureau of Reclamation (USBR) projections of Davis Dam release and stage in Lake Havasu. Future projections of river level at I-3 are based upon USBR projections presented in the April 24-Month Study (Report dated April 16, 2018). These data are reported monthly by the US Department of Interior, at http://www.usbr.gov/lc/region/g4000/24mo.pdf

ft AMSL = feet above mean sea level

FIGURE 4-7
PAST AND PREDICTED FUTURE RIVER LEVELS AT TOPOCK COMPRESSOR STATION

FIRST QUARTER 2018 AND ANNUAL INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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APPENDIX A

Well Inspection and Maintenance Log, First Quarter 2018

Table A-1
Well Inspection Log, First Quarter 2018
First Quarter 2018 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 this quarter? (Yes/No)
C-BNS	01/03/2018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-NR3-D	01/04/2018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-NR4-D	01/04/2018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-R22A-D	01/03/2018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-R27-D	01/03/2018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-TAZ-D	01/03/2018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-09	02/23/2018	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes
MW-10	02/23/2018	Yes	No	Yes	No	Yes	No	Yes	NA	Yes	Yes	No	Yes	Yes
MW-11	02/23/2018	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes
MW-34-100	02/20/2018	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes
MW-38S	02/23/2018	Yes	No	Yes	No	No	NA	Yes	No	Yes	Yes	No	Yes	Yes
MW-44-115	02/20/2018	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes
MW-46-175	02/20/2018	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes
MW-57-050	02/19/2018	Yes	No	Yes	No	Yes	--	Yes	No	NA	Yes	No	Yes	No
MW-58-065	02/19/2018	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes
MW-58BR	02/19/2018	Yes	Yes	Yes	No	Yes	Yes	Yes	No	--	Yes	No	Yes	Yes
MW-62-065	02/19/2018	Yes	Yes	Yes	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes
MW-62-110	02/20/2018	Yes	No	Yes	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes
MW-63-065	02/21/2018	Yes	No	Yes	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes
MW-64BR	02/19/2018	Yes	No	Yes	Yes	Yes	No	Yes	No	NA	Yes	No	Yes	Yes
MW-65-160	02/22/2018	Yes	No	Yes	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes
MW-65-225	02/22/2018	Yes	No	Yes	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes
MW-68-180	02/22/2018	Yes	No	Yes	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes
MW-68-240	02/22/2018	Yes	No	Yes	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes
MW-68BR-280	02/22/2018	Yes	No	Yes	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes
MW-69-195	02/22/2018	Yes	No	Yes	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes
MW-72-080	02/20/2018	Yes	No	Yes	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes
MW-73-080	02/20/2018	Yes	No	Yes	--	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes
PE-01	01/04/2018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PE-01	02/07/2018	NA	NA	Yes	No	Yes	NA	NA	NA	NA	NA	NA	Yes	No
PE-01	03/07/2018	NA	NA	Yes	No	Yes	NA	NA	NA	NA	NA	NA	Yes	No
R-19	01/04/2018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
R-28	01/03/2018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
R63	01/03/2018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RMP-AB1	01/03/2018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RMP-AB2	01/03/2018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RMP-AB3	01/04/2018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RRB	01/04/2018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW1	01/03/2018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW2	01/03/2018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TW-02D	02/23/2018	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	No
TW-03D	01/04/2018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TW-03D	02/07/2018	NA	NA	Yes	No	Yes	NA	NA	NA	NA	NA	NA	Yes	No
TW-03D	03/07/2018	NA	NA	Yes	No	Yes	NA	NA	NA	NA	NA	NA	Yes	No
C-CON-D	01/03/2018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-CON-S	01/04/2018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-I-3-D	01/03/2018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-I-3-S	01/03/2018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-MAR-D	01/04/2018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-MAR-S	01/04/2018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-NR1-D	01/04/2018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

APPENDIX B

Lab Reports, First Quarter 2018 (Provided on CD Only with Hard Copy Submittal)

APPENDIX C

Other Monitoring Results

Table C-1

Arsenic Results in Monitoring Wells, December 2015 through March 2018

First Quarter 2018 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 Method	Dissolved Arsenic (µg/L)
MW-09	SA	12/1/2015		LF	1.6
MW-09	SA	5/3/2016		LF	1.8
MW-09	SA	12/7/2016		LF	1.8
MW-09	SA	2/9/2017		LF	1.7
MW-09	SA	5/3/2017		LF	1.7
MW-09	SA	12/7/2017		LF	1.5
MW-09	SA	2/23/2018		LF	1.6
MW-10	SA	12/1/2015		LF	2.9
MW-10	SA	12/7/2016		LF	3
MW-10	SA	12/7/2017		LF	2.6
MW-10	SA	12/7/2017	FD	LF	2.5
MW-11	SA	12/2/2015		LF	1.7
MW-11	SA	12/2/2015	FD	LF	1.5
MW-11	SA	5/3/2016		LF	1.5
MW-11	SA	5/3/2016	FD	LF	1.5
MW-11	SA	12/7/2016		LF	1.5
MW-11	SA	12/7/2016	FD	LF	1.4
MW-11	SA	2/9/2017		LF	1.4
MW-11	SA	5/3/2017		LF	1.3
MW-11	SA	12/7/2017		LF	1.3
MW-11	SA	2/23/2018		LF	1.4
MW-12	SA	12/2/2015		LF	36
MW-12	SA	12/7/2016		3V	41
MW-12	SA	12/11/2017		LF	38
MW-13	SA	12/7/2015		LF	1.9
MW-13	SA	12/8/2016		LF	1.4
MW-13	SA	12/8/2017		LF	2.2
MW-14	SA	12/7/2015		LF	0.87
MW-14	SA	4/27/2016		LF	0.86
MW-14	SA	12/8/2016		LF	0.91
MW-14	SA	5/1/2017		LF	0.75
MW-14	SA	5/1/2017	FD	3V	0.74
MW-14	SA	12/13/2017		LF	0.78
MW-19	SA	12/8/2016		LF	0.96
MW-20-130	DA	12/8/2015		LF	4.5
MW-20-130	DA	12/8/2015	FD	LF	4.5
MW-20-130	DA	4/27/2016		LF	4.6
MW-20-130	DA	12/9/2016		LF	5.2
MW-20-130	DA	12/9/2016	FD	LF	5.3
MW-20-130	DA	4/27/2017		LF	4.8

Table C-1

Arsenic Results in Monitoring Wells, December 2015 through March 2018

First Quarter 2018 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 Method	Dissolved Arsenic (µg/L)
MW-20-130	DA	4/27/2017	FD	LF	4.5
MW-20-130	DA	12/7/2017		LF	3.6
MW-22	SA	12/3/2015		LF	15
MW-22	SA	4/25/2016		LF	13
MW-22	SA	12/6/2016		LF	16
MW-22	SA	4/28/2017		LF	13
MW-22	SA	12/6/2017		LF	17
MW-23-060	BR	12/3/2015		3V	4.2
MW-23-060	BR	5/2/2016		3V	4.1
MW-23-060	BR	12/14/2016		LF	5.7
MW-23-060	BR	4/28/2017		LF	3.1
MW-23-060	BR	12/8/2017		LF	4
MW-23-080	BR	12/3/2015		3V	4.1
MW-23-080	BR	5/2/2016		3V	4
MW-23-080	BR	12/14/2016		LF	5.1
MW-23-080	BR	12/14/2016	FD	LF	4.9
MW-23-080	BR	4/28/2017		LF	4.4
MW-23-080	BR	12/8/2017		LF	4.9
MW-24A	SA	12/1/2015		LF	0.15
MW-24A	SA	5/3/2016		LF	ND (0.1)
MW-24A	SA	12/6/2016		LF	0.13
MW-24A	SA	5/3/2017		LF	ND (0.1)
MW-24A	SA	12/7/2017		LF	0.14
MW-24A	SA	12/7/2017	FD	LF	0.22
MW-24B	DA	12/1/2015		LF	2.8
MW-24B	DA	5/3/2016		LF	2.8
MW-24B	DA	5/3/2016	FD	LF	3.1
MW-24B	DA	12/6/2016		LF	1.4
MW-24B	DA	5/3/2017		LF	2.6
MW-24B	DA	5/3/2017	FD	LF	2.8
MW-24B	DA	12/7/2017		LF	3.1
MW-24BR	BR	12/2/2015		3V	0.37
MW-24BR	BR	12/7/2016		3V	ND (0.5)
MW-24BR	BR	12/8/2017		3V	0.37
MW-25	SA	12/7/2015		LF	1.2
MW-25	SA	4/27/2016		LF	1.1
MW-25	SA	12/8/2016		LF	1.4
MW-25	SA	5/1/2017		LF	1
MW-25	SA	12/8/2017		LF	1.2
MW-26	SA	12/8/2015		LF	1.9

Table C-1

Arsenic Results in Monitoring Wells, December 2015 through March 2018

First Quarter 2018 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 Method	Dissolved Arsenic (µg/L)
MW-26	SA	12/8/2015	FD	LF	1.8
MW-26	SA	4/28/2016		LF	2
MW-26	SA	12/8/2016		LF	1.9
MW-26	SA	12/8/2016	FD	LF	1.8
MW-26	SA	4/26/2017		LF	1.9
MW-26	SA	12/11/2017		LF	2
MW-26	SA	12/11/2017	FD	LF	1.9
MW-27-020	SA	12/3/2015		LF	1.5
MW-27-020	SA	12/6/2016		LF	1.3
MW-27-020	SA	12/4/2017		LF	1.2
MW-27-060	MA	12/3/2015		LF	12
MW-27-060	MA	12/3/2015	FD	LF	13
MW-27-060	MA	12/6/2016		LF	8.3
MW-27-060	MA	12/6/2016	FD	LF	8
MW-27-060	MA	12/4/2017		LF	11
MW-27-085	DA	12/3/2015		LF	1.4
MW-27-085	DA	4/25/2016		LF	1.3
MW-27-085	DA	4/25/2016	FD	LF	1.3
MW-27-085	DA	12/6/2016		LF	1.5
MW-27-085	DA	4/28/2017		LF	1.3
MW-27-085	DA	4/28/2017	FD	LF	1.3
MW-27-085	DA	12/4/2017		LF	1.7
MW-28-025	SA	12/2/2015		LF	0.81
MW-28-025	SA	4/26/2016		LF	1
MW-28-025	SA	12/8/2016		LF	0.84
MW-28-025	SA	4/26/2017		LF	0.99
MW-28-025	SA	12/7/2017		LF	0.71
MW-28-090	DA	12/2/2015		LF	2.1
MW-28-090	DA	4/26/2016		LF	2.2
MW-28-090	DA	12/8/2016		LF	2.5
MW-28-090	DA	4/26/2017		LF	2.2
MW-28-090	DA	12/7/2017		LF	1.7
MW-29	SA	12/1/2015		LF	15
MW-29	SA	4/26/2016		LF	13 J
MW-29	SA	12/8/2016		LF	12
MW-29	SA	4/26/2017		LF	15
MW-29	SA	12/7/2017		LF	9.2
MW-30-030	SA	12/3/2015		LF	2.5
MW-30-030	SA	12/6/2016		LF	2.7
MW-30-030	SA	12/6/2017		LF	2

Table C-1

Arsenic Results in Monitoring Wells, December 2015 through March 2018

First Quarter 2018 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 Method	Dissolved Arsenic (µg/L)
MW-30-050	MA	12/3/2015		LF	2.9
MW-30-050	MA	12/3/2015	FD	LF	3
MW-30-050	MA	12/6/2016		LF	2.9
MW-30-050	MA	12/6/2017		LF	2.9
MW-30-050	MA	12/6/2017	FD	LF	2.9
MW-31-060	SA	12/7/2015		LF	1.2
MW-31-060	SA	4/27/2016		LF	1.1
MW-31-060	SA	12/9/2016		LF	1.2
MW-31-060	SA	12/9/2016	FD	LF	1.2
MW-31-060	SA	4/27/2017		LF	1.1
MW-31-060	SA	4/27/2017	FD	LF	1.1
MW-31-060	SA	12/12/2017		LF	1.1
MW-31-135	DA	12/7/2015		LF	3.4
MW-31-135	DA	12/9/2016		LF	3.9
MW-31-135	DA	12/12/2017		LF	3.5
MW-31-135	DA	12/12/2017	FD	LF	3.6
MW-32-020	SA	12/3/2015		LF	3.9
MW-32-020	SA	12/3/2015	FD	LF	4.3
MW-32-020	SA	12/6/2016		LF	4.9
MW-32-020	SA	12/4/2017		LF	3.4
MW-32-035	SA	12/3/2015		LF	17
MW-32-035	SA	4/25/2016		LF	27
MW-32-035	SA	12/6/2016		LF	13
MW-32-035	SA	4/27/2017		LF	26
MW-32-035	SA	12/4/2017		LF	20
MW-33-040	SA	12/1/2015		LF	10
MW-33-040	SA	4/26/2016		LF	12
MW-33-040	SA	4/26/2016	FD	LF	12
MW-33-040	SA	12/8/2016		LF	11
MW-33-040	SA	4/26/2017		LF	11
MW-33-040	SA	12/7/2017		LF	9.7
MW-33-090	MA	12/1/2015		LF	1.1
MW-33-090	MA	4/26/2016		3V	1
MW-33-090	MA	12/8/2016		LF	1.2
MW-33-090	MA	4/26/2017		LF	1.2
MW-33-090	MA	12/7/2017		LF	1.1
MW-33-150	DA	12/1/2015		LF	1.1
MW-33-150	DA	4/26/2016		LF	1.3
MW-33-150	DA	12/8/2016		LF	1.8
MW-33-150	DA	4/26/2017		LF	1.6

Table C-1

Arsenic Results in Monitoring Wells, December 2015 through March 2018

First Quarter 2018 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 Method	Dissolved Arsenic (µg/L)
MW-33-150	DA	4/26/2017	FD	LF	1.5
MW-33-150	DA	12/7/2017		LF	1.8
MW-33-210	DA	12/1/2015		LF	1
MW-33-210	DA	4/26/2016		LF	1
MW-33-210	DA	12/8/2016		3V	1.2
MW-33-210	DA	4/26/2017		LF	1.2
MW-33-210	DA	12/7/2017		LF	1
MW-34-055	MA	12/3/2015		LF	2.4
MW-34-055	MA	12/6/2016		LF	2.4
MW-34-055	MA	12/6/2017		LF	2.5
MW-34-080	DA	12/3/2015		LF	1.3
MW-34-080	DA	4/26/2016		LF	1.3
MW-34-080	DA	12/6/2016		LF	1.3
MW-34-080	DA	12/6/2016	FD	LF	1.3
MW-34-080	DA	4/27/2017		LF	1.3
MW-34-080	DA	12/6/2017		LF	1.4
MW-34-100	DA	12/3/2015		LF	1.4
MW-34-100	DA	12/3/2015	FD	LF	1.5
MW-34-100	DA	2/25/2016		LF	1.9
MW-34-100	DA	4/26/2016		LF	1.1
MW-34-100	DA	12/6/2016		LF	1.2
MW-34-100	DA	2/6/2017		LF	1.2
MW-34-100	DA	2/6/2017	FD	LF	1.4
MW-34-100	DA	4/27/2017		LF	1.1
MW-34-100	DA	10/2/2017		LF	1.4
MW-34-100	DA	12/6/2017		LF	1.3
MW-34-100	DA	2/20/2018		LF	1.2
MW-35-060	SA	12/7/2015		LF	1
MW-35-060	SA	4/27/2016		LF	0.99
MW-35-060	SA	4/27/2016	FD	LF	1
MW-35-060	SA	12/9/2016		LF	1.1
MW-35-060	SA	5/1/2017		LF	0.94
MW-35-060	SA	12/8/2017		LF	0.99
MW-35-135	DA	12/7/2015		3V	0.87
MW-35-135	DA	4/27/2016		LF	0.81
MW-35-135	DA	12/9/2016		LF	0.95
MW-35-135	DA	12/9/2016	FD	LF	0.91
MW-35-135	DA	5/1/2017		LF	0.67
MW-35-135	DA	12/8/2017		LF	0.84
MW-36-020	SA	12/8/2015		LF	1.8

Table C-1

Arsenic Results in Monitoring Wells, December 2015 through March 2018

First Quarter 2018 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 Method	Dissolved Arsenic (µg/L)
MW-36-020	SA	12/7/2016		LF	1.9
MW-36-020	SA	12/6/2017		LF	2.3
MW-36-040	SA	12/8/2015		LF	4.6
MW-36-040	SA	12/7/2016		LF	5.6
MW-36-040	SA	12/6/2017		LF	4.8
MW-36-050	MA	12/8/2015		LF	3.8
MW-36-050	MA	12/7/2016		LF	4.4
MW-36-050	MA	12/6/2017		LF	4.7
MW-36-070	MA	12/8/2015		LF	2.9
MW-36-070	MA	12/7/2016		LF	3.2
MW-36-070	MA	12/6/2017		LF	2.3
MW-36-090	DA	12/8/2015		LF	21
MW-36-090	DA	4/26/2016		LF	7.2
MW-36-090	DA	12/7/2016		LF	18
MW-36-090	DA	4/27/2017		LF	5.5
MW-36-090	DA	12/6/2017		LF	4.6
MW-36-100	DA	12/8/2015		LF	8.5
MW-36-100	DA	4/26/2016		LF	6.5
MW-36-100	DA	12/7/2016		LF	6.6
MW-36-100	DA	4/27/2017		LF	5.1
MW-36-100	DA	4/27/2017	FD	LF	5
MW-36-100	DA	12/6/2017		LF	4.3
MW-36-100	DA	12/6/2017	FD	LF	4.5
MW-37D	DA	12/8/2016		LF	4.4
MW-37S	MA	12/8/2015		LF	1.7
MW-37S	MA	12/8/2016		LF	1.9
MW-37S	MA	12/8/2017		LF	1.8
MW-38D	DA	12/1/2015		3V	7.7
MW-38D	DA	12/1/2015		LF	7.3
MW-38D	DA	5/3/2016		3V	7.6
MW-38D	DA	5/3/2016		LF	7.9
MW-38D	DA	12/7/2016		3V	8.2
MW-38D	DA	12/7/2016		LF	8.1
MW-38D	DA	5/3/2017		3V	6.7
MW-38D	DA	5/3/2017		LF	7.6
MW-38D	DA	12/7/2017		3V	7
MW-38D	DA	12/7/2017		LF	7.3
MW-38S	SA	12/1/2015		3V	13
MW-38S	SA	12/1/2015		LF	14
MW-38S	SA	2/24/2016		3V	14

Table C-1

Arsenic Results in Monitoring Wells, December 2015 through March 2018

First Quarter 2018 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 Method	Dissolved Arsenic (µg/L)
MW-38S	SA	2/24/2016		LF	14
MW-38S	SA	5/3/2016		3V	11
MW-38S	SA	5/3/2016		LF	13
MW-38S	SA	9/29/2016		3V	9.8
MW-38S	SA	9/29/2016		LF	11
MW-38S	SA	12/7/2016		3V	9.6
MW-38S	SA	12/7/2016		LF	9.9
MW-38S	SA	12/7/2016	FD	3V	9.9
MW-38S	SA	2/9/2017		3V	8.4
MW-38S	SA	2/9/2017		LF	8.6
MW-38S	SA	5/3/2017		3V	7.9
MW-38S	SA	5/3/2017		LF	7.7
MW-38S	SA	9/26/2017		3V	7.7
MW-38S	SA	9/26/2017		LF	7.7
MW-38S	SA	9/26/2017	FD	LF	7.5
MW-38S	SA	12/7/2017		3V	7.3
MW-38S	SA	12/7/2017		LF	7.1
MW-38S	SA	2/23/2018		3V	6.8
MW-38S	SA	2/23/2018		LF	6.9
MW-39-040	SA	12/4/2015		LF	18
MW-39-040	SA	12/7/2016		LF	19
MW-39-040	SA	12/5/2017		LF	18
MW-39-040	SA	12/5/2017	FD	LF	18
MW-39-050	MA	12/4/2015		LF	2.4
MW-39-050	MA	12/7/2016		LF	2.3
MW-39-050	MA	12/5/2017		LF	2.1
MW-39-060	MA	12/4/2015		LF	4.4
MW-39-060	MA	12/4/2015	FD	LF	4.2
MW-39-060	MA	12/7/2016		LF	4.7
MW-39-060	MA	12/5/2017		LF	4
MW-39-100	DA	12/4/2015		LF	3
MW-39-100	DA	4/26/2016		LF	2.5
MW-39-100	DA	4/26/2016	FD	LF	2.6
MW-39-100	DA	12/7/2016		LF	2.3
MW-39-100	DA	4/27/2017		LF	2
MW-39-100	DA	12/5/2017		LF	2.1
MW-40D	DA	12/7/2015		H	4.2
MW-40D	DA	12/7/2015		LF	3.9
MW-40D	DA	12/7/2015	FD	H	3.9
MW-40D	DA	5/4/2016		H	4.4

Table C-1

Arsenic Results in Monitoring Wells, December 2015 through March 2018

First Quarter 2018 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 Method	Dissolved Arsenic (µg/L)
MW-40D	DA	5/4/2016		LF	4.1
MW-40S	SA	12/7/2015		H	1.7
MW-40S	SA	12/7/2015		LF	1.3
MW-41D	DA	12/7/2015		LF	1.7
MW-41D	DA	4/27/2016		LF	1.9
MW-41D	DA	12/8/2016		LF	2.9
MW-41D	DA	5/1/2017		LF	2
MW-41D	DA	12/13/2017		LF	2.8
MW-41D	DA	12/13/2017	FD	LF	2.8
MW-41M	DA	12/7/2015		LF	2
MW-41M	DA	12/7/2015	FD	LF	2.2
MW-41M	DA	12/8/2016		LF	2.2
MW-41M	DA	12/13/2017		LF	2.2
MW-41S	SA	12/7/2015		LF	1.6
MW-41S	SA	12/8/2016		LF	1.7
MW-41S	SA	12/13/2017		LF	1.6
MW-42-030	SA	12/3/2015		LF	3.4
MW-42-030	SA	12/4/2017		LF	2.6
MW-42-030	SA	12/4/2017	FD	LF	2.6
MW-42-055	MA	12/3/2015		LF	27
MW-42-055	MA	4/26/2016		LF	28
MW-42-055	MA	12/6/2016		LF	29
MW-42-055	MA	4/28/2017		LF	28
MW-42-055	MA	12/4/2017		LF	28
MW-42-065	MA	12/3/2015		LF	4
MW-42-065	MA	4/26/2016		LF	5.1
MW-42-065	MA	12/6/2016		LF	5.4
MW-42-065	MA	12/6/2016	FD	LF	5.5
MW-42-065	MA	4/28/2017		LF	5.7
MW-42-065	MA	12/4/2017		LF	14
MW-43-025	SA	12/8/2015		LF	17
MW-43-025	SA	12/7/2016		LF	25
MW-43-025	SA	12/5/2017		LF	25
MW-43-075	DA	12/2/2015		LF	13
MW-43-075	DA	12/9/2016		LF	13
MW-43-075	DA	12/5/2017		LF	12
MW-43-090	DA	12/2/2015		LF	1.2
MW-43-090	DA	12/9/2016		LF	2.2
MW-43-090	DA	12/5/2017		LF	3.1
MW-44-070	MA	12/4/2015		LF	6.6

Table C-1

Arsenic Results in Monitoring Wells, December 2015 through March 2018

First Quarter 2018 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 Method	Dissolved Arsenic (µg/L)
MW-44-070	MA	4/26/2016		LF	4.1
MW-44-070	MA	12/7/2016		LF	5.3
MW-44-070	MA	4/27/2017		3V	3.7
MW-44-070	MA	12/6/2017		LF	4.6
MW-44-115	DA	12/4/2015		LF	5.6
MW-44-115	DA	2/25/2016		LF	6.1
MW-44-115	DA	2/25/2016	FD	LF	5.5
MW-44-115	DA	4/26/2016		LF	6
MW-44-115	DA	12/7/2016		LF	6.6
MW-44-115	DA	2/6/2017		LF	5.2
MW-44-115	DA	4/27/2017		LF	5.8
MW-44-115	DA	10/2/2017		LF	5.4
MW-44-115	DA	12/6/2017		LF	5.9
MW-44-115	DA	2/20/2018		LF	5.7
MW-44-115	DA	2/20/2018	FD	LF	5.6
MW-44-125	DA	12/4/2015		LF	4.3
MW-44-125	DA	12/4/2015	FD	LF	4.1
MW-44-125	DA	4/26/2016		LF	4
MW-44-125	DA	4/26/2016	FD	LF	4
MW-44-125	DA	12/7/2016		LF	5.1
MW-44-125	DA	12/7/2016	FD	LF	5
MW-44-125	DA	4/27/2017		LF	3
MW-44-125	DA	12/6/2017		LF	4.8
MW-47-055	SA	12/2/2015		LF	0.74
MW-47-055	SA	4/26/2016		3V	1.1
MW-47-055	SA	12/8/2016		LF	1.3
MW-47-055	SA	4/26/2017		LF	0.96
MW-47-055	SA	4/26/2017	FD	LF	0.96
MW-47-055	SA	12/7/2017		LF	1.2
MW-47-055	SA	12/7/2017	FD	LF	1.2
MW-47-115	DA	4/26/2017		LF	1.8
MW-49-135	DA	12/1/2015		3V	1.9
MW-49-135	DA	12/8/2016		3V	2.2
MW-49-135	DA	12/8/2016	FD	3V	2
MW-49-135	DA	12/7/2017		3V	1.8
MW-49-275	DA	12/8/2016		LF	2.8
MW-49-365	DA	12/1/2015		LF	1.6
MW-49-365	DA	12/8/2016		LF	3.6
MW-50-200	DA	12/7/2015		LF	3.2
MW-51	MA	12/8/2015		LF	3.8

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Arsenic Results in Monitoring Wells, December 2015 through March 2018

First Quarter 2018 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 Method	Dissolved Arsenic (µg/L)
MW-51	MA	4/27/2016		LF	3.4
MW-51	MA	12/9/2016		LF	4
MW-51	MA	4/26/2017		LF	3.5
MW-51	MA	4/26/2017	FD	LF	3.5
MW-51	MA	12/11/2017		LF	3.8
MW-52D	DA	12/2/2015		3V	2.7
MW-52D	DA	4/25/2016		LF	2.3
MW-52D	DA	12/5/2016		LF	2.5
MW-52D	DA	4/27/2017		LF	2
MW-52D	DA	12/5/2017		LF	2.6
MW-52M	DA	12/2/2015		3V	0.81
MW-52M	DA	4/25/2016		LF	0.92
MW-52M	DA	12/5/2016		LF	0.74
MW-52M	DA	4/27/2017		LF	ND (0.5)
MW-52M	DA	12/5/2017		LF	0.83
MW-52M	DA	12/5/2017	FD	LF	0.74
MW-52S	MA	12/2/2015		3V	0.37
MW-52S	MA	4/25/2016		LF	0.38
MW-52S	MA	12/5/2016		LF	0.34
MW-52S	MA	12/5/2016	FD	LF	0.23
MW-52S	MA	4/27/2017		LF	0.36
MW-52S	MA	12/5/2017		LF	0.4
MW-53D	DA	12/2/2015		3V	2.6
MW-53D	DA	4/27/2016		LF	2.9 J
MW-53D	DA	12/5/2016		LF	0.68
MW-53D	DA	4/27/2017		LF	3.3
MW-53D	DA	4/27/2017	FD	LF	2.9
MW-53D	DA	12/5/2017		LF	2.9
MW-53M	DA	12/2/2015		3V	0.51
MW-53M	DA	4/27/2016		LF	ND (0.5)
MW-53M	DA	12/5/2016		LF	0.47
MW-53M	DA	4/27/2017		LF	0.67
MW-53M	DA	12/5/2017		LF	0.63
MW-54-085	DA	12/9/2015		LF	2.5
MW-54-085	DA	12/9/2015		LF	ND (5)
MW-54-085	DA	12/9/2015	FD	LF	2.4
MW-54-085	DA	4/29/2016		LF	ND (5)
MW-54-085	DA	12/15/2016		3V	3.16
MW-54-085	DA	5/4/2017		LF	4
MW-54-085	DA	12/13/2017		LF	4.22

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Arsenic Results in Monitoring Wells, December 2015 through March 2018

First Quarter 2018 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 Method	Dissolved Arsenic (µg/L)
MW-54-140	DA	12/9/2015		LF	2.4
MW-54-140	DA	12/9/2015		LF	ND (5)
MW-54-140	DA	4/29/2016		LF	ND (5)
MW-54-140	DA	12/15/2016		3V	2.98
MW-54-140	DA	5/4/2017		LF	2.9
MW-54-140	DA	12/13/2017		LF	3.51
MW-54-195	DA	12/9/2015		LF	0.94
MW-54-195	DA	12/9/2015		LF	ND (5)
MW-54-195	DA	4/29/2016		LF	ND (5)
MW-54-195	DA	12/15/2016		LF	1.17
MW-54-195	DA	12/15/2016	FD	LF	1.35
MW-54-195	DA	5/4/2017		3V	0.94
MW-54-195	DA	12/13/2017		LF	1.36
MW-55-120	DA	2/24/2016		LF	6.4
MW-55-120	DA	2/24/2016		LF	5.8
MW-57-070	BR	12/4/2015		3V	1.4
MW-57-070	BR	4/28/2016		3V	1.4
MW-57-070	BR	12/13/2016		LF	1.5
MW-57-070	BR	5/1/2017		LF	1.2
MW-57-070	BR	12/11/2017		LF	1.5
MW-57-185	BR	12/4/2015		3V	13
MW-57-185	BR	4/28/2016		3V	10
MW-57-185	BR	12/13/2016		3V	17
MW-57-185	BR	5/1/2017		3V	12
MW-57-185	BR	12/11/2017		3V	11
MW-57-185	BR	12/11/2017		LF	3.9
MW-58BR	BR	12/7/2015		LF	1.5
MW-58BR	BR	2/24/2016		LF	1.5
MW-58BR	BR	4/28/2016		LF	1.4
MW-58BR	BR	4/28/2016	FD	LF	1.3
MW-58BR	BR	9/27/2016		LF	1.6
MW-58BR	BR	12/13/2016		LF	1.6
MW-58BR	BR	2/7/2017		LF	1.4
MW-58BR	BR	5/2/2017		LF	1.5
MW-58BR	BR	9/27/2017		LF	1.6
MW-58BR	BR	12/11/2017		LF	1.8
MW-58BR	BR	2/19/2018		LF	1.7
MW-59-100	SA	12/3/2015		LF	1.9
MW-59-100	SA	12/3/2015	FD	LF	2
MW-59-100	SA	4/29/2016		LF	2.2

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Arsenic Results in Monitoring Wells, December 2015 through March 2018

First Quarter 2018 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 Method	Dissolved Arsenic (µg/L)
MW-59-100	SA	12/7/2016		LF	2.3
MW-59-100	SA	12/7/2016	FD	LF	2.2
MW-59-100	SA	5/1/2017		LF	2.2
MW-59-100	SA	12/7/2017		LF	1.8
MW-60-125	BR	12/4/2015		3V	1.3
MW-60-125	BR	4/28/2016		3V	1.6
MW-60-125	BR	12/14/2016		LF	1.5
MW-60-125	BR	5/2/2017		LF	1.5
MW-60-125	BR	12/6/2017		LF	1.6
MW-60BR-245	BR	12/4/2015		3V	7
MW-60BR-245	BR	2/23/2016		3V	6.9
MW-60BR-245	BR	4/29/2016		G	6.8
MW-60BR-245	BR	9/29/2016		3V	7.7
MW-60BR-245	BR	12/14/2016		3V	7.1
MW-60BR-245	BR	2/8/2017		3V	6.4
MW-60BR-245	BR	5/3/2017		3V	6.9
MW-60BR-245	BR	9/26/2017		3V	5.3
MW-60BR-245	BR	12/13/2017		LF	6.3
MW-60BR-245	BR	12/14/2017		3V	2.9
MW-60BR-245	BR	2/21/2018		3V	7.6
MW-60BR-245	BR	2/21/2018		LF	4.6
MW-61-110	BR	12/4/2015		3V	3.3
MW-61-110	BR	4/29/2016		LF	3.3
MW-61-110	BR	12/13/2016		3V	3.4
MW-61-110	BR	5/2/2017		3V	3.1
MW-61-110	BR	12/6/2017		LF	3.4
MW-62-065	BR	12/3/2015		3V	1.3
MW-62-065	BR	2/23/2016		3V	1.2
MW-62-065	BR	5/2/2016		3V	1.5
MW-62-065	BR	9/28/2016		LF	1.8
MW-62-065	BR	12/13/2016		LF	1.4
MW-62-065	BR	2/9/2017		3V	1.3
MW-62-065	BR	5/2/2017		LF	1.3
MW-62-065	BR	9/25/2017		LF	1.6
MW-62-065	BR	9/25/2017	FD	LF	1.5
MW-62-065	BR	12/6/2017		LF	1.7
MW-62-065	BR	2/19/2018		LF	1.6
MW-62-065	BR	2/19/2018	FD	LF	1.6
MW-62-110	BR	12/4/2015		3V	7.7
MW-62-110	BR	2/24/2016		3V	4.9

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Arsenic Results in Monitoring Wells, December 2015 through March 2018

First Quarter 2018 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 Method	Dissolved Arsenic (µg/L)
MW-62-110	BR	5/3/2016		Tap	6.2
MW-62-110	BR	9/28/2016		Flute	5
MW-62-110	BR	12/14/2016		G	13
MW-62-110	BR	2/8/2017		3V	7.2
MW-62-110	BR	5/3/2017		Tap	12
MW-62-110	BR	9/27/2017		Tap	4.3
MW-62-110	BR	12/7/2017		Tap	20
MW-62-110	BR	2/21/2018		Tap	6.7
MW-62-190	BR	12/4/2015		3V	3.9
MW-62-190	BR	5/3/2016		Tap	4.7
MW-62-190	BR	12/14/2016		G	3.8
MW-62-190	BR	5/3/2017		Tap	3.2
MW-62-190	BR	12/7/2017		Tap	3.4 J
MW-62-190	BR	12/7/2017	FD	Tap	5.2 J
MW-63-065	BR	12/4/2015		3V	1.9
MW-63-065	BR	2/23/2016		3V	1.7
MW-63-065	BR	4/28/2016		3V	1.6
MW-63-065	BR	4/28/2016	FD	3V	1.5
MW-63-065	BR	9/30/2016		LF	1.5
MW-63-065	BR	9/30/2016	FD	LF	1.4
MW-63-065	BR	12/13/2016		LF	1.6
MW-63-065	BR	2/9/2017		3V	1.4
MW-63-065	BR	5/2/2017		LF	1.5
MW-63-065	BR	9/28/2017		LF	1.4
MW-63-065	BR	12/12/2017		LF	1.5
MW-63-065	BR	2/21/2018		LF	1.5
MW-64BR	BR	12/7/2015		LF	3.3
MW-64BR	BR	2/22/2016		LF	4.1
MW-64BR	BR	5/2/2016		LF	4.2
MW-64BR	BR	9/28/2016		LF	4
MW-64BR	BR	12/13/2016		LF	4.2
MW-64BR	BR	12/13/2016	FD	LF	4.7
MW-64BR	BR	2/7/2017		LF	3.8
MW-64BR	BR	5/2/2017		LF	3.8
MW-64BR	BR	9/25/2017		LF	4.2
MW-64BR	BR	12/6/2017		LF	4.2
MW-64BR	BR	2/19/2018		LF	4.3
MW-64BR	BR	2/19/2018	FD	LF	4.1
MW-65-160	SA	12/2/2015		LF	0.73
MW-65-160	SA	2/24/2016		LF	0.54

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Arsenic Results in Monitoring Wells, December 2015 through March 2018

First Quarter 2018 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 Method	Dissolved Arsenic (µg/L)
MW-65-160	SA	5/3/2016		LF	0.54
MW-65-160	SA	9/29/2016		LF	0.54
MW-65-160	SA	12/6/2016		LF	0.8
MW-65-160	SA	2/8/2017		LF	0.6
MW-65-160	SA	5/4/2017		LF	0.35
MW-65-160	SA	9/26/2017		LF	0.43
MW-65-160	SA	12/5/2017		LF	0.74
MW-65-160	SA	2/22/2018		LF	0.8
MW-65-225	DA	12/2/2015		LF	2.6
MW-65-225	DA	2/24/2016		LF	2.2
MW-65-225	DA	5/3/2016		LF	2.8
MW-65-225	DA	9/29/2016		LF	4.1
MW-65-225	DA	12/6/2016		LF	3
MW-65-225	DA	2/8/2017		LF	2.1
MW-65-225	DA	5/4/2017		LF	1.9
MW-65-225	DA	5/4/2017	FD	LF	1.9
MW-65-225	DA	9/26/2017		LF	1.9
MW-65-225	DA	12/5/2017		LF	2.3
MW-65-225	DA	2/22/2018		LF	2.1
MW-66-165	SA	12/2/2015		LF	0.9
MW-66-165	SA	4/25/2016		LF	1.1
MW-66-165	SA	12/5/2016		LF	0.96
MW-66-165	SA	4/25/2017		LF	1
MW-66-165	SA	12/5/2017		LF	1.2
MW-66-230	DA	12/3/2015		LF	4.4
MW-66-230	DA	4/25/2016		LF	4.3
MW-66-230	DA	12/5/2016		LF	4.7
MW-66-230	DA	4/25/2017		LF	5.4
MW-66-230	DA	12/5/2017		LF	7.2
MW-66BR-270	BR	12/9/2015		3V	ND (0.5)
MW-66BR-270	BR	5/4/2016		3V	ND (0.1)
MW-66BR-270	BR	12/15/2016		3V	0.15
MW-66BR-270	BR	5/4/2017		3V	ND (0.1)
MW-66BR-270	BR	12/14/2017		3V	0.13
MW-67-185	SA	12/2/2015		LF	0.93
MW-67-185	SA	5/3/2016		LF	1.1
MW-67-185	SA	12/5/2016		LF	0.96
MW-67-185	SA	5/3/2017		LF	0.92
MW-67-185	SA	12/4/2017		LF	0.94
MW-67-225	MA	12/2/2015		LF	3.5

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First Quarter 2018 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 Method	Dissolved Arsenic (µg/L)
MW-67-225	MA	5/3/2016		LF	3.6
MW-67-225	MA	5/3/2016	FD	LF	3.7
MW-67-225	MA	12/5/2016		LF	3.6
MW-67-225	MA	5/4/2017		LF	3.2
MW-67-225	MA	12/4/2017		LF	3.4
MW-67-260	DA	12/2/2015		LF	8.9
MW-67-260	DA	5/3/2016		LF	9.3
MW-67-260	DA	12/5/2016		LF	9 J
MW-67-260	DA	12/5/2016	FD	LF	20 J
MW-67-260	DA	5/3/2017		LF	6.3
MW-67-260	DA	12/4/2017		LF	6.9
MW-68-180	SA	12/2/2015		LF	2.7
MW-68-180	SA	2/24/2016		LF	2.7
MW-68-180	SA	5/4/2016		LF	2.8
MW-68-180	SA	9/29/2016		LF	3.1
MW-68-180	SA	12/6/2016		LF	3
MW-68-180	SA	2/8/2017		LF	2.6
MW-68-180	SA	2/8/2017	FD	LF	2.4
MW-68-180	SA	5/3/2017		LF	2.9
MW-68-180	SA	9/26/2017		LF	2.7
MW-68-180	SA	2/22/2018		LF	2.7
MW-68-240	DA	12/2/2015		LF	1.5
MW-68-240	DA	5/4/2016		LF	1.5
MW-68-240	DA	12/6/2016		LF	1.8
MW-68-240	DA	5/3/2017		LF	2
MW-68-240	DA	2/22/2018		LF	1.7
MW-68BR-280	BR	12/3/2015		LF	1.3
MW-68BR-280	BR	5/4/2016		LF	0.82
MW-68BR-280	BR	12/6/2016		3V	1.2
MW-68BR-280	BR	5/4/2017		3V	ND (0.5)
MW-68BR-280	BR	5/4/2017	FD	3V	ND (0.5)
MW-68BR-280	BR	2/22/2018		LF	0.89
MW-69-195	BR	12/4/2015		3V	2.3
MW-69-195	BR	2/24/2016		3V	2.4
MW-69-195	BR	2/24/2016	FD	3V	2.3
MW-69-195	BR	4/25/2016		3V	2.3
MW-69-195	BR	9/29/2016		LF	2.5
MW-69-195	BR	12/6/2016		LF	2.7
MW-69-195	BR	2/9/2017		LF	2.2
MW-69-195	BR	5/3/2017		LF	2.1

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Arsenic Results in Monitoring Wells, December 2015 through March 2018

First Quarter 2018 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 Method	Dissolved Arsenic (µg/L)
MW-69-195	BR	9/26/2017		LF	2.2
MW-69-195	BR	12/4/2017		LF	2.5
MW-69-195	BR	2/22/2018		LF	2.1
MW-70-105	BR	12/7/2015		3V	4.2
MW-70-105	BR	4/28/2016		LF	4.8
MW-70-105	BR	12/14/2016		LF	4.1
MW-70-105	BR	5/2/2017		LF	3.7
MW-70-105	BR	12/11/2017		LF	3.9
MW-70BR-225	BR	12/7/2015		3V	1.8
MW-70BR-225	BR	4/28/2016		3V	2
MW-70BR-225	BR	12/14/2016		3V	2
MW-70BR-225	BR	12/14/2016	FD	3V	2.1
MW-70BR-225	BR	5/2/2017		3V	1.8
MW-70BR-225	BR	12/11/2017		3V	1.9
MW-70BR-225	BR	12/11/2017		LF	2.2
MW-71-035	SA	12/4/2015		LF	9.5
MW-71-035	SA	5/3/2016		LF	5.3
MW-71-035	SA	5/3/2016	FD	LF	5.7
MW-71-035	SA	12/14/2016		G	4.2
MW-71-035	SA	5/3/2017		LF	ND (2.5)
MW-71-035	SA	12/12/2017		LF	2.5
MW-72-080	BR	12/7/2015		3V	10
MW-72-080	BR	2/23/2016		3V	12
MW-72-080	BR	4/29/2016		3V	10
MW-72-080	BR	9/28/2016		LF	11
MW-72-080	BR	12/12/2016		LF	12
MW-72-080	BR	2/7/2017		3V	11
MW-72-080	BR	5/2/2017		LF	9
MW-72-080	BR	9/28/2017		LF	11
MW-72-080	BR	9/28/2017	FD	Tap	11
MW-72-080	BR	12/7/2017		LF	11
MW-72-080	BR	2/20/2018		LF	11
MW-72BR-200	BR	12/8/2015		3V	15
MW-72BR-200	BR	2/23/2016		3V	16
MW-72BR-200	BR	4/28/2016		3V	16
MW-72BR-200	BR	9/28/2016		3V	16
MW-72BR-200	BR	12/12/2016		3V	17
MW-72BR-200	BR	2/8/2017		3V	15
MW-72BR-200	BR	5/2/2017		3V	13
MW-72BR-200	BR	9/27/2017		3V	15

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Arsenic Results in Monitoring Wells, December 2015 through March 2018

First Quarter 2018 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 Method	Dissolved Arsenic (µg/L)
MW-72BR-200	BR	12/6/2017		3V	15
MW-72BR-200	BR	12/6/2017		LF	13
MW-72BR-200	BR	2/20/2018		3V	15
MW-72BR-200	BR	2/20/2018		LF	15
MW-73-080	BR	12/8/2015		3V	1.7
MW-73-080	BR	2/23/2016		3V	1.5
MW-73-080	BR	4/29/2016		3V	2.1
MW-73-080	BR	9/28/2016		G	2.3
MW-73-080	BR	12/12/2016		LF	1.6
MW-73-080	BR	12/12/2016	FD	LF	1.7
MW-73-080	BR	2/8/2017		3V	1.6
MW-73-080	BR	5/2/2017		LF	1.5
MW-73-080	BR	9/27/2017		LF	1.3
MW-73-080	BR	12/6/2017		LF	1.4
MW-73-080	BR	2/20/2018		LF	1.7
MW-74-240	BR	12/7/2015		3V	14
MW-74-240	BR	4/27/2016		LF	11
MW-74-240	BR	12/8/2016		LF	9.6
MW-74-240	BR	4/27/2017		LF	9.7
MW-74-240	BR	12/6/2017		LF	13
PM-03	---	4/5/2016		Tap	1.2
PM-04	---	4/5/2016		Tap	0.43
R-28	---	12/9/2015		G	2.3
R-28	---	1/26/2016		G	2.2
R-28	---	1/26/2016	FD	G	2.3
R-28	---	2/24/2016		G	2.2
R-28	---	4/27/2016		G	2.1
R-28	---	7/7/2016		G	2.3
R-28	---	11/29/2016		G	2.3
R-28	---	11/29/2016	FD	G	2.3
R-28	---	1/24/2017		G	2.2
R-28	---	2/21/2017		G	2.2
R-28	---	5/11/2017		G	2.1
R-28	---	8/16/2017		G	2.2
R-28	---	11/15/2017		G	2.3
R-28	---	1/3/2018		G	2.3
R-28	---	2/21/2018		G	2.2
TW-02D	DA	12/9/2015	FD	Tap	2.4

Notes:

Table C-1

Arsenic Results in Monitoring Wells, December 2015 through March 2018

First Quarter 2018 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 Method	Dissolved Arsenic (µg/L)

(a) = data were analyzed by an Arizona certified laboratory.
--- = data were either not collected, not available or were rejected
FD = field duplicate sample.
J = concentration or reporting limit (RL) estimated by laboratory or data validation.
ND = not detected at listed RL.
UF = unfiltered.
µg/LL = micrograms per liter.

Sample Methods:
3V = three volume.
Flute = flexible liner underground technologies sampling system.
LF = Low Flow (minimal drawdown)
Slant = slant (non vertical) wells MW-52, MW-53, MW-56 are sampled from dedicated Barcad screens, using a peristaltic pump.
Tap = sampled from tap or port of extraction or supply well.

Wells are assigned to separate aquifer zones for results reporting:
SA = shallow interval of Alluvial Aquifer.
MA = mid-depth interval of Alluvial Aquifer.
DA = deep interval of Alluvial Aquifer.
PA = perched aquifer (unsaturated zone).
BR = well completed in bedrock (Miocene Conglomerate or pre-Tertiary crystalline rock).

Starting in Third Quarter 2014, the groundwater sample collection method was switched from the traditional three-volume purge method (3V) to the low flow (LF) method at many short screen wells screened in alluvial sediments. The method for purging prior to sample collection is indicated in the sample method column of this table.

The California primary drinking water standard maximum contaminant level (MCL) for Arsenic is 10 µg/L.
The Background Study Upper Tolerance Limit for Arsenic at the site is 24.3 ug/L.

Table C-2

Additional Analytes from Wells in Bat Cave Wash, First Quarter 2018

First Quarter 2018 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles, California

							Dissolved Metals				
Location ID	Sample Date	Chloride (mg/L)	Bromide (mg/L)	Sulfate (mg/L)	Total Alkalinity (mg/L)	Total Dissolved Solids (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Iron (µg/L)	Sodium (mg/L)	Boron (mg/L)
MW-09	2/23/2018	770	ND (1)	240	130	1,800	110	28	31	520	0.78
MW-10	2/23/2018	670	0.86	270	120	1,700	110	17	250	470	0.96
MW-11	2/23/2018	560	ND (1)	190	92	1,300	120	21	ND (20)	320	0.47

Notes:

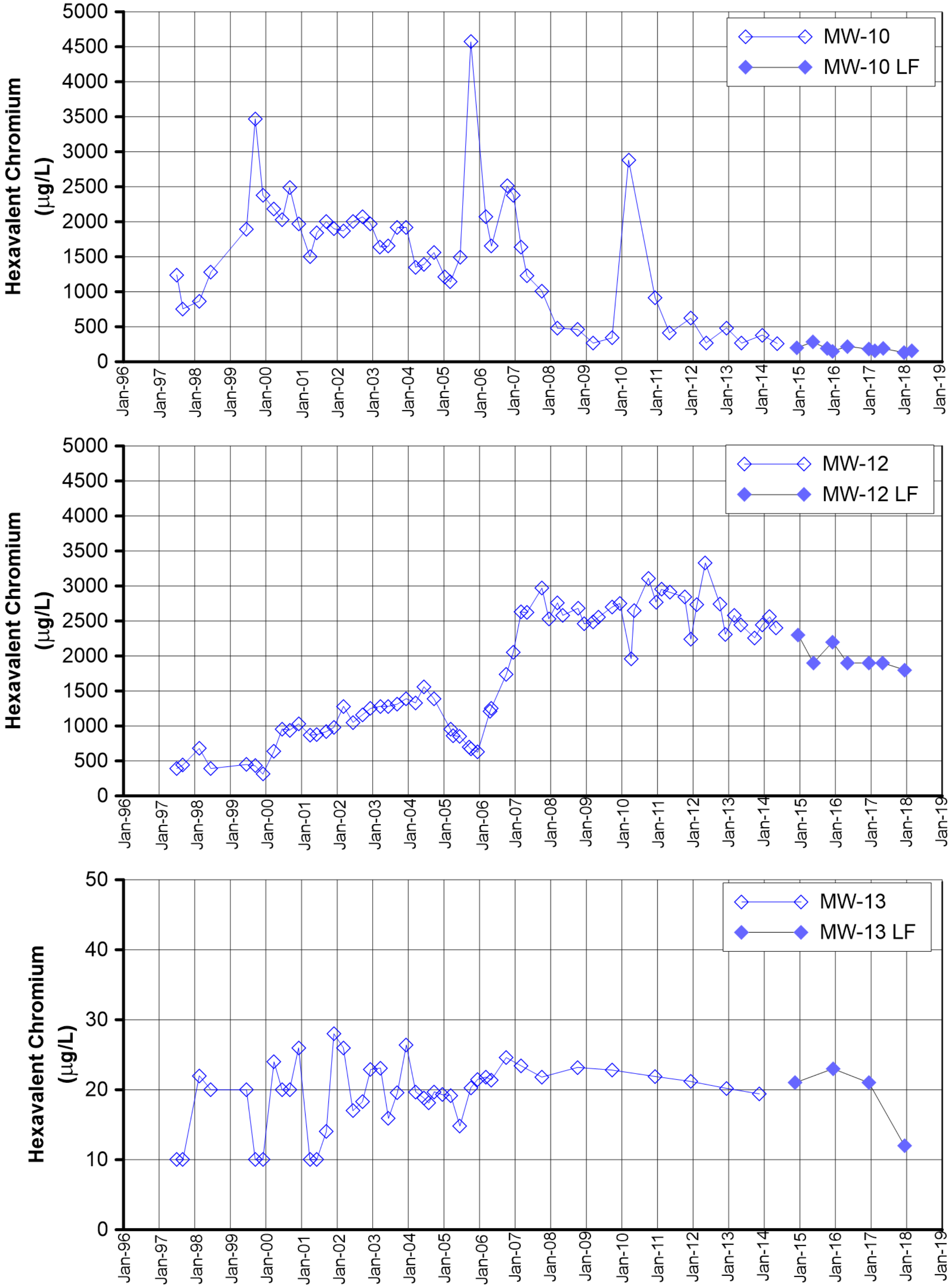
--- = data were either not collected, not available or were rejected

FD = field duplicate sample.

J = concentration or reporting limit (RL) estimated by laboratory or data validation.

APPENDIX D

Groundwater Monitoring Data for GMP and Interim Measures Monitoring Wells



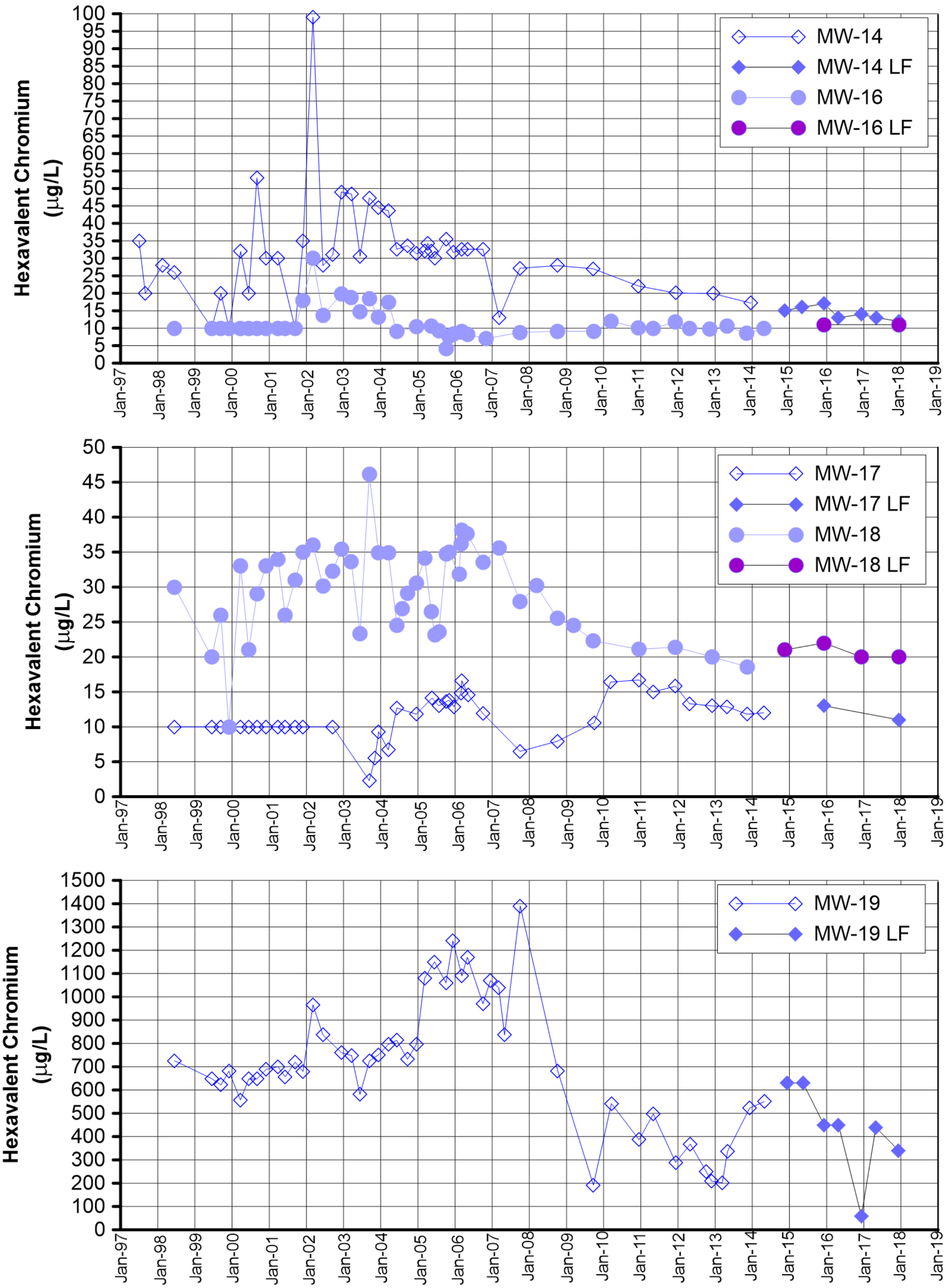
Notes:

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 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS

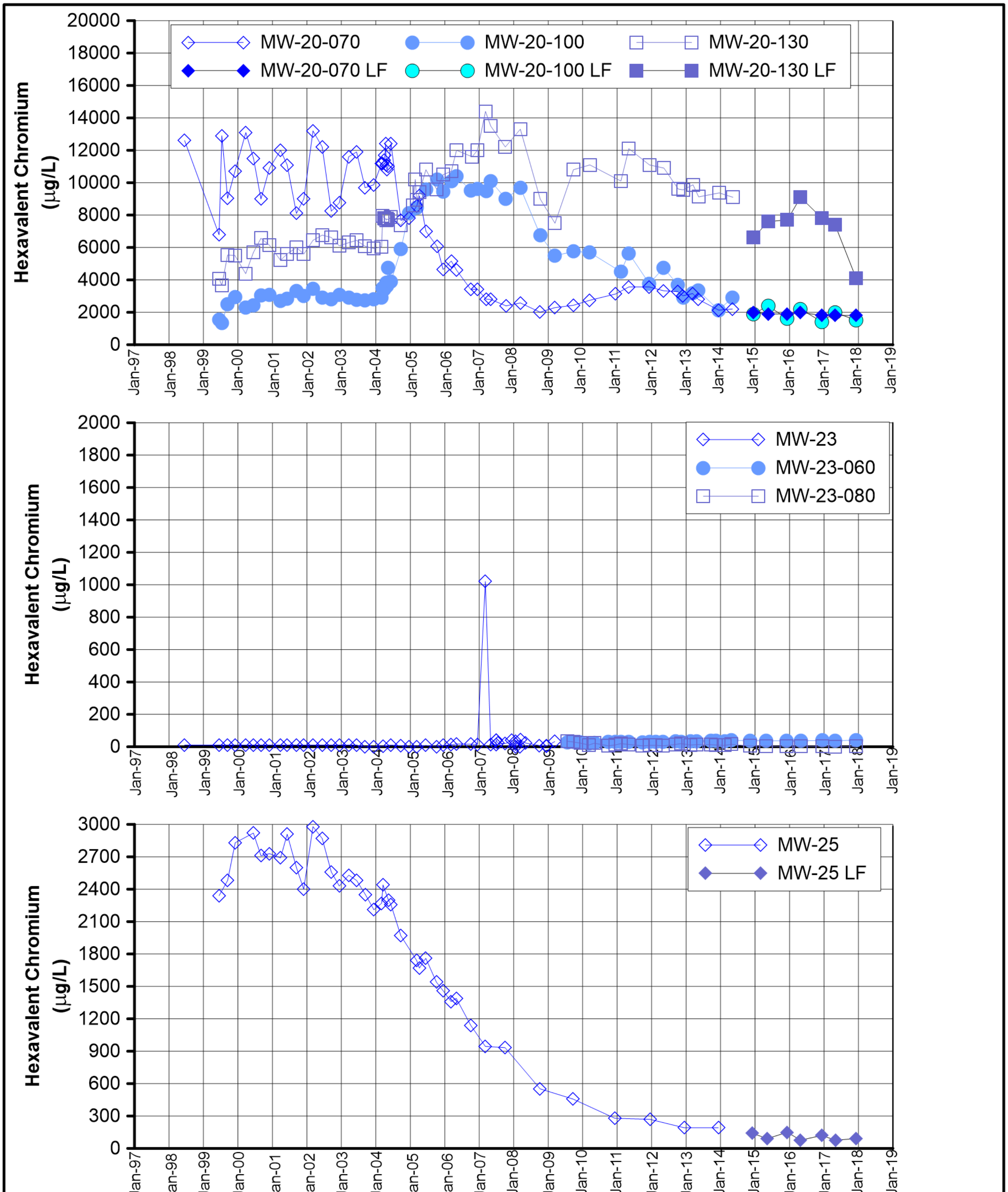


Notes:

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-2
HEXAVALENT CHROMIUM IN MW-14, MW-16, MW-17, MW-18, AND MW-19
FIRST QUARTER 2018 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-3
HEXAVALENT CHROMIUM IN MW-20 AND MW-23 CLUSTERS AND MW-25

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

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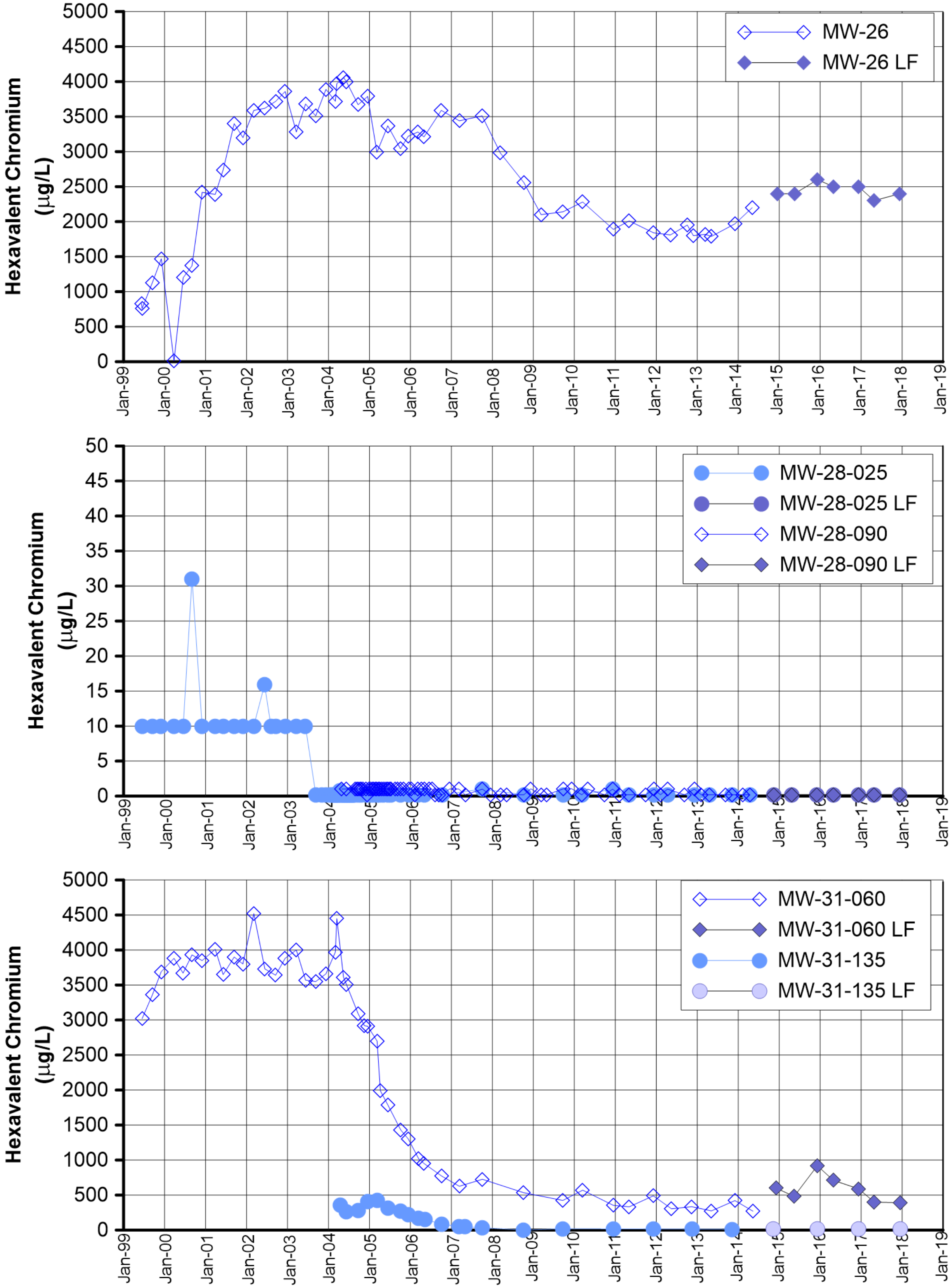

Notes:
1) The IM Contingency Plan and hexavalent chromium [Cr(VI)] trigger levels were updated July 17, 2008 (DTSC, 2008b).
2) The trigger level for MW-28-090 is 20 µg/L.

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 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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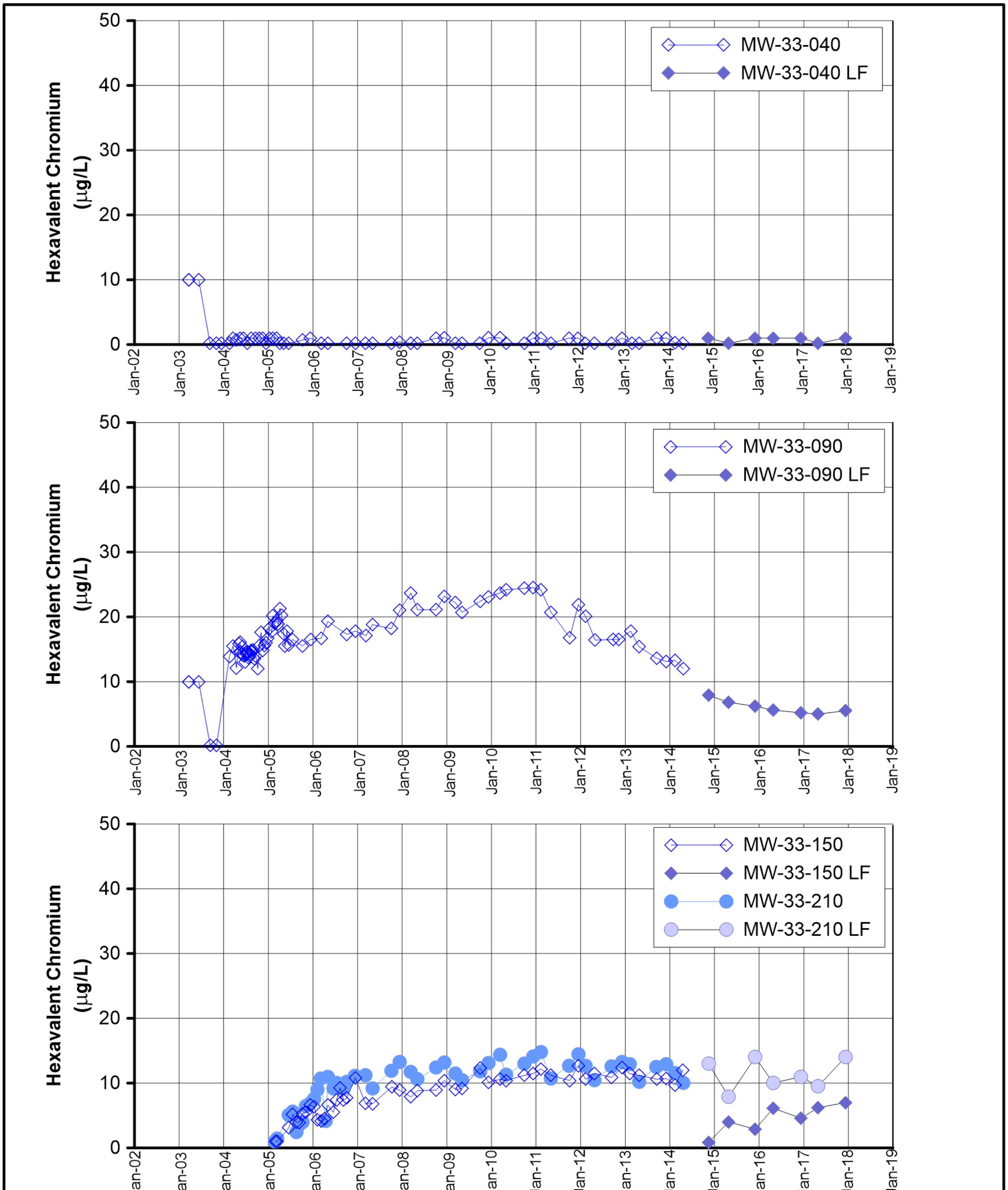

Notes:

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

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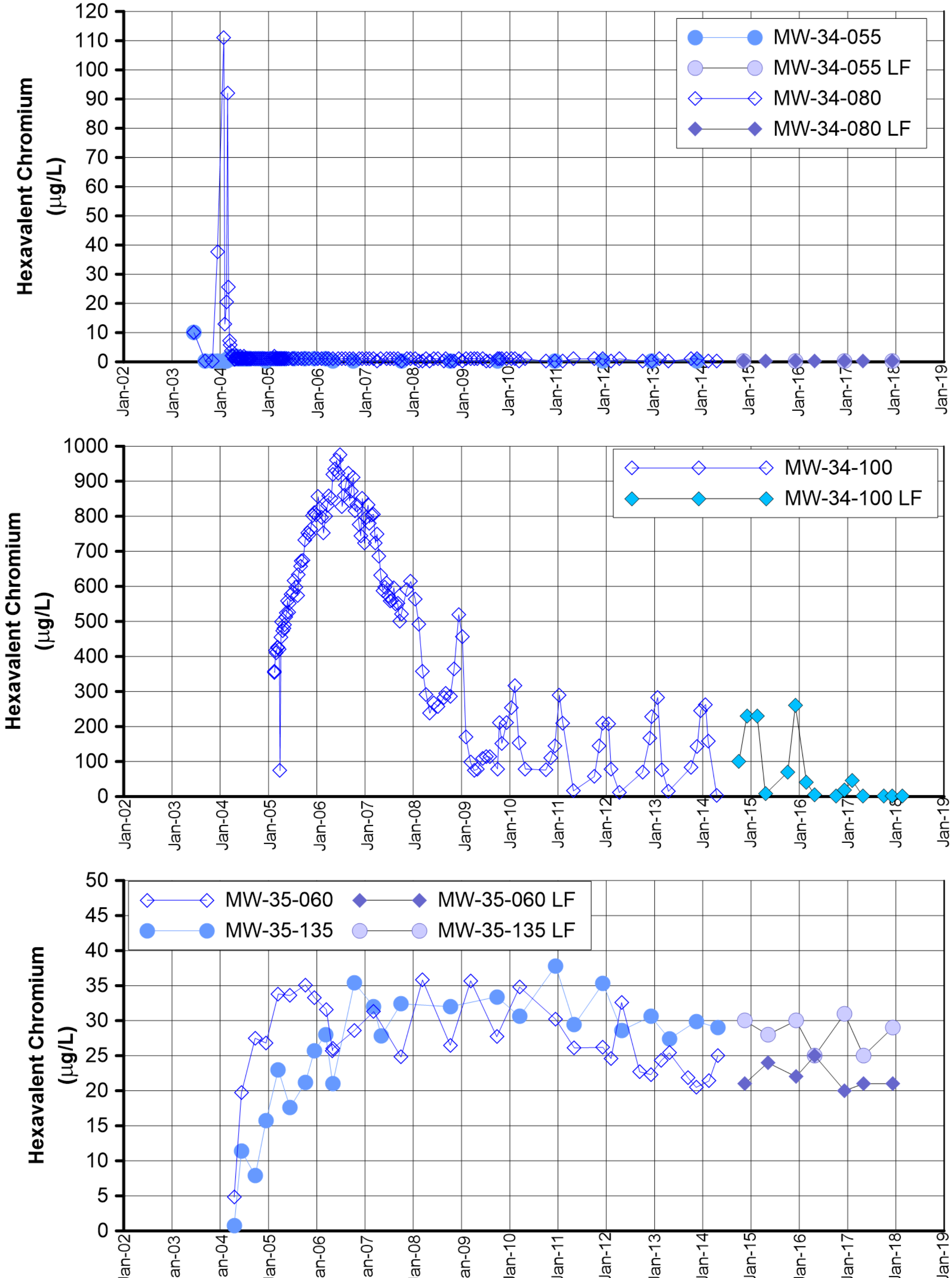
FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA



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

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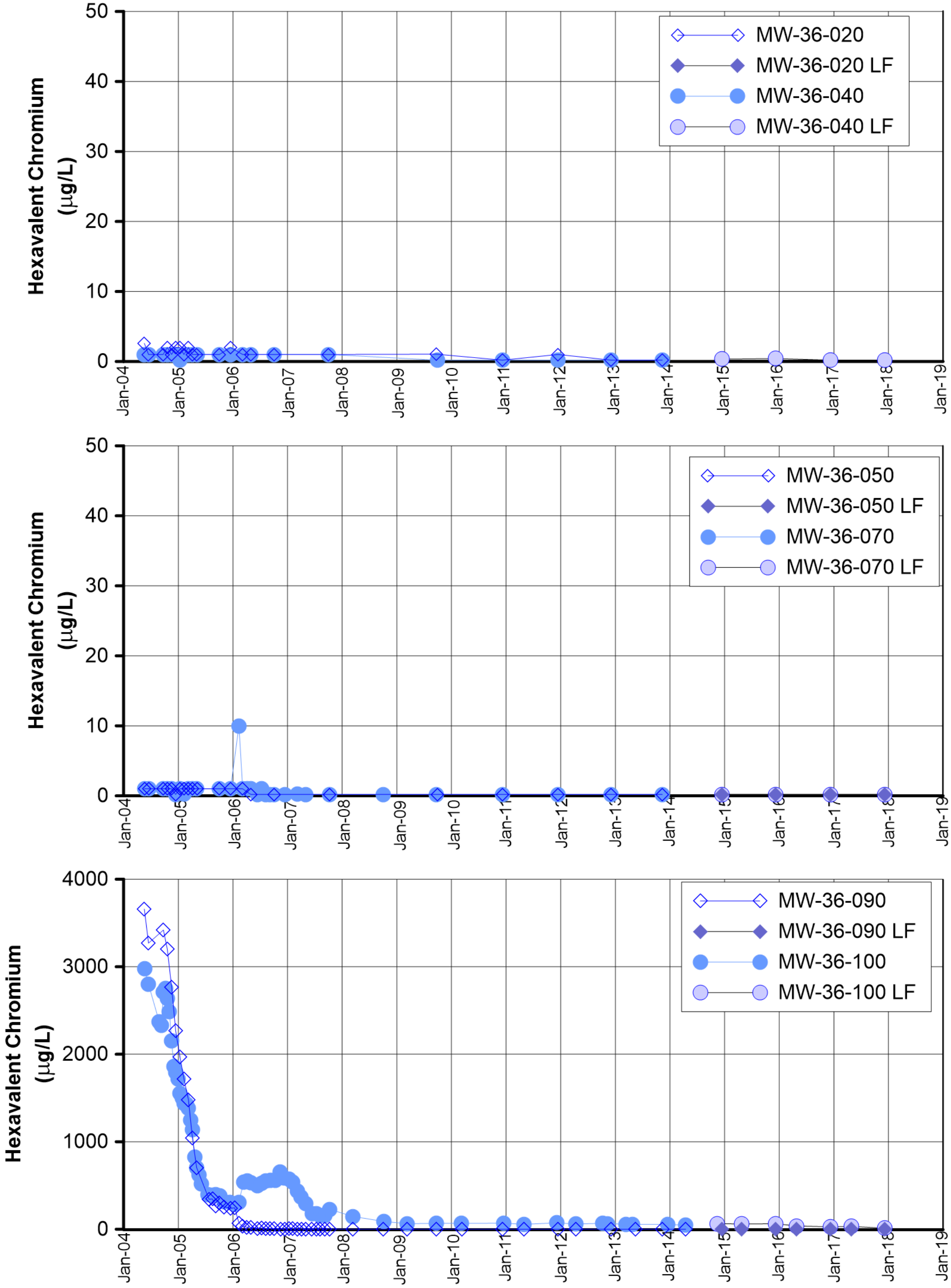
FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA



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-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 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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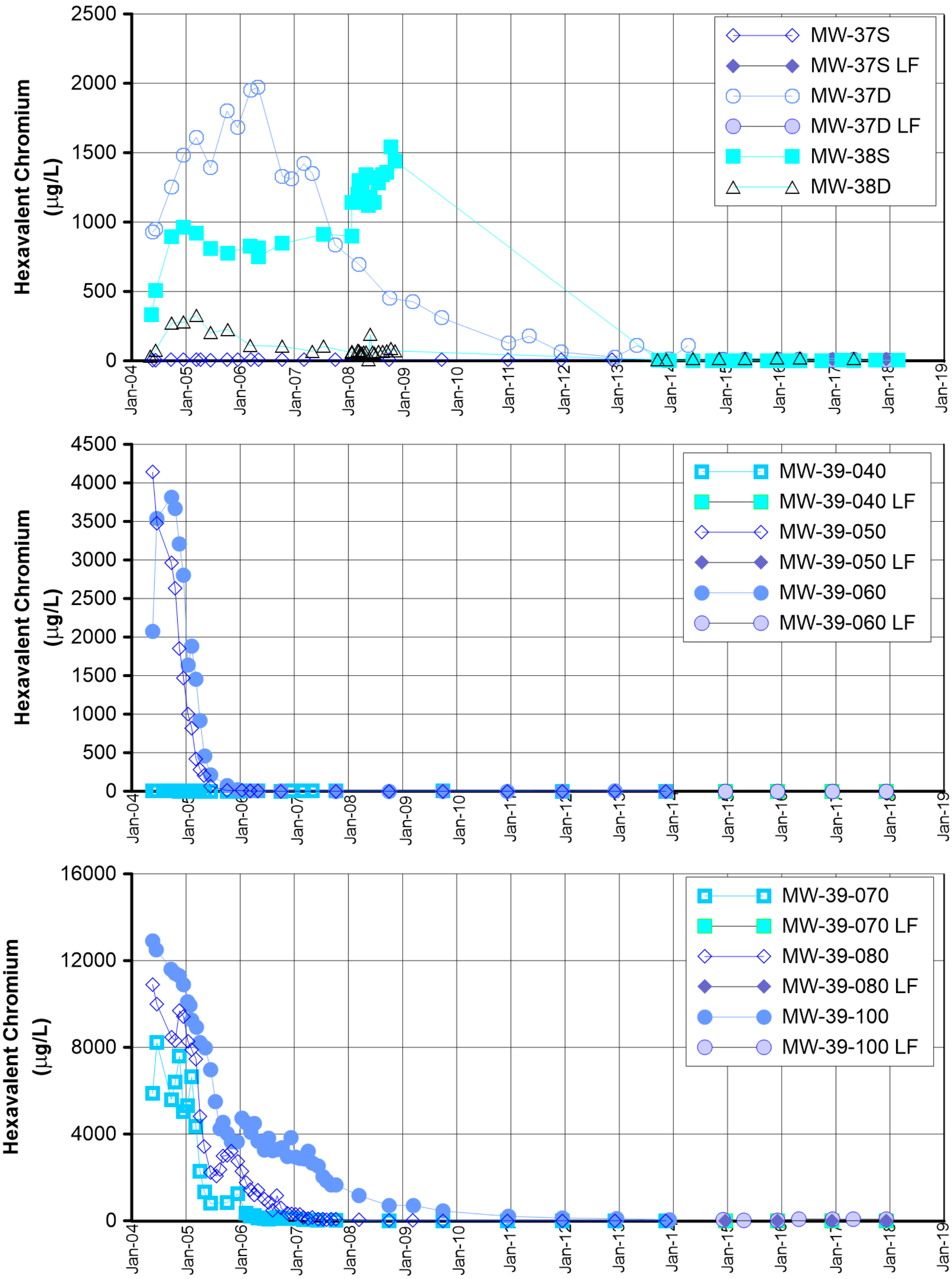

Notes:
1) The IM Contingency Plan and hexavalent chromium [Cr(VI)] trigger levels were updated July 17, 2008 (DTSC, 2008b).
2) The trigger level for MW-39-040 is 20 µg/L.

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

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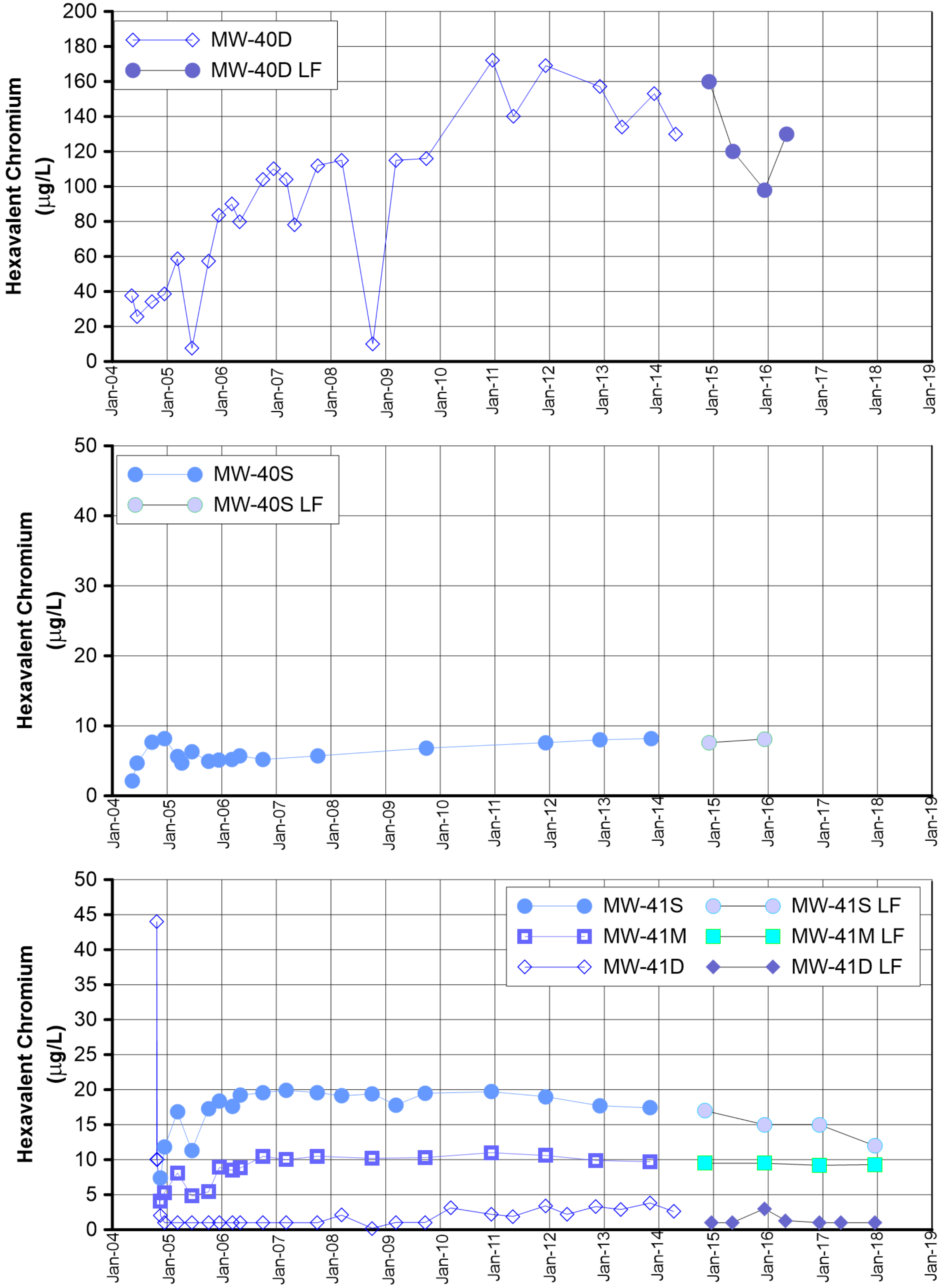
FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA



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

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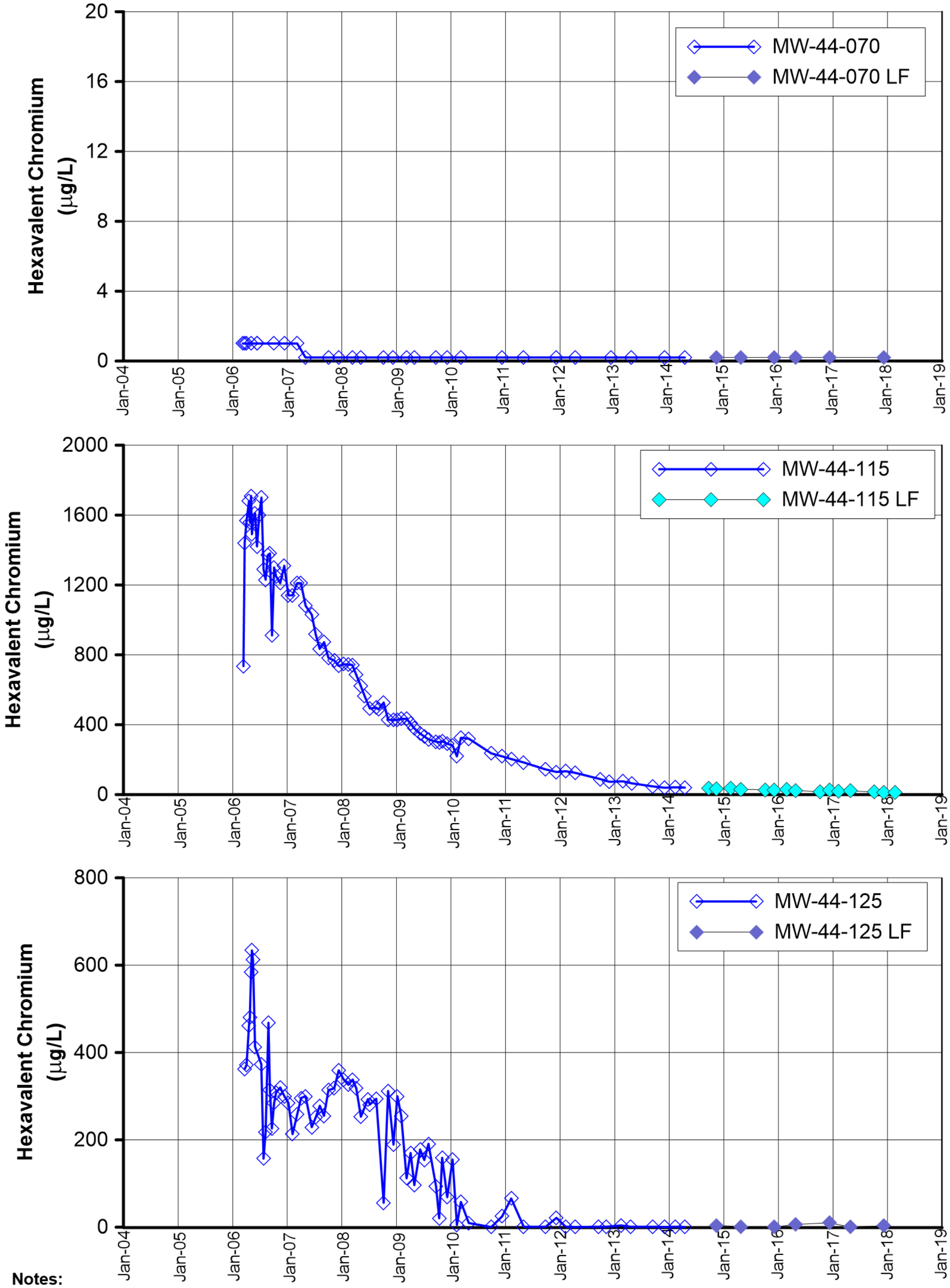
FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA



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

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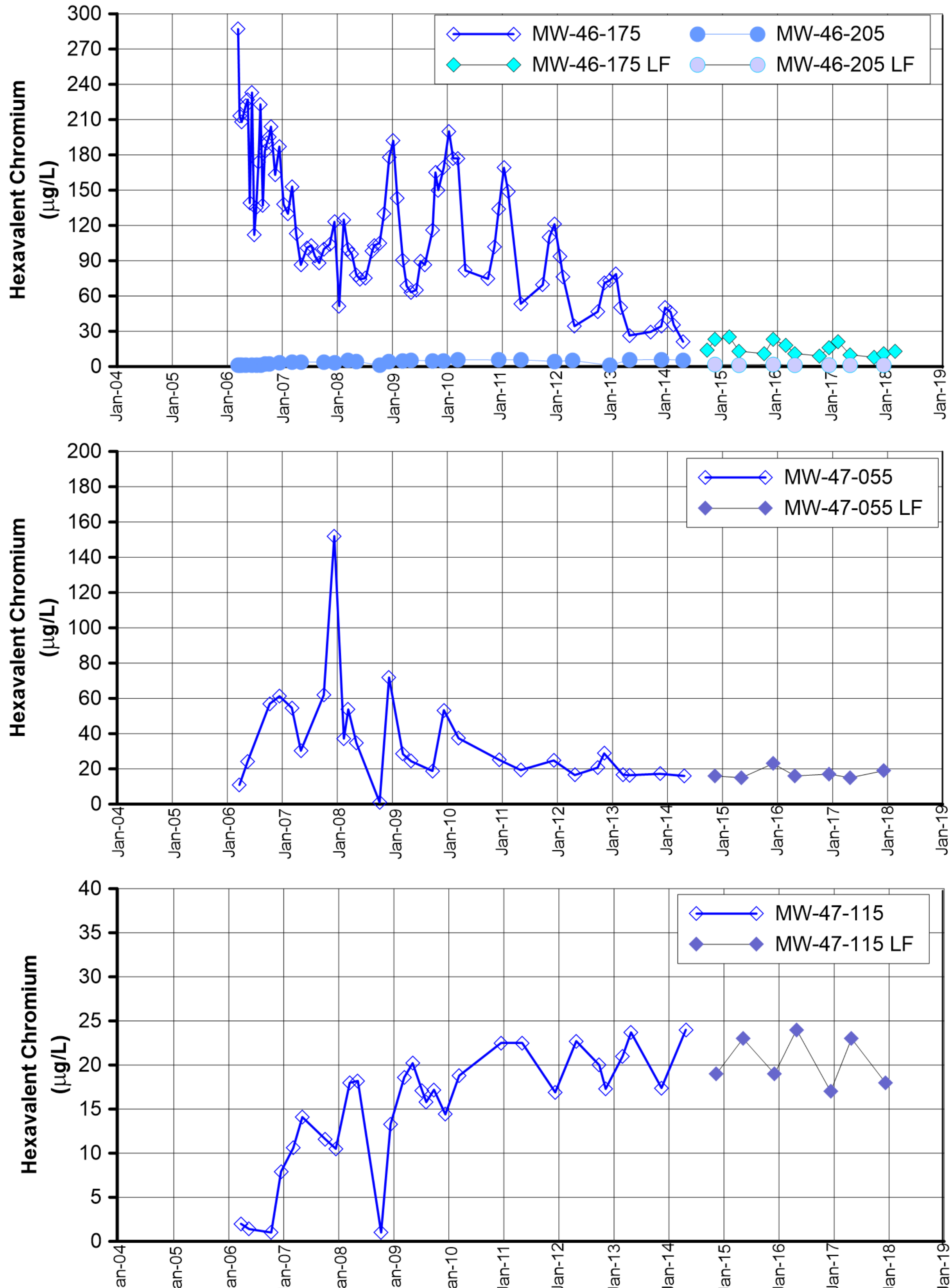
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA



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 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

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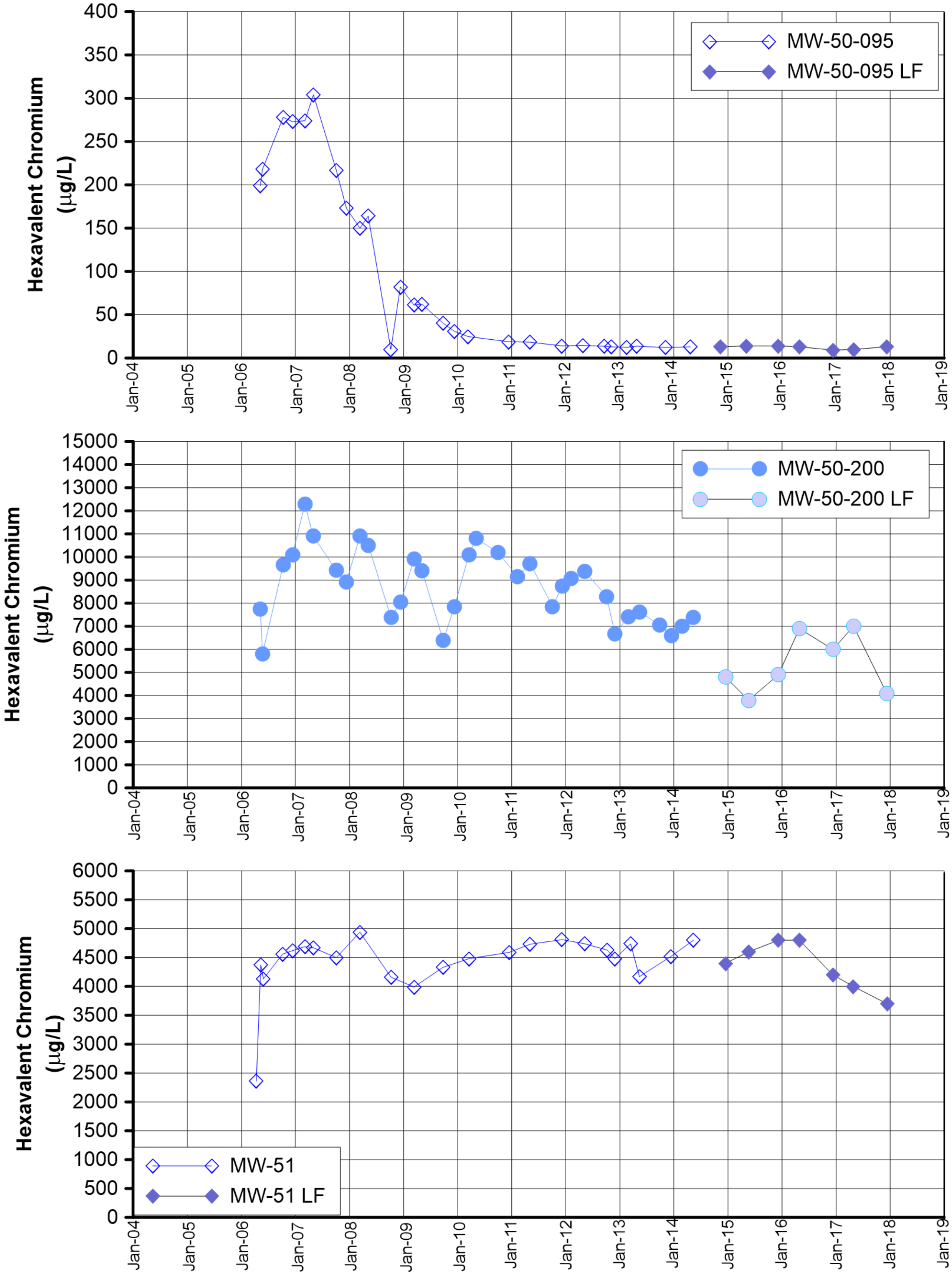

Notes:

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

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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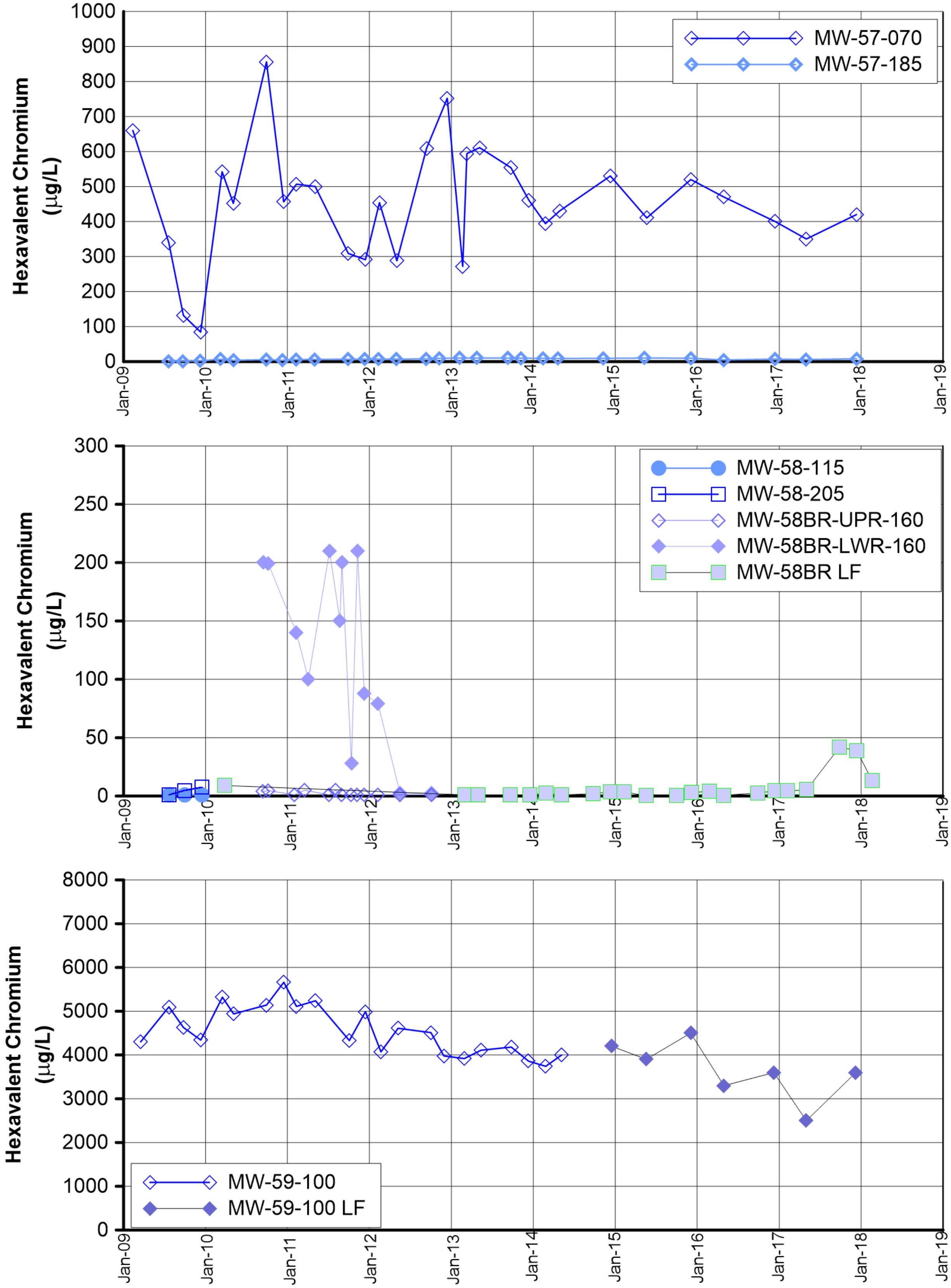

Note:

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

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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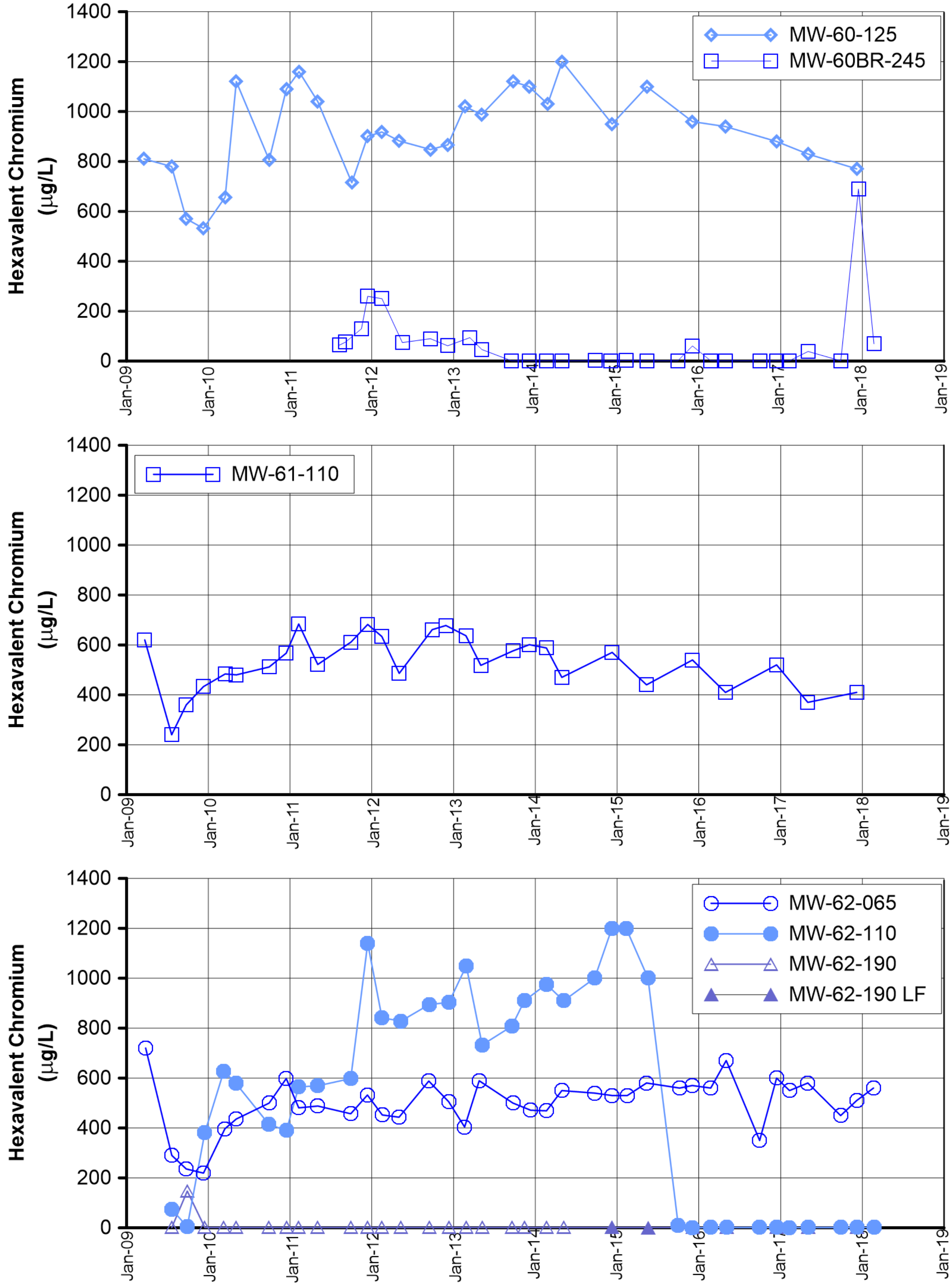

Notes:

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

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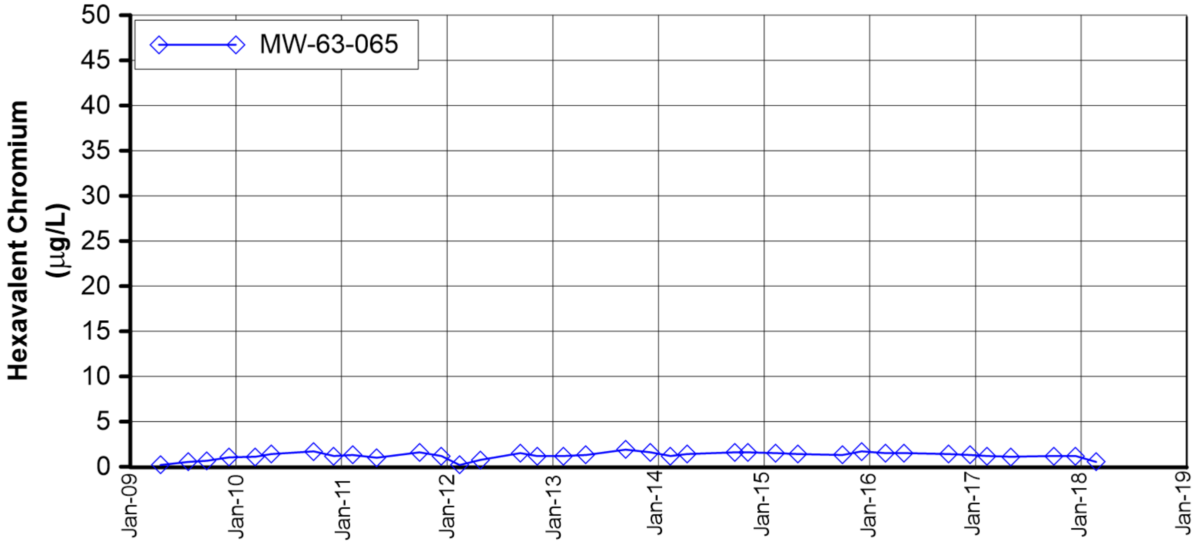
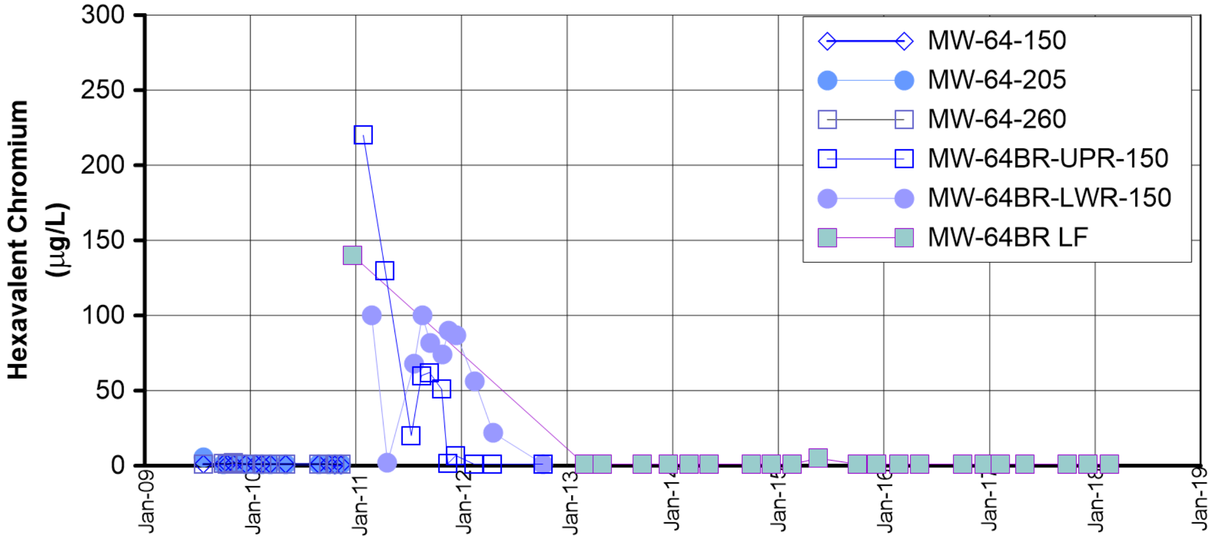
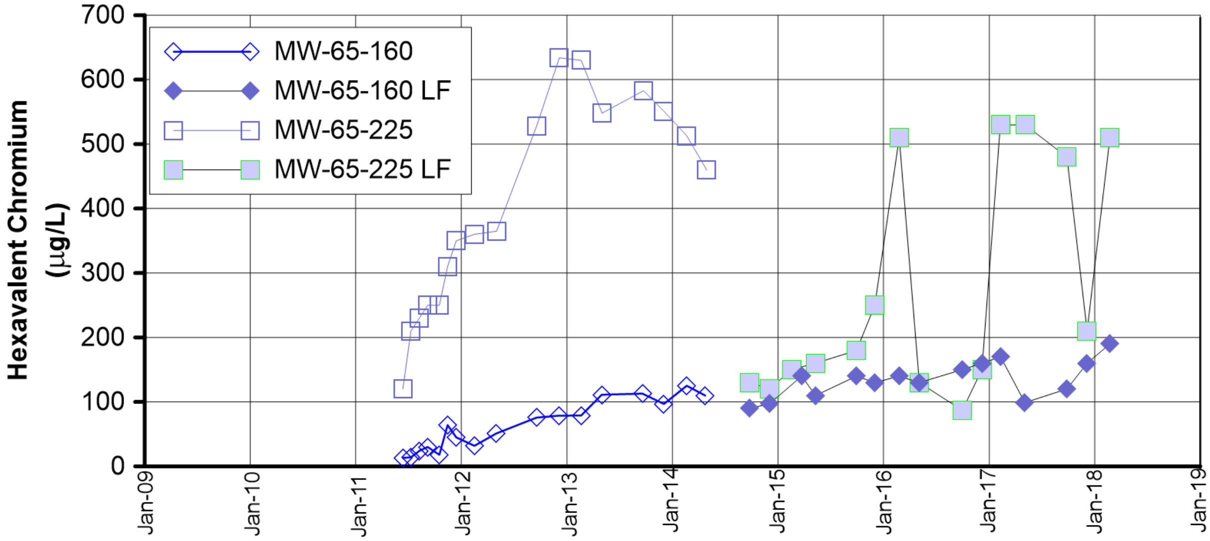
FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA







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

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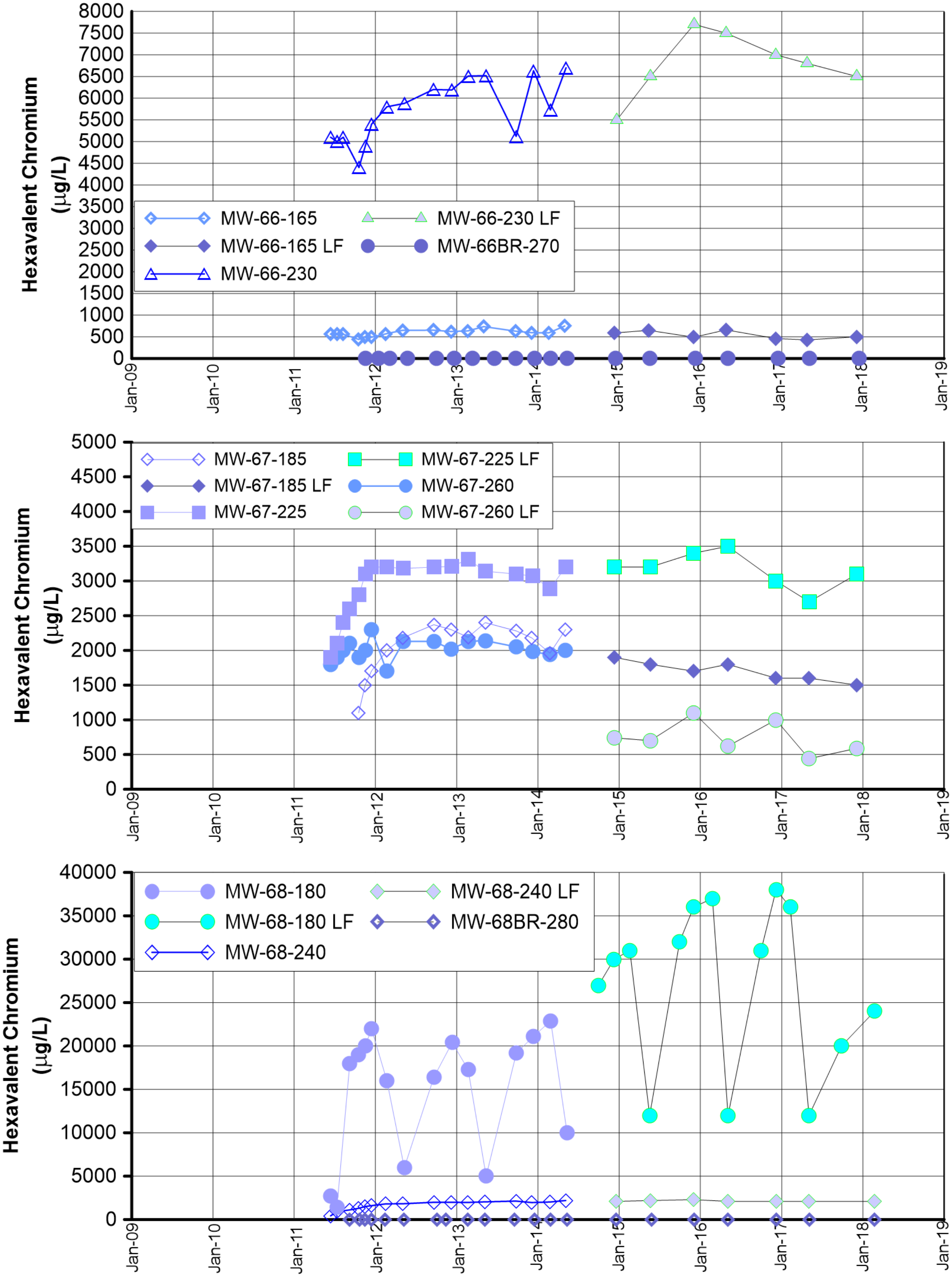
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA



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 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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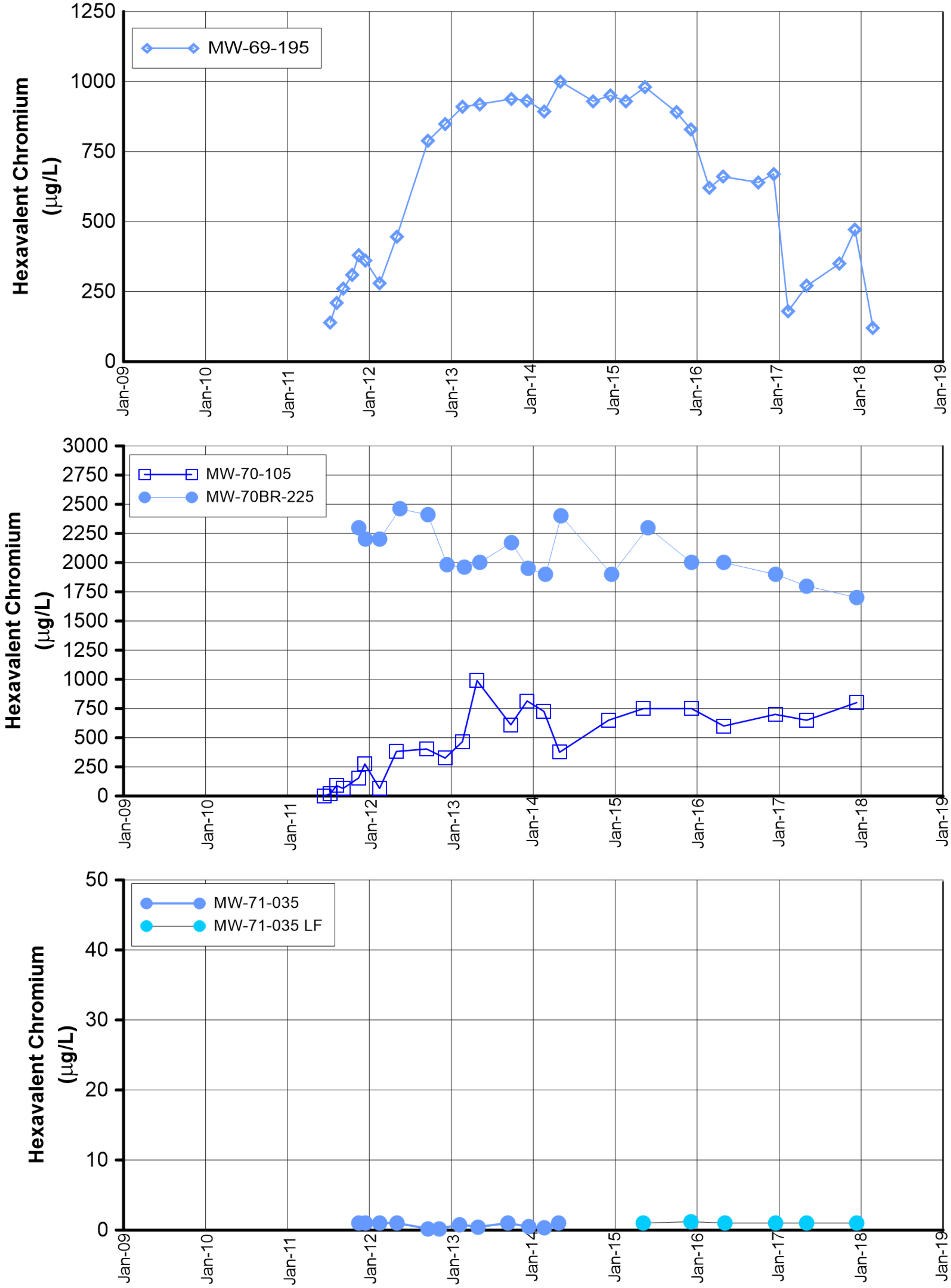

Notes:

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 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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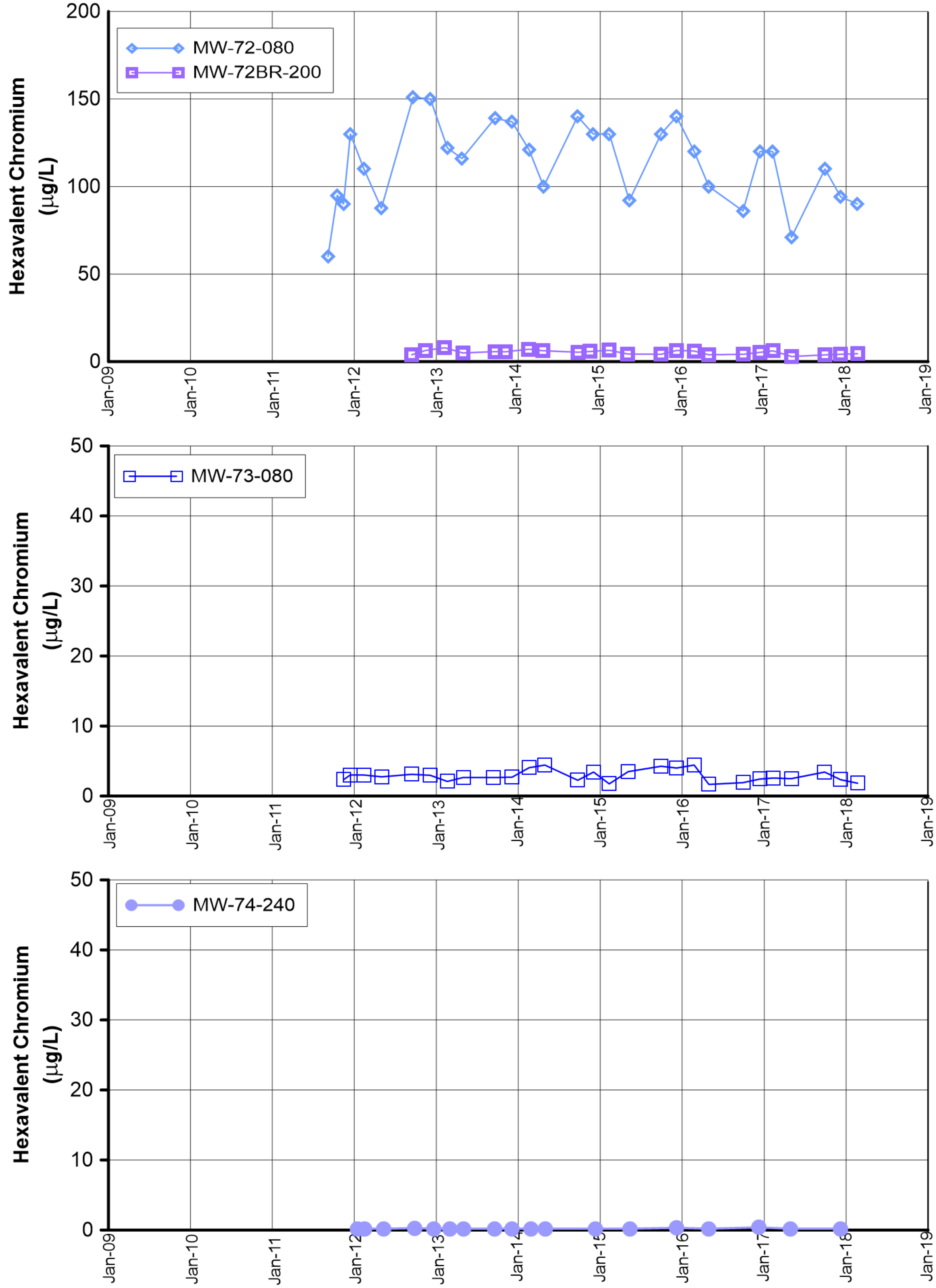

FIGURE D-18
HEXAVALENT CHROMIUM
IN MW-72 CLUSTER, MW-73-080, AND MW-74-240

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FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE
MONITORING AND SITE-WIDE GROUNDWATER
AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

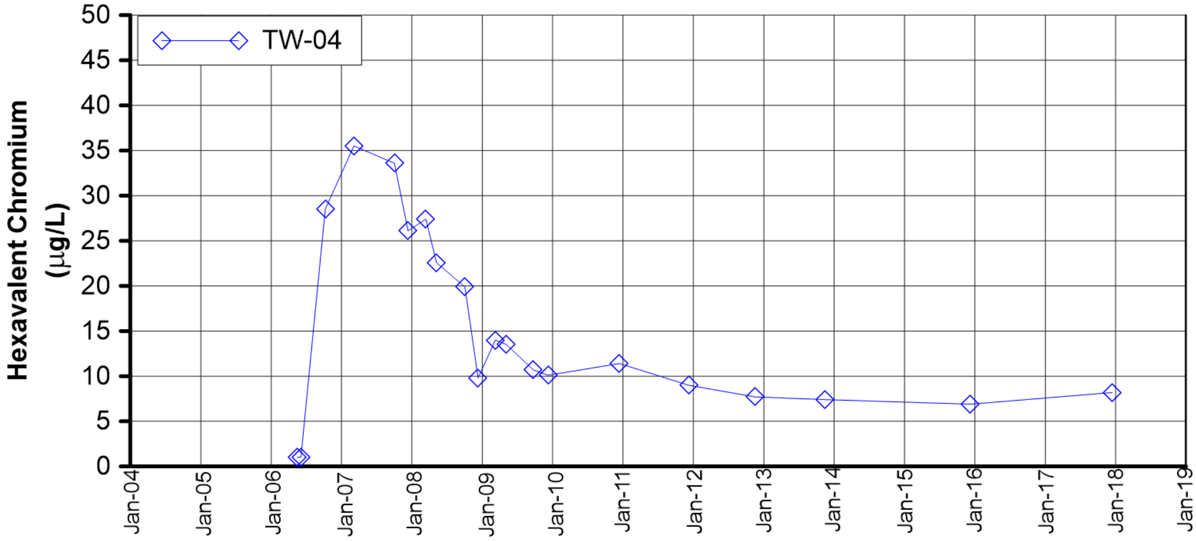

FIGURE D-19
HEXAVALENT CHROMIUM
IN TW-04

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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Table D-1
Chromium Concentrations of Wells within Approximately 800 feet of TW-3D Compared to the Maximum Detected Chromium Concentrations from 2014
First Quarter 2018 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report,
PG&E Topock Compressor Station, Needles, California

	Hexavalent Chromium		Total Dissolved Chromium		
Location ID	Maximum 2014 Hexavalent Chromium Concentration and New Trigger Levels (µg/L)	2018 First Quarter Hexavalent Chromium Result (µg/L)	Maximum 2014 Total Dissolved Chromium Concentration and New Trigger Levels (µg/L)	2018 First Quarter Total Dissolved Chromium Result (µg/L)	Trigger Level Exceeded (Yes if triggered - blank if not)
Shallow Zone Wells					
MW-20-070	2,200	---	2,400	---	
MW-26	2,400	---	2,300	---	
MW-27-020	ND (0.20)	---	ND (1.0)	---	
MW-28-025	ND (0.20)	---	ND (1.0)	---	
MW-30-030	0.21	---	ND (1.0)	---	
MW-31-060	600	---	660	---	
MW-32-020	ND (1.0)	---	ND (5.0)	---	
MW-32-035	ND (1.0)	---	ND (1.0)	---	
MW-33-040	0.28	---	ND (1.0)	---	
MW-36-020	ND (0.20)	---	ND (1.0)	---	
MW-36-040	0.34	---	ND (1.0)	---	
MW-39-040	ND (0.20)	---	ND (1.0)	---	
MW-42-030	0.54	---	ND (1.0)	---	
MW-47-055	16	---	16	---	
Middle Zone Wells					
MW-20-100	2,900	---	2,900	---	
MW-27-060	ND (0.20)	---	ND (1.0)	---	
MW-30-050	ND (0.20)	---	ND (1.0)	---	
MW-33-090	13.3	---	15.5	---	
MW-34-055	ND (0.20)	---	ND (1.0)	---	
MW-36-050	ND (0.20)	---	ND (1.0)	---	
MW-36-070	ND (0.20)	---	ND (1.0)	---	
MW-39-050	ND (0.20)	---	ND (1.0)	---	
MW-39-060	ND (0.20)	---	ND (1.0)	---	
MW-39-070	ND (0.20)	---	ND (1.0)	---	
MW-42-055	0.35	---	2.8	---	
MW-42-065	ND (0.20)	---	ND (1.0)	---	
MW-44-070	ND (0.20)	---	ND (1.0)	---	
MW-51	4,800	---	4,800	---	
Deep Zone Wells					
MW-20-130	9,100	---	9,000	---	
MW-27-085	ND (1.0)	---	ND (1.0)	---	
MW-28-090	ND (0.20)	---	ND (1.0)	---	
MW-31-135	12	---	12	---	
MW-33-150	12 J	---	10.8	---	
MW-33-210	13	---	13.5	---	
MW-34-080	ND (0.20)	---	ND (1.0)	---	
MW-34-100	263	ND (1)	270	1.5	
MW-36-090	ND (0.20)	---	ND (1.0)	---	
MW-36-100	65	---	62	---	

Table D-1
Chromium Concentrations of Wells within Approximately 800 feet of TW-3D Compared to the Maximum Detected Chromium Concentrations from 2014
First Quarter 2018 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report,
PG&E Topock Compressor Station, Needles, California

	Hexavalent Chromium		Total Dissolved Chromium		
Location ID	**Maximum 2014 Hexavalent Chromium Concentration and New Trigger Levels (µg/L)**	**2018 First Quarter Hexavalent Chromium Result (µg/L)**	**Maximum 2014 Total Dissolved Chromium Concentration and New Trigger Levels (µg/L)**	**2018 First Quarter Total Dissolved Chromium Result (µg/L)**	**Trigger Level Exceeded (Yes if triggered - blank if not)**
MW-39-080	ND (0.20)	---	ND (1.0)	---	
MW-39-100	57	---	49	---	
MW-44-115	41.6	13	42.9	12	
MW-44-125	4.0 J	---	5.9	---	
MW-45-095a	13.7 (a)	---	14.2 (a)	---	
MW-46-175	46.3	13	46.1	12	
MW-46-205	5.5	---	4.8	---	
MW-47-115	24	---	20	---	
PE-01	5.6	2.3	6	2	
TW-04	7.4	---	6.5	---	

Notes:
--- = data were either not collected, not available or were rejected
J = concentration or reporting limit estimated by laboratory or data validation.
ug/L = micrograms per liter.
(a) = Result is the maximum from 2013

APPENDIX E

Interim Measures Extraction System Operations Log, First Quarter 2018

APPENDIX E

Interim Measures Extraction System Operations Log, First Quarter 2018, PG&E Topock Performance Monitoring Program

During First Quarter 2018 (January through March), extraction well TW-3D operated at a target pump rate of at 135 gallons per minute, excluding periods of planned and unplanned downtime. Extraction wells TW-2D and PE-01 were only operated to collect a sample during First Quarter 2018. Extraction well TW-2S was not operated during First Quarter 2018. The operational run time for the Interim Measure groundwater extraction system (combined or individual pumping) was approximately 96.9 percent during First Quarter 2018.

The Interim Measure Number 3 (IM-3) facility treated approximately 16,991,873 gallons of extracted groundwater during First Quarter 2018. The IM-3 facility also treated approximately 18,900 gallons of injection well backwashing/re-development water and 375 gallons of purge water from site sampling activities. Five 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 3.1 percent of downtime during First Quarter 2018) 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 2018

- **January 3, 2018 (planned):** The extraction well system was offline from 7:46 a.m. to 10:54 a.m. to change out the microfilter modules due to high transmembrane pressure. Extraction system downtime was 3 hours 8 minutes.
- **January 4, 2018 (unplanned):** The extraction system was offline from 10:58 a.m. to 11:00 a.m. due to a programmable logic controller (PLC) and human machine interface (HMI) connectivity issue. Extraction system downtime was 2 minutes.
- **January 5, 2018 (planned):** The extraction system was offline from 10:32 a.m. to 10:44 a.m. due to testing of the pipeline critical alarms and leak detection system. Extraction system downtime was 12 minutes.
- **January 9, 2018 (unplanned):** The extraction well system was offline from 3:34 a.m. to 4:00 a.m. due to loss of power from the City of Needles. Extraction system downtime was 26 minutes.
- **January 9, 2018 (planned):** The extraction well system was offline from 11:20 a.m. to 1:08 p.m. to change out the microfilter modules due to high transmembrane pressure. Extraction system downtime was 1 hour 48 minutes.
- **January 13, 2018 (unplanned):** The extraction well system was offline from 12:12 p.m. to 1:46 p.m. due to the Clarifier Feed Pump (P-400) shutting off for unknown reasons, which caused a high level at Raw Water Storage Tank (T-100). Extraction system downtime was 1 hour 34 minutes.
- **January 16, 2018 (planned):** The extraction well system was offline from 4:48 p.m. to 5:08 p.m. due to a blockage in the piping between Iron Oxidation Tanks T-301A, B, and C; this situation forced the plant to operate at slower pumping rates, which caused high levels in the Chromium Reduction Reactor Tank (T-300A) and T-100. Extraction system downtime was 20 minutes.
- **January 19, 2018 (planned):** The extraction well system was offline from 10:12 a.m. to 11:56 a.m. to change out the microfilter modules due to high transmembrane pressure. Extraction system downtime was 1 hour 44 minutes.

- **January 22, 2018 (planned):** The extraction well system was offline from 10:04 a.m. to 11:30 a.m. due to a blockage in the piping between Iron Oxidation Tanks T-301A, B, and C; this situation forced the plant to operate at slower rates, which caused a high level in T-100. Extraction was shut down to lower the tank level in T-100. Extraction system downtime was 1 hour 26 minutes.
- **January 24, 2018 (planned):** The extraction well system was offline from 9:02 a.m. to 10:04 a.m. due to a blockage in the piping between Iron Oxidation Tanks T-301A, B, and C; this situation forced the plant to operate at slower rates, which caused a high level in T-100. Extraction was shut down to lower the tank level in T-100. Extraction system downtime was 1 hour 2 minutes.
- **January 30, 2018 (planned):** The extraction well system was offline from 2:38 a.m. to 3:20 a.m. due a valve failure in the airline at T-100. Extraction system downtime was 42 minutes.

E.2 February 2018

- **February 1, 2018 (planned):** The extraction well system was offline from 10:10 a.m. to 11:16 a.m. to change out the microfilter modules due to high transmembrane pressure. Extraction system downtime was 1 hour 6 minutes.
- **February 2, 2018 (planned):** The extraction system was offline from 11:40 a.m. to 12:04 p.m. due to testing of the pipeline critical alarms and leak detection system. Extraction system downtime was 24 minutes.
- **February 6, 2018 (unplanned):** The extraction system was offline from 3:22 p.m. to 4:02 p.m. due to collecting a total depth measurement at extraction well TW-3D. Extraction system downtime was 40 minutes.
- **February 9, 2018 (planned):** The extraction well system was offline from 10:08 a.m. to 12:40 p.m. to change out the microfilter modules due to high transmembrane pressure. Extraction system downtime was 2 hours 32 minutes.
- **February 14, 2018 (unplanned):** The extraction well system was offline from 1:10 a.m. to 1:32 p.m. because the ferrous chloride feed pump (P800) failed and was replaced. Extraction system downtime was 12 hours 22 minutes.
- **February 21, 2018 (unplanned):** The extraction well system was offline from 7:18 a.m. to 7:26 a.m. due to loss of power from the City of Needles. Extraction system downtime was 8 minutes.
- **February 22, 2018 (unplanned):** The extraction well system was offline from 6:26 a.m. to 7:12 a.m. due to variable frequency drive (VFD) motor problems at Clarifier Feed Pump (P400). Extraction system downtime was 46 minutes.
- **February 23, 2018 (planned):** The extraction well system was offline from 9:50 a.m. to 9:58 a.m. due to switching between TW-3D and TW-2D to collect a sample at TW-2D. Extraction system downtime was 8 minutes.
- **February 23, 2018 (unplanned):** The extraction well system was offline from 11:02 a.m. to 3:24 a.m. due to the VFD giving erratic output signals that indicated P400 had scale buildup. The plant was shut down to remove the scaling. Also, microfilter modules were changed out due to high transmembrane pressure Extraction system downtime was 4 hours 22 minutes.

E.3 March 2018

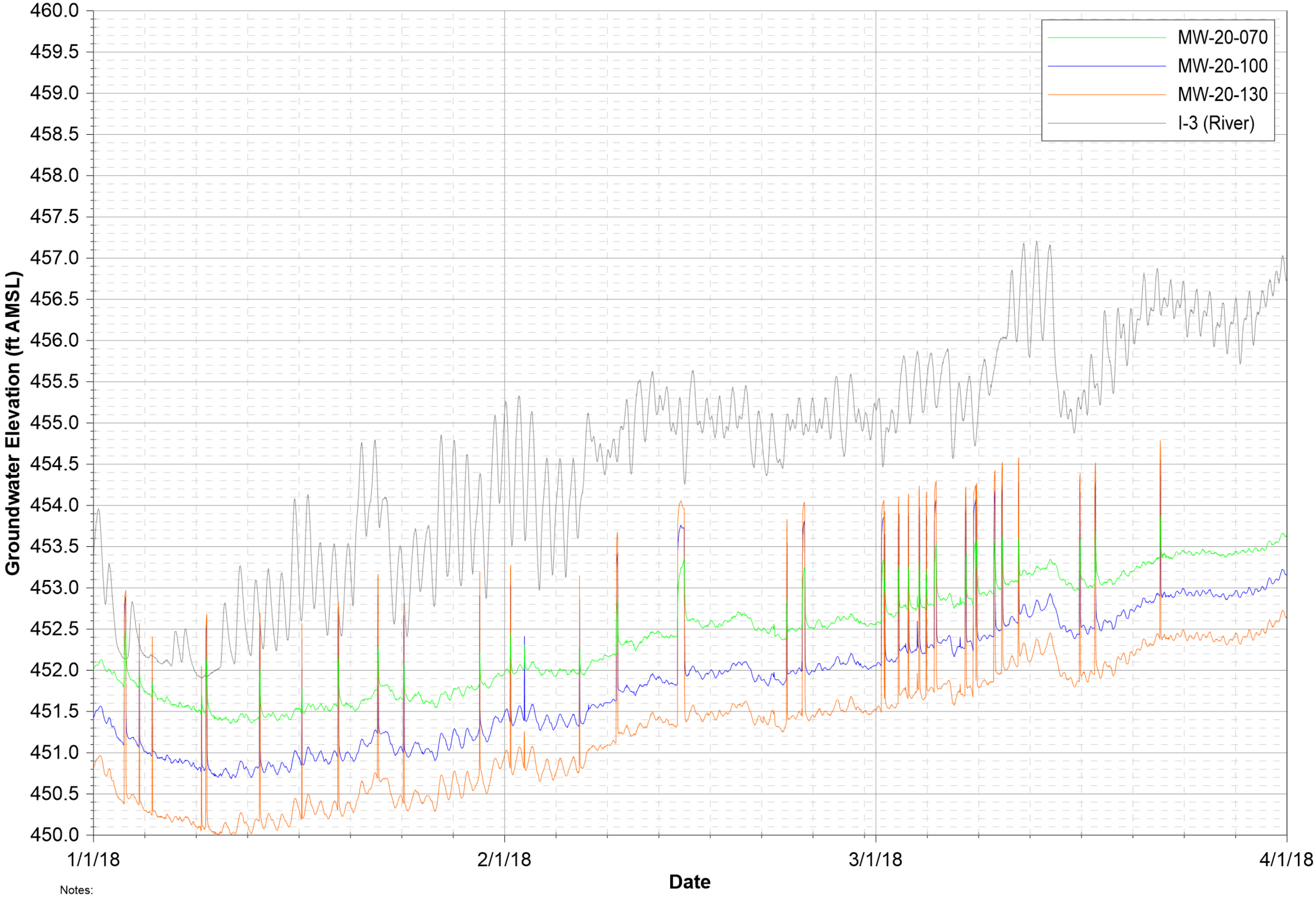
- **March 1, 2018 (unplanned):** The extraction system was offline from 9:54 a.m. to 3:00 p.m. to replace a variable frequency drive (VFD) at Clarifier Feed Pump (P-400). Extraction system downtime was 5 hours 6 minutes.

- **March 1, 2018 (unplanned):** The extraction well system was offline from 3:58 p.m. to 4:32 p.m. due to a malfunctioned valve controller. The plant was shut down so the operator could reset the controller and the valve. Extraction system downtime was 34 minutes.
- **March 2, 2018 (unplanned):** The extraction system was offline from 4:18 p.m. to 5:40 p.m. to lower the water level in Raw Water Storage Tank (T-100). Extraction system downtime was 1 hour 22 minutes.
- **March 3, 2018 (unplanned):** The extraction system was offline from 5:14 a.m. to 5:20 a.m. due to a malfunctioning Flow Control Valve (FCV-602), which got stuck in the closed position. The plant was shut down to purge the airline. Extraction system downtime was 6 minutes.
- **March 3, 2018 (unplanned):** The extraction system was offline from 10:14 a.m. to 11:32 a.m. due to a programmable logic controller (PLC) and human machine interface (HMI) connectivity issue. Extraction system downtime was 1 hour 18 minutes.
- **March 4, 2018 (unplanned):** The extraction system was offline from 2:48 a.m. to 3:02 a.m. due to a programmable logic controller (PLC) and human machine interface (HMI) connectivity issue. Extraction system downtime was 14 minutes.
- **March 4, 2018 (unplanned):** The extraction system was offline from 5:44 a.m. to 7:10 a.m. and from 6:50 p.m. to 7:50 p.m. to lower the water level in Raw Water Storage Tank (T-100). Extraction system downtime was 2 hour 26 minutes.
- **March 5, 2018 (planned):** The extraction system was offline from 9:50 a.m. to 1:30 p.m. due to testing of the pipeline critical alarms and leak detection system, to change out the microfilter modules due to high transmembrane pressure, and to clean out the chromium reduction reactor. Extraction system downtime was 3 hours 40 minutes.
- **March 7, 2018 (unplanned):** The extraction system was offline from 5:34 p.m. to 7:10 p.m. to lower the water level in Raw Water Storage Tank (T-100). Extraction system downtime was 1 hour 36 minutes.
- **March 8, 2018 (unplanned):** The extraction system was offline from 8:08 a.m. to 12:42 p.m. and from 1:30 p.m. to 2:50 p.m. to change some hand operated valves between tanks due to scale buildup. Extraction system downtime was 5 hour 54 minutes.
- **March 9, 2018 (unplanned):** The extraction system was offline from 9:38 p.m. to 9:50 p.m. and from 10:02 p.m. to 12:00 am to lower the water level in Raw Water Storage Tank (T-100). Extraction system downtime was 2 hours 10 minutes.
- **March 10, 2018 (unplanned):** The extraction system was offline from 11:34 a.m. to 1:24 p.m. to clean the pipe between Iron Oxidation Reactor No. 2 (T-301B) and Iron Oxidation Reactor No. 3 (T-301C). Extraction system downtime was 1 hours 50 minutes.
- **March 11, 2018 (unplanned):** The extraction system was offline from 5:38 p.m. to 7:00 p.m. to lower the water level in Raw Water Storage Tank (T-100). Extraction system downtime was 1 hours 22 minutes.
- **March 16, 2018 (unplanned):** The extraction system was offline from 8:20 a.m. to 9:50 a.m. to lower the water level in Raw Water Storage Tank (T-100) due to the Raw Water Feed Pump (P-200) shutting off. Extraction system downtime was 1 hours 30 minutes.
- **March 17, 2018 (planned):** The extraction system was offline from 12:02 p.m. to 2:00 p.m. to lower the water level in Raw Water Storage Tank (T-100) due to receiving injection well backwash water. Extraction system downtime was 1 hours 58 minutes.

- **March 22, 2018 (planned):** The extraction system was offline from 10:06 a.m. to 11:12 a.m. to change out the microfilter modules due to high transmembrane pressure. Extraction system downtime was 1 hour 6 minutes.

APPENDIX F

Hydraulic Data for Interim Measures Reporting Period



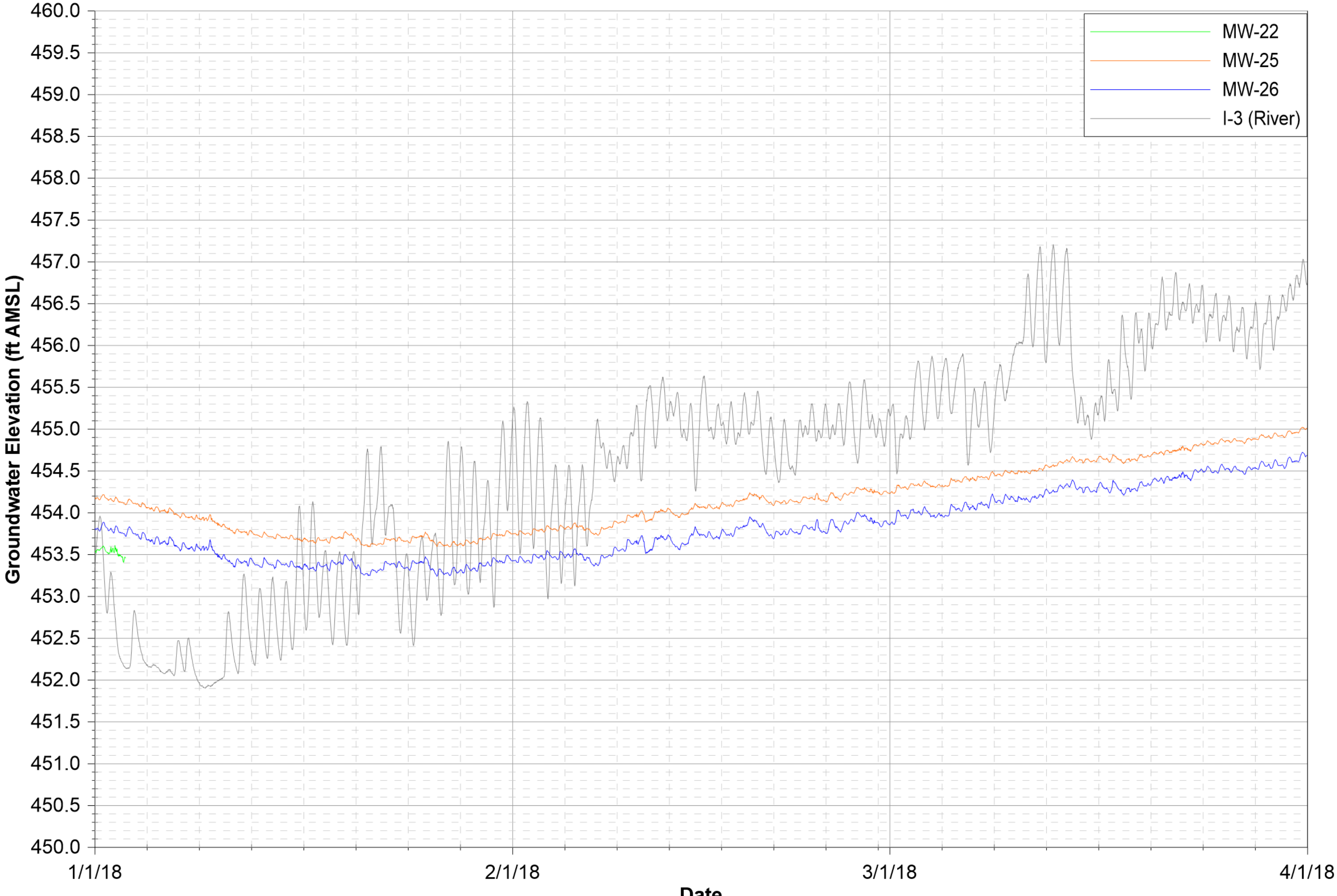
Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1A
MW-20 CLUSTER HYDROGRAPHS

FIRST QUARTER 2018 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\10_Q118



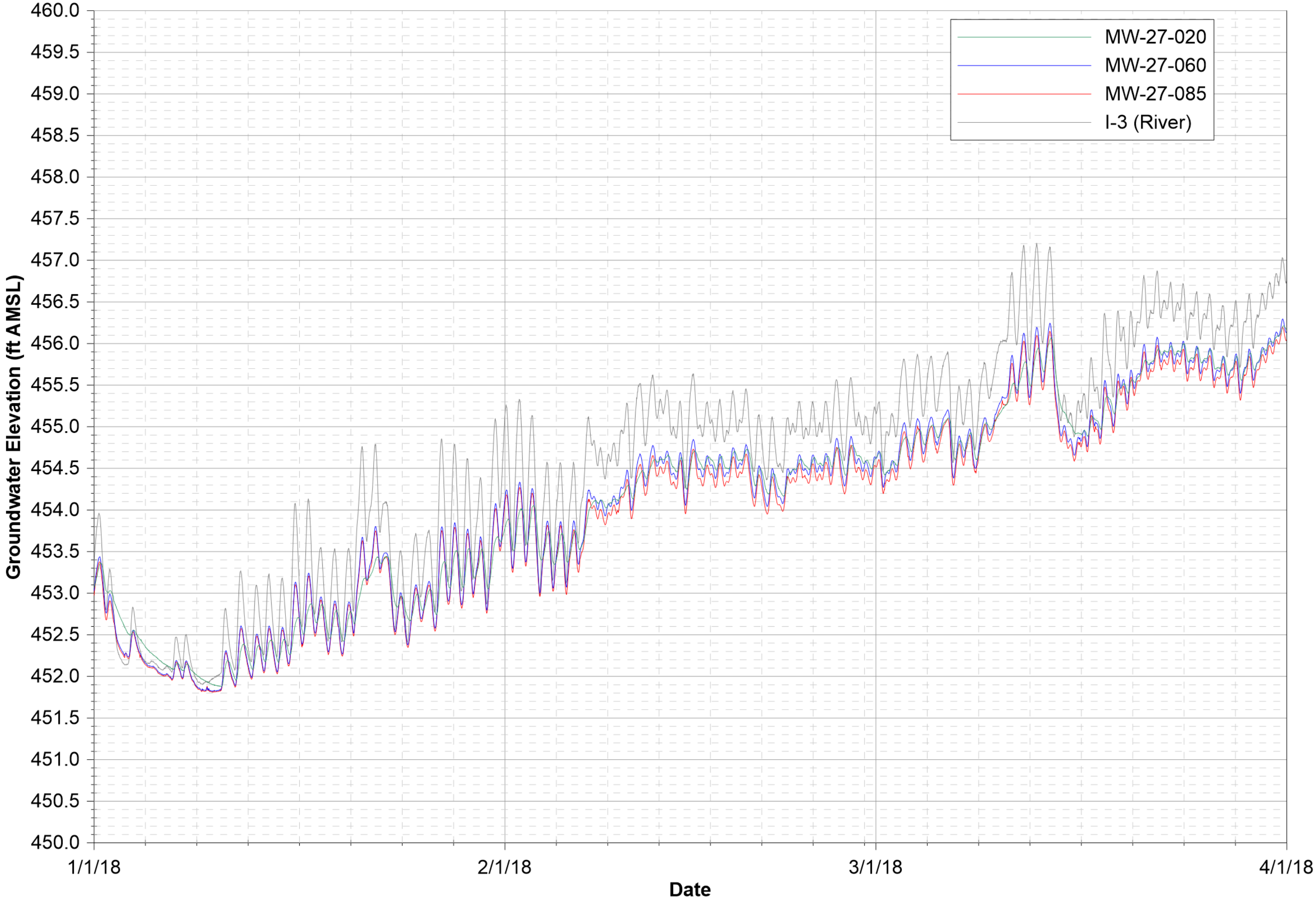
Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.
3. MW-22 data unavailable from January 3, 2018 through March 31, 2018 due to transducer malfunction.

FIGURE F-1B

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

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS



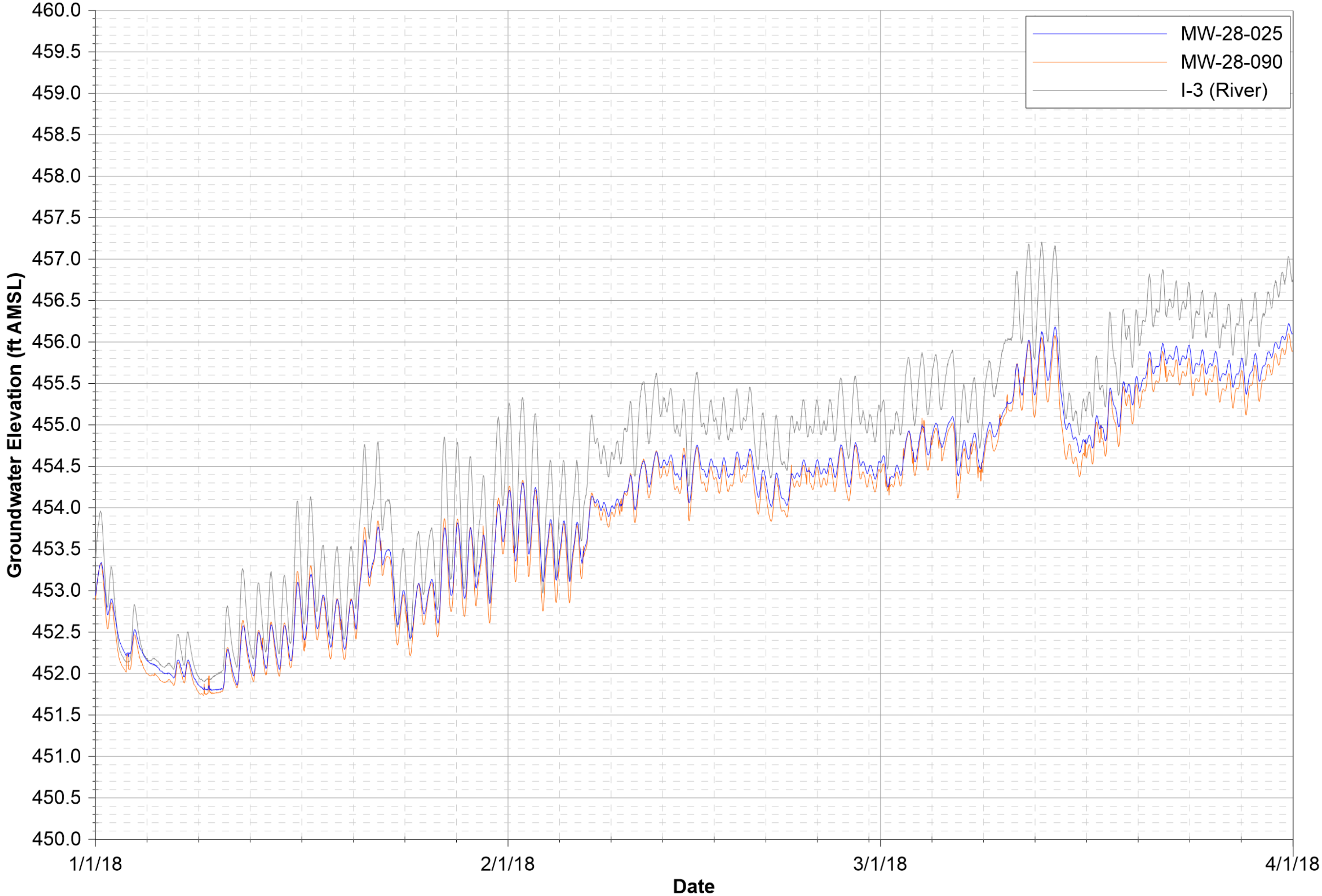
Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level

FIGURE F-1C

MW-27 CLUSTER HYDROGRAPHS

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS

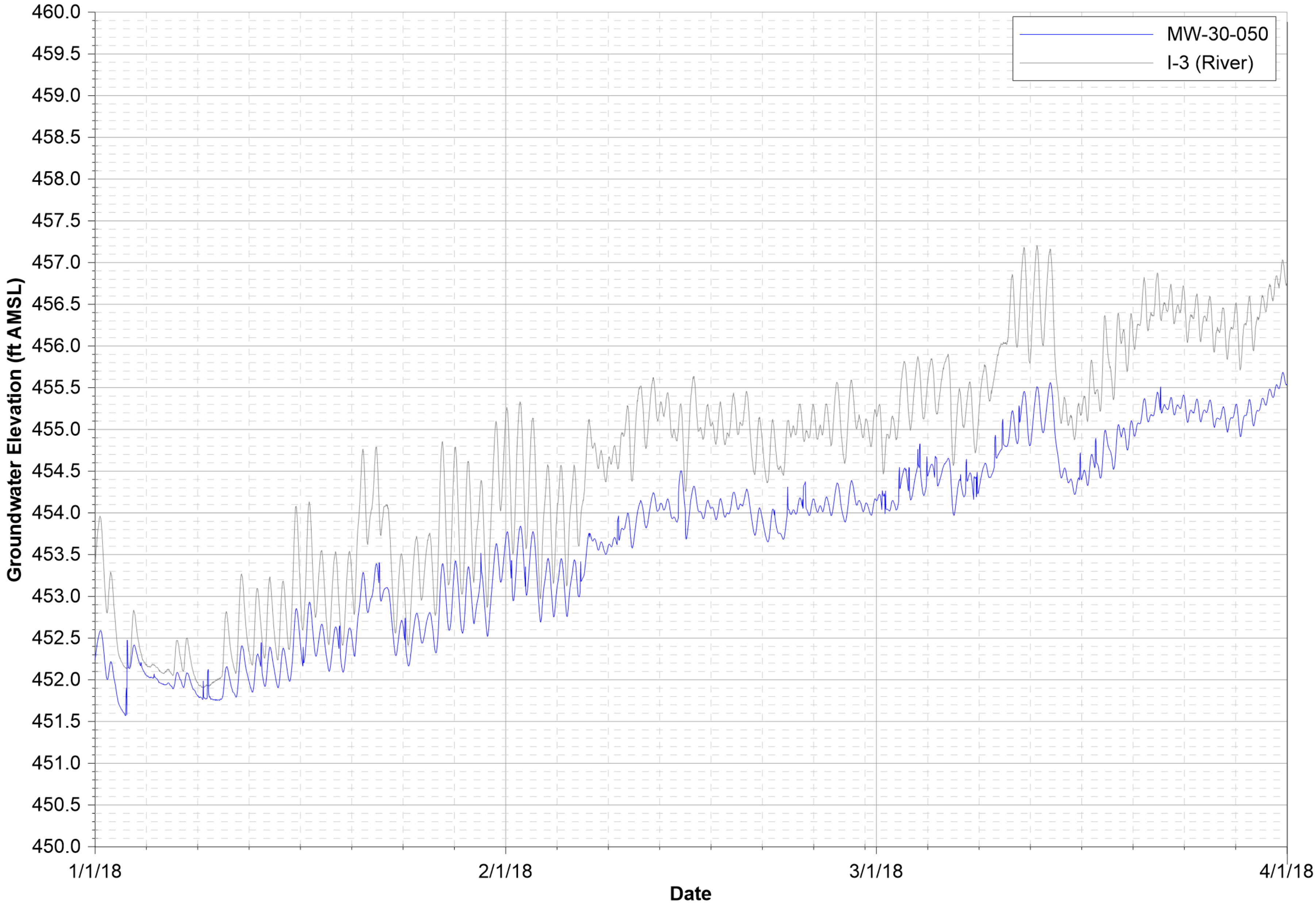


Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1D
MW-28 CLUSTER HYDROGRAPHS

FIRST QUARTER 2018 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-1E

MW-30-050 HYDROGRAPH

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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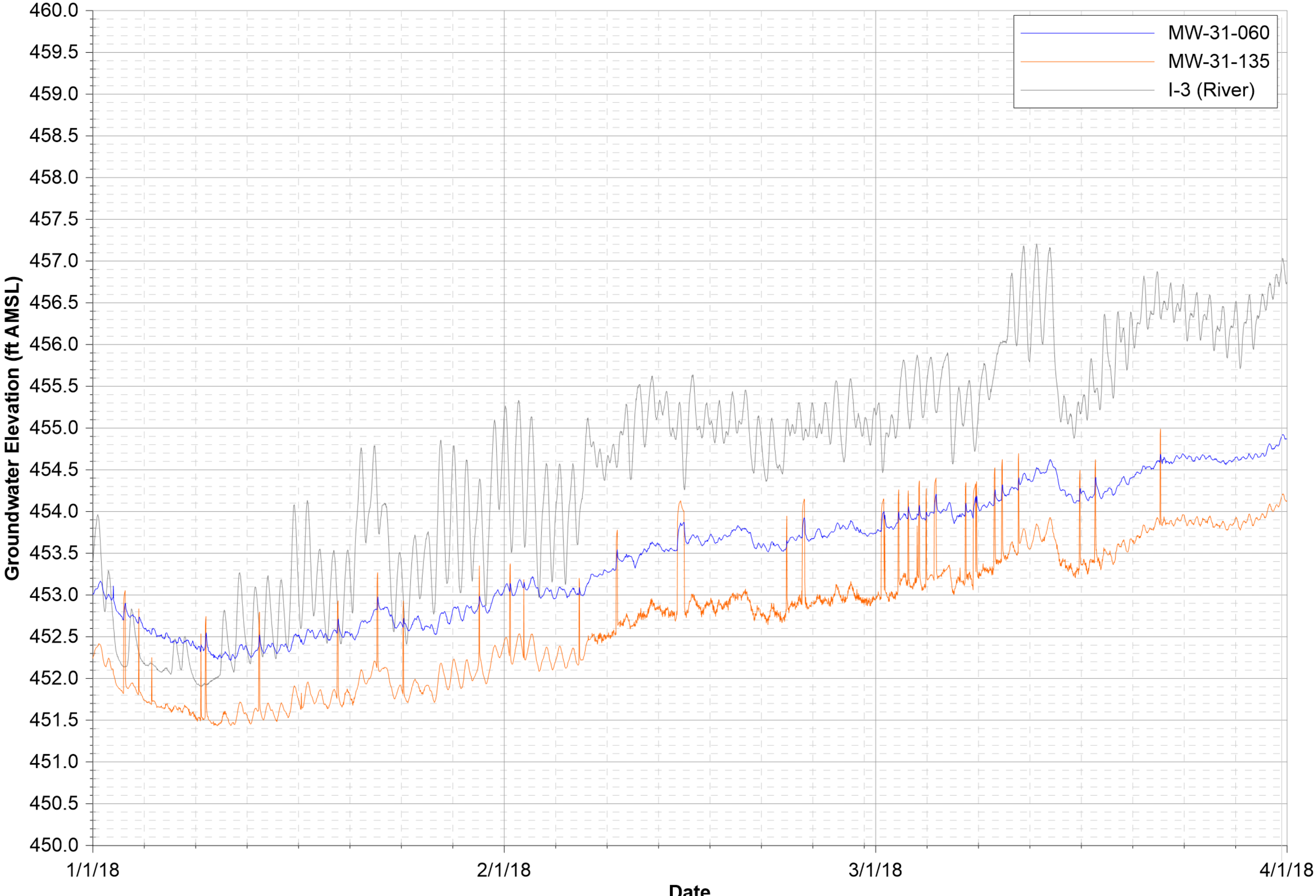


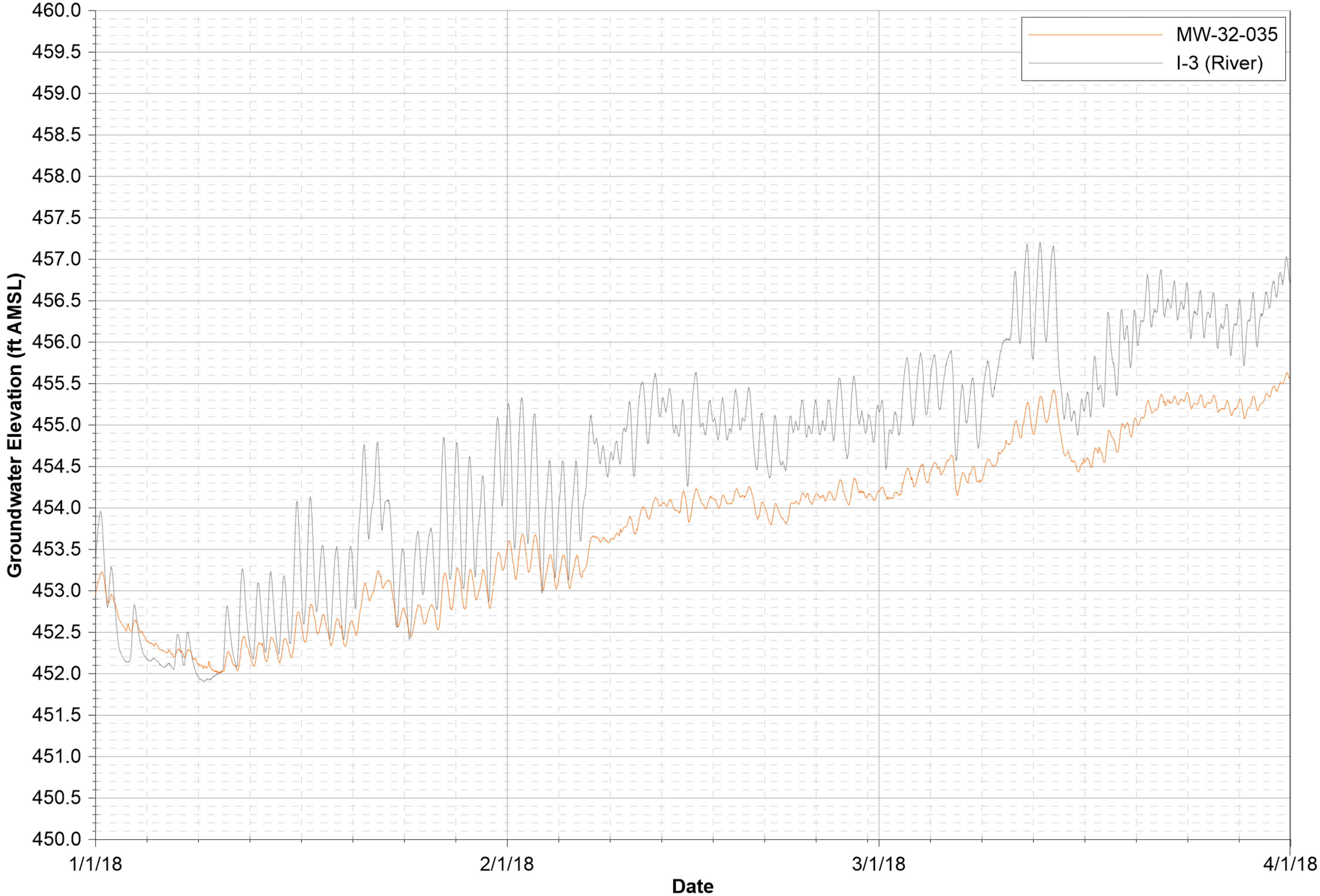
Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1F

MW-31 CLUSTER HYDROGRAPHS

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS

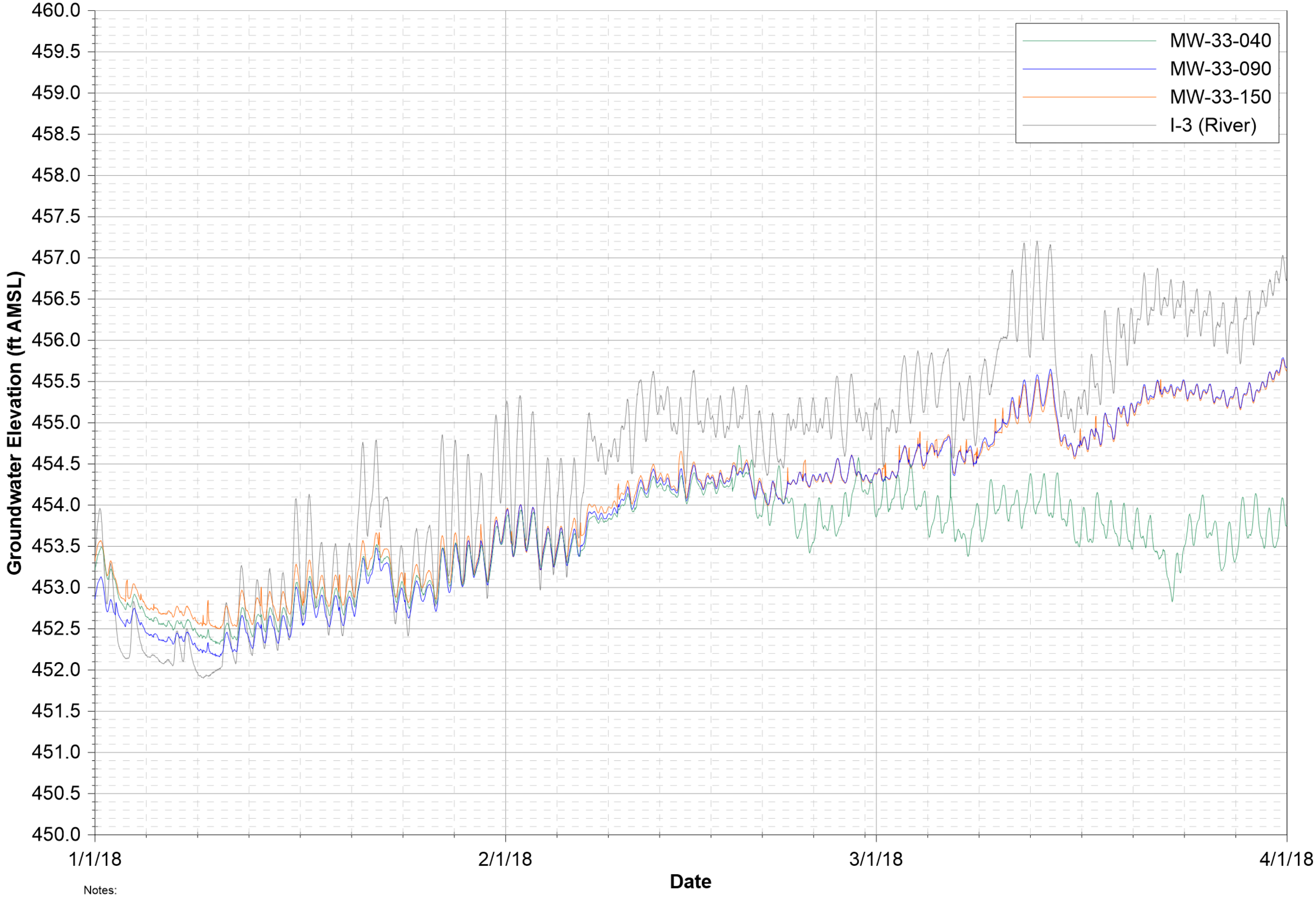


Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1G
MW-32 HYDROGRAPH

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS



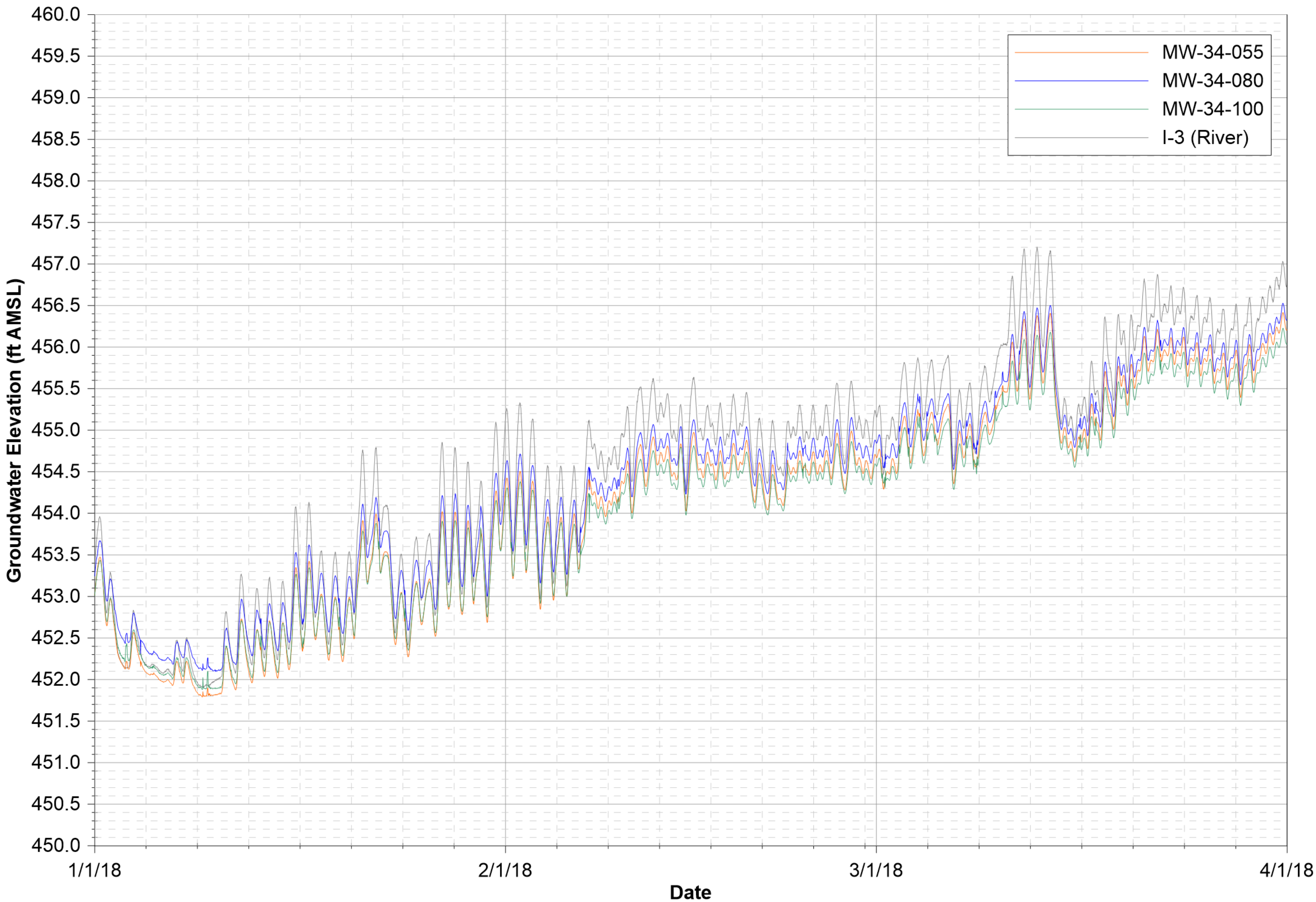
Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1H

MW-33 CLUSTER HYDROGRAPHS

FIRST QUARTER 2018 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 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS

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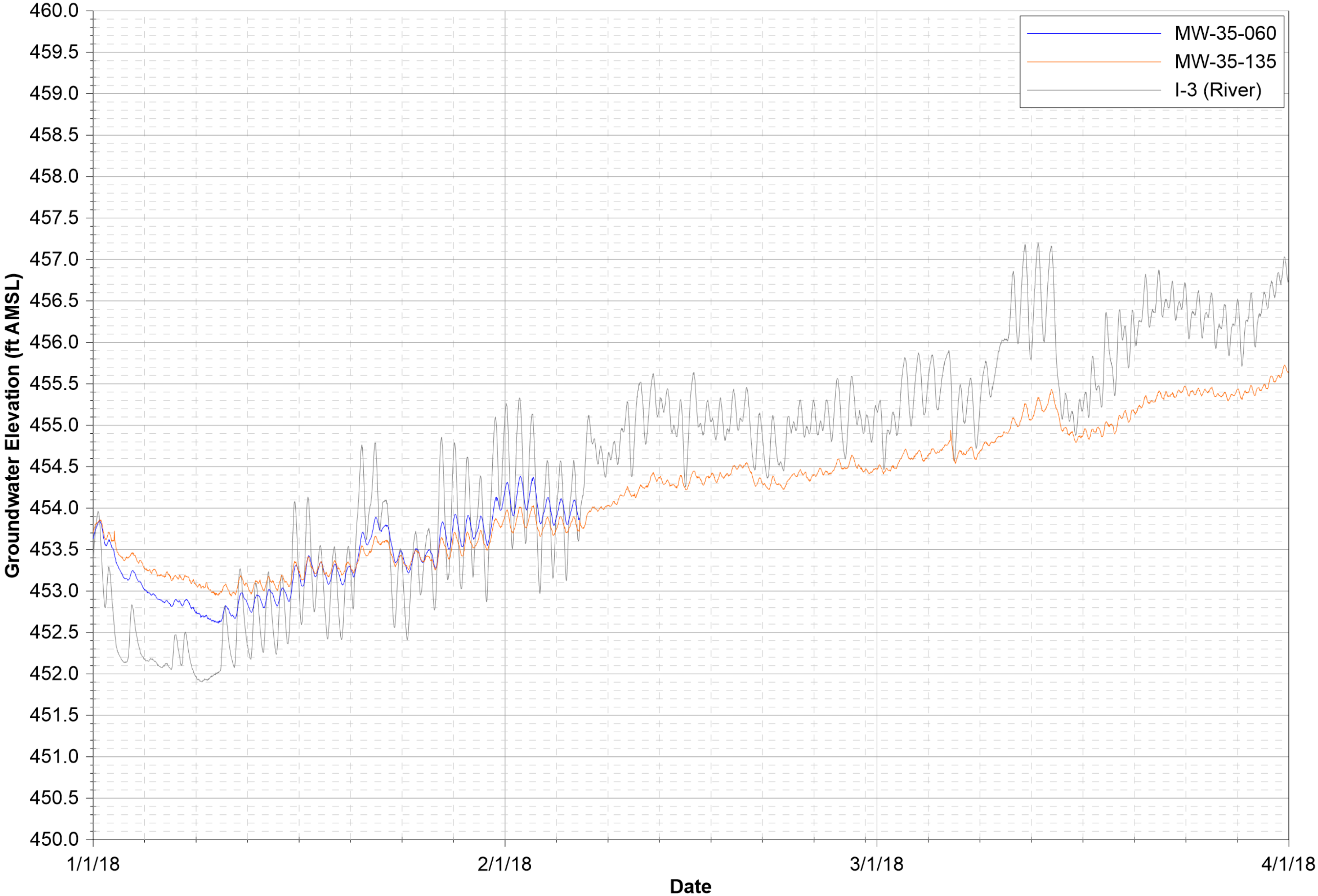


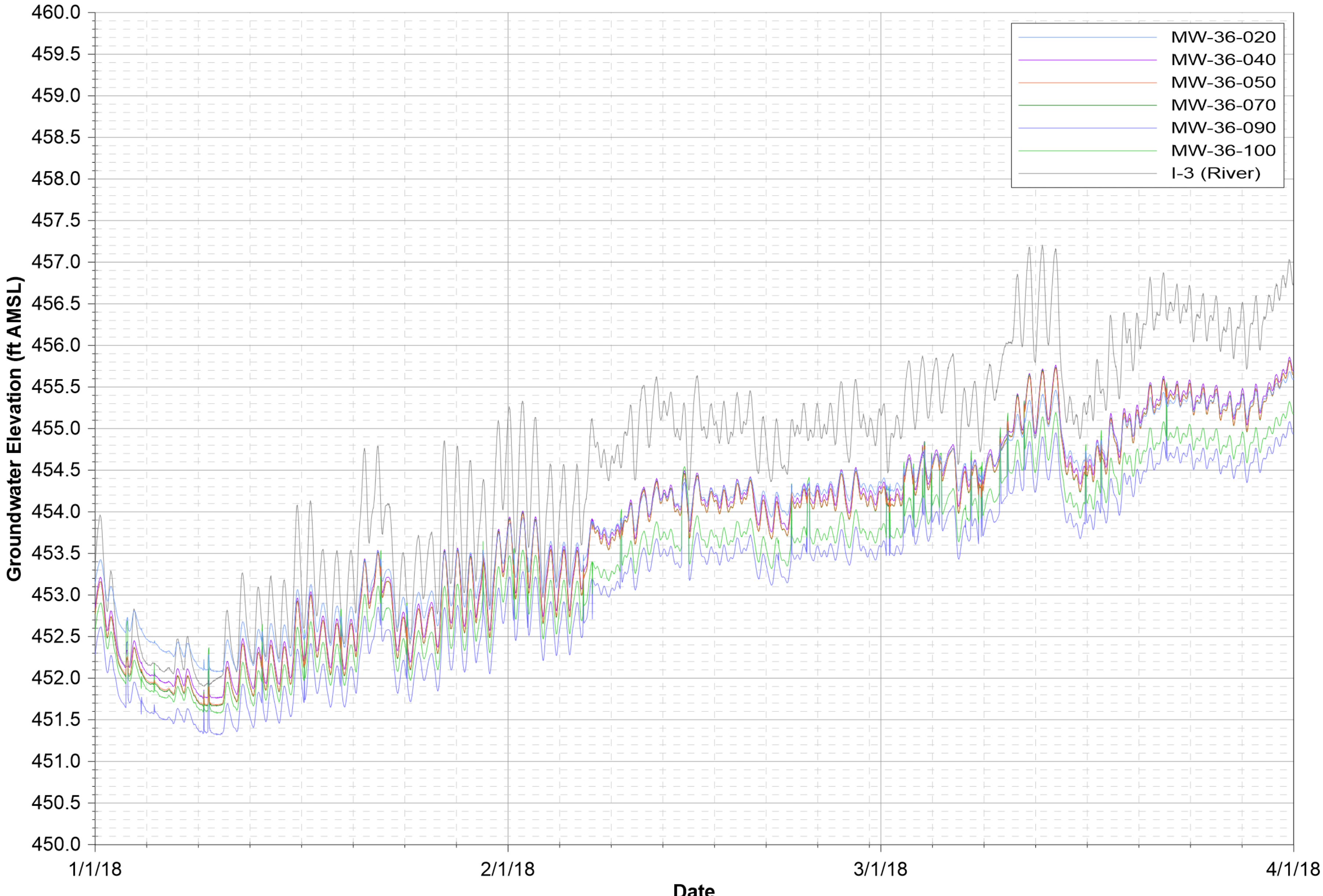
Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.
3. MW-35-060 data unavailable from February 6, 2018 through March 31, 2018 due to transducer malfunction.

FIGURE F-1J

MW-35 CLUSTER HYDROGRAPHS

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS



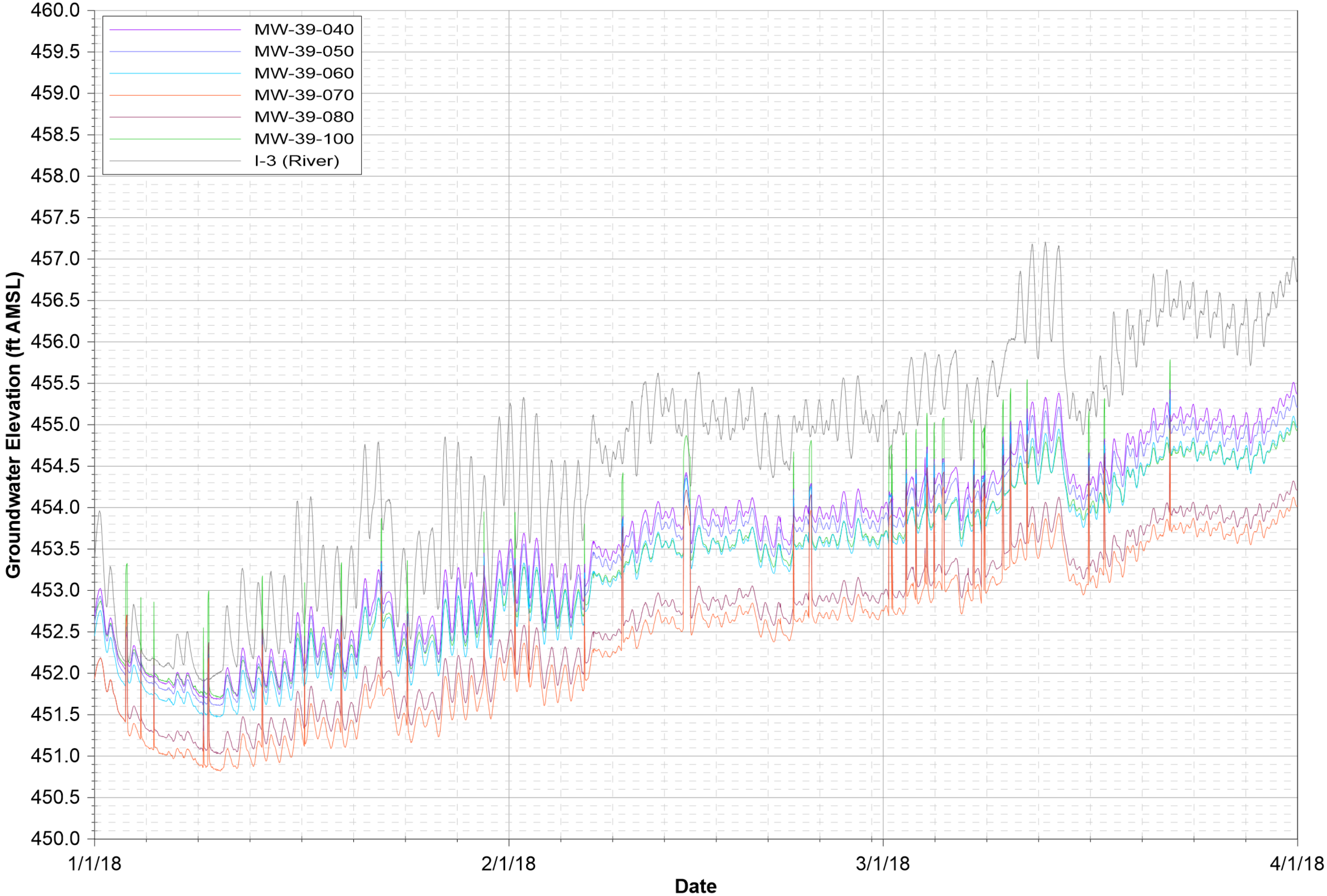
Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1K

MW-36 CLUSTER HYDROGRAPHS

FIRST QUARTER 2018 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 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS

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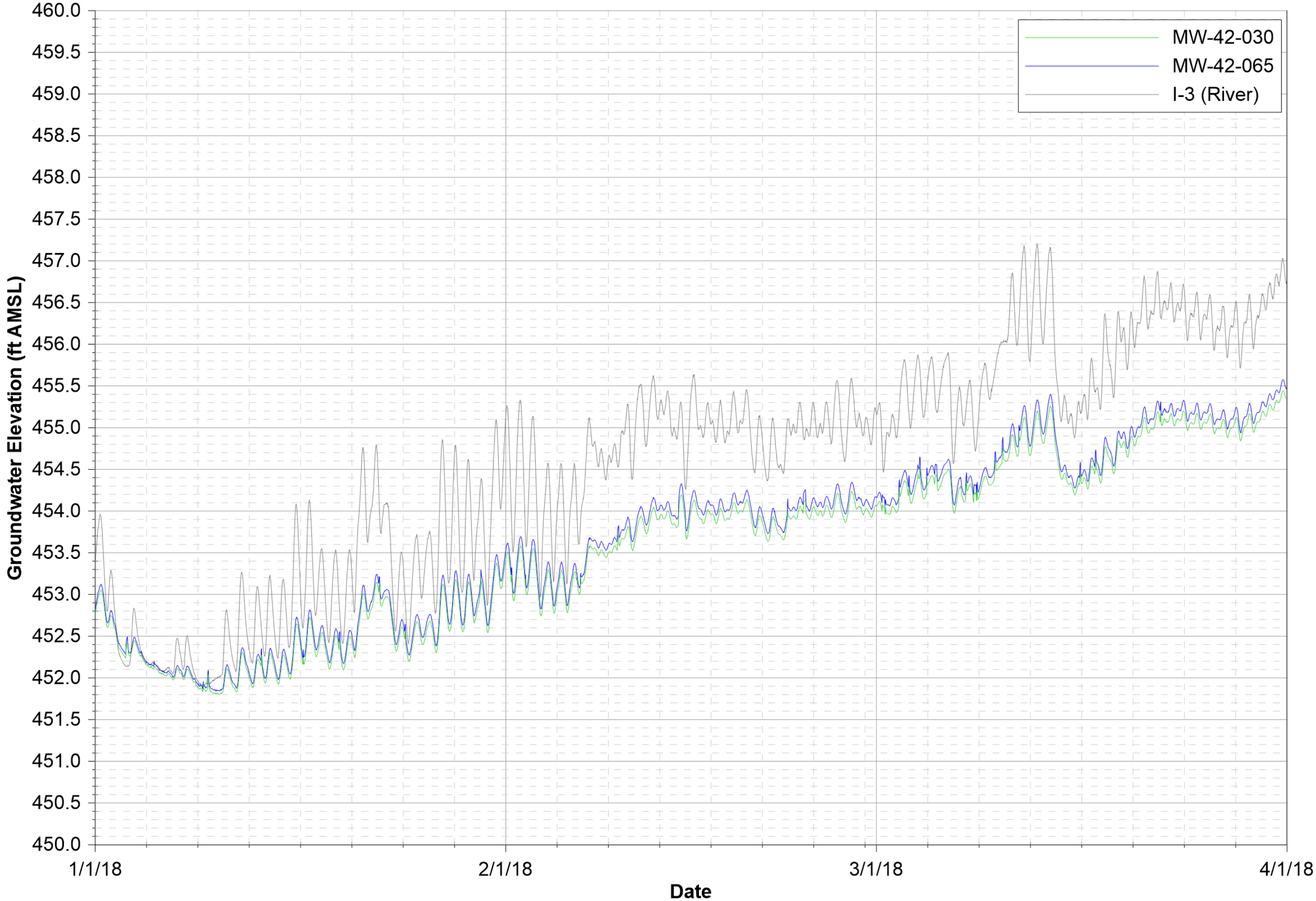

Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1M
MW-42 CLUSTER HYDROGRAPHS

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS

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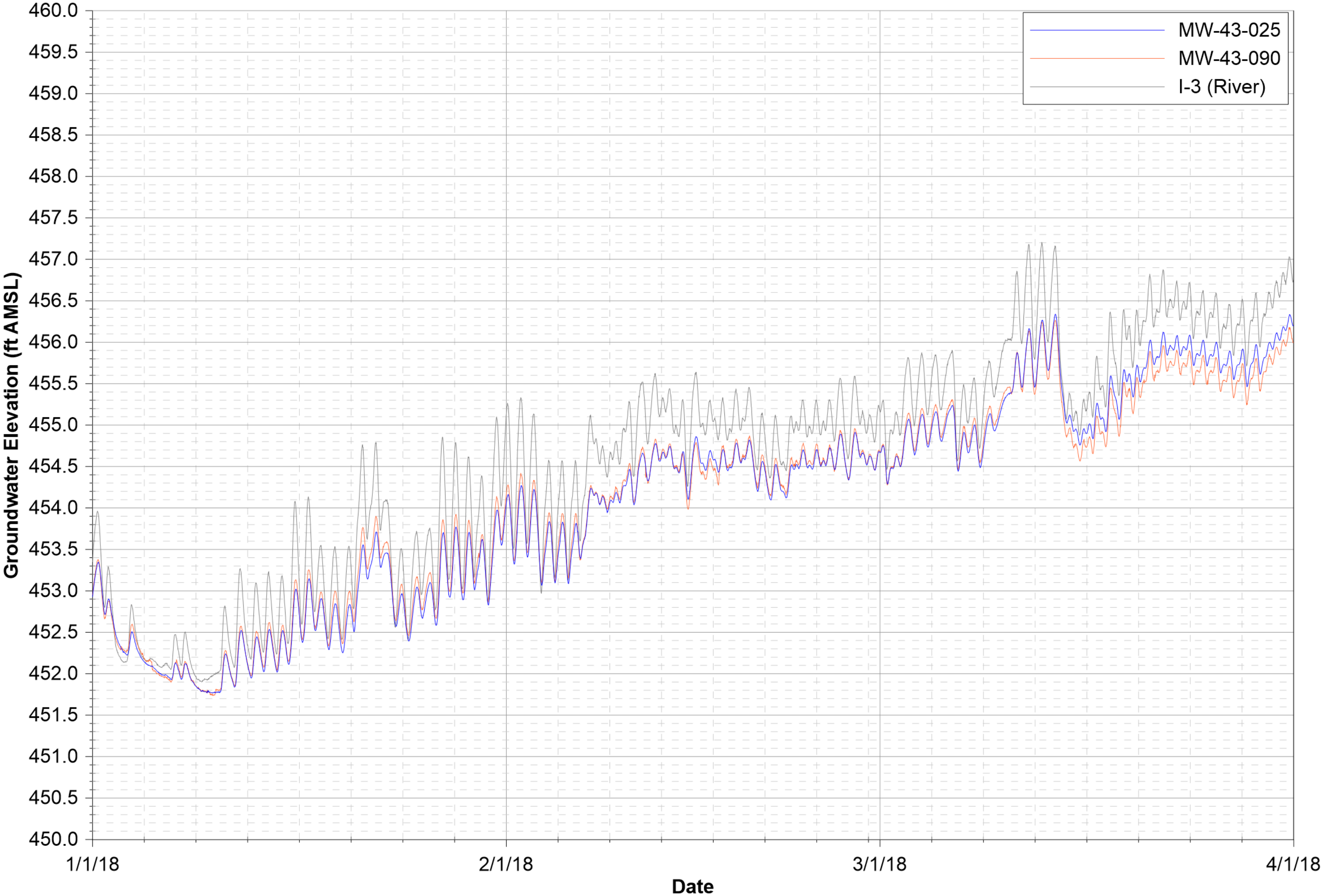

Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1N
MW-43 CLUSTER HYDROGRAPHS

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS

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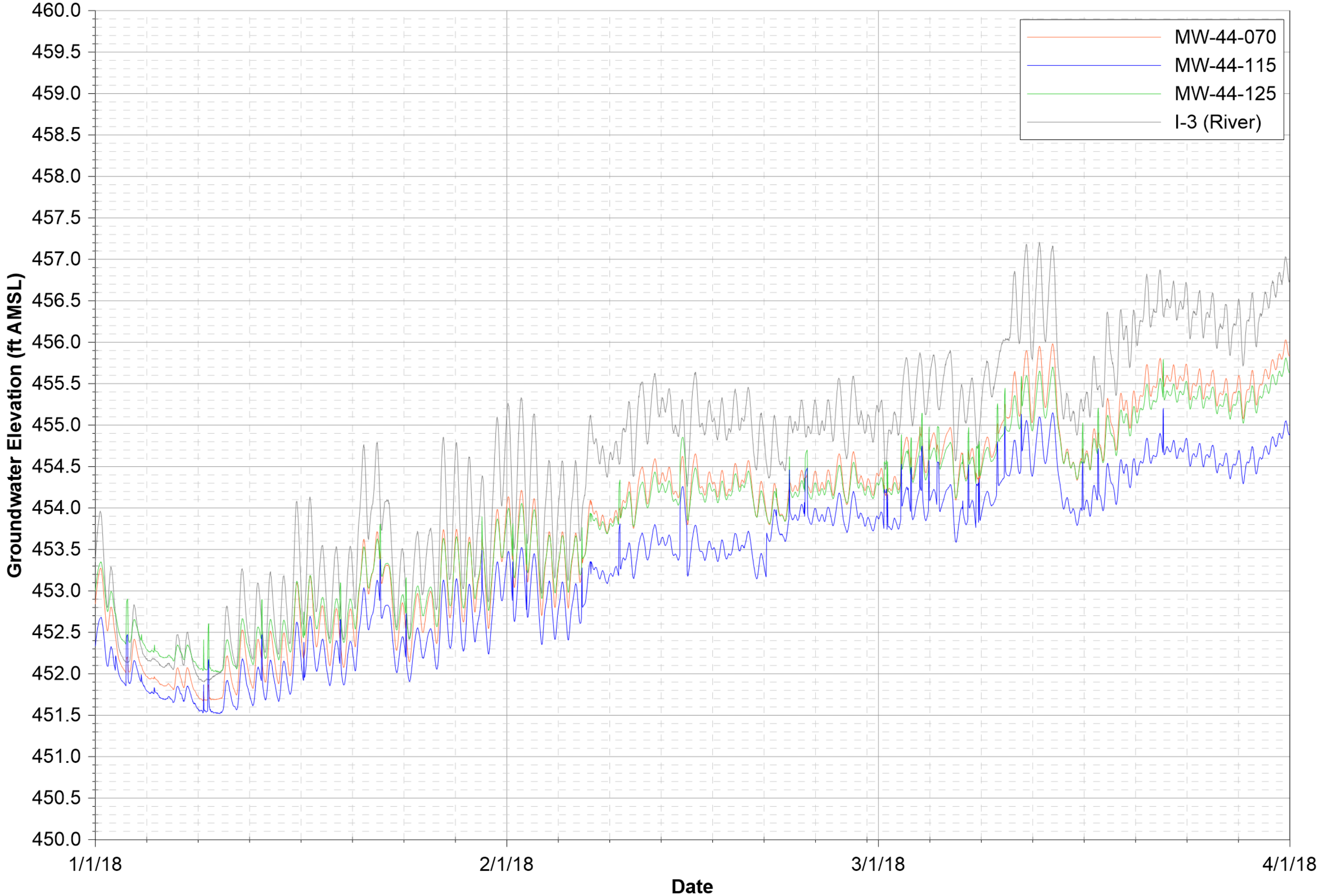

Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1O

MW-44 CLUSTER HYDROGRAPHS

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS

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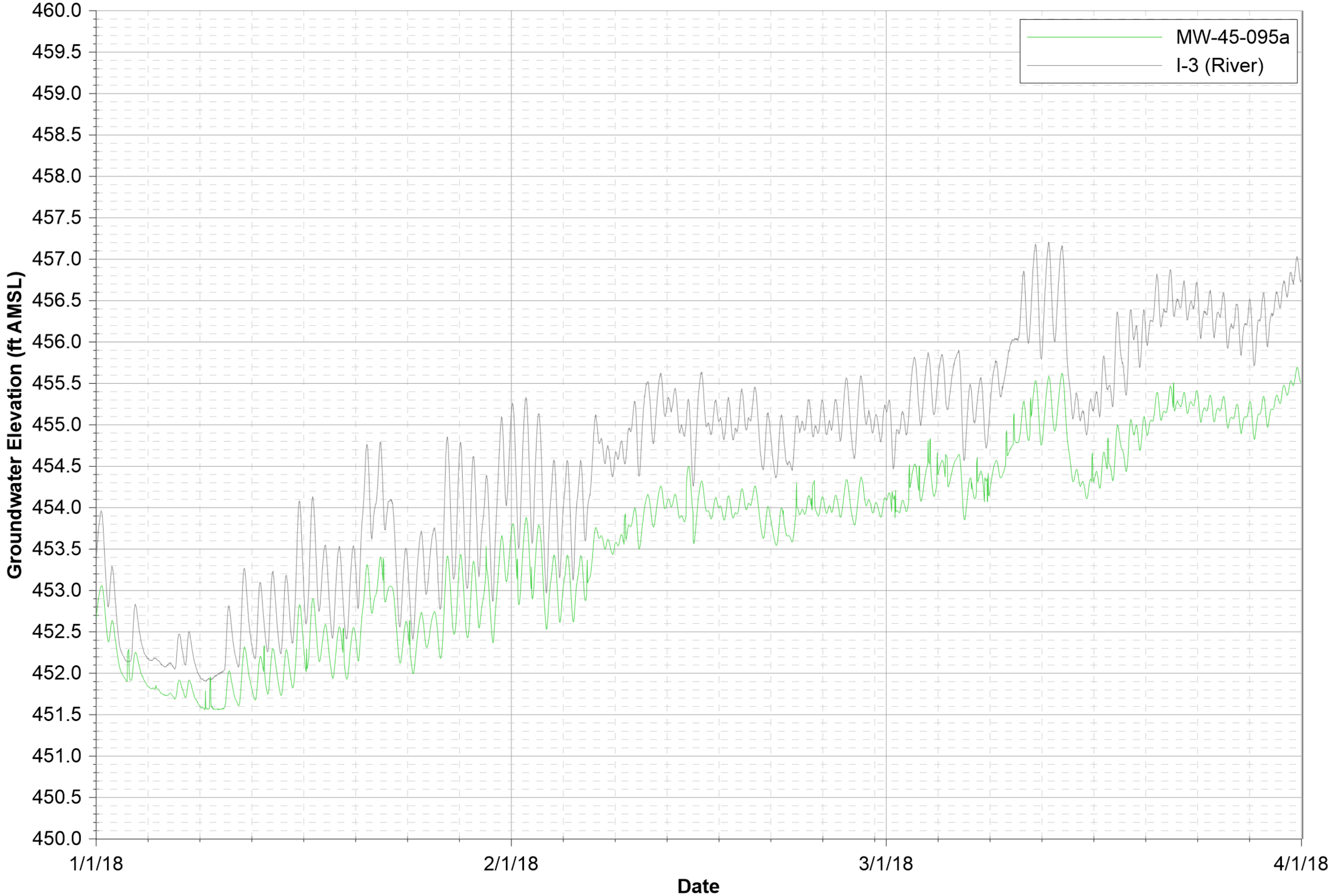
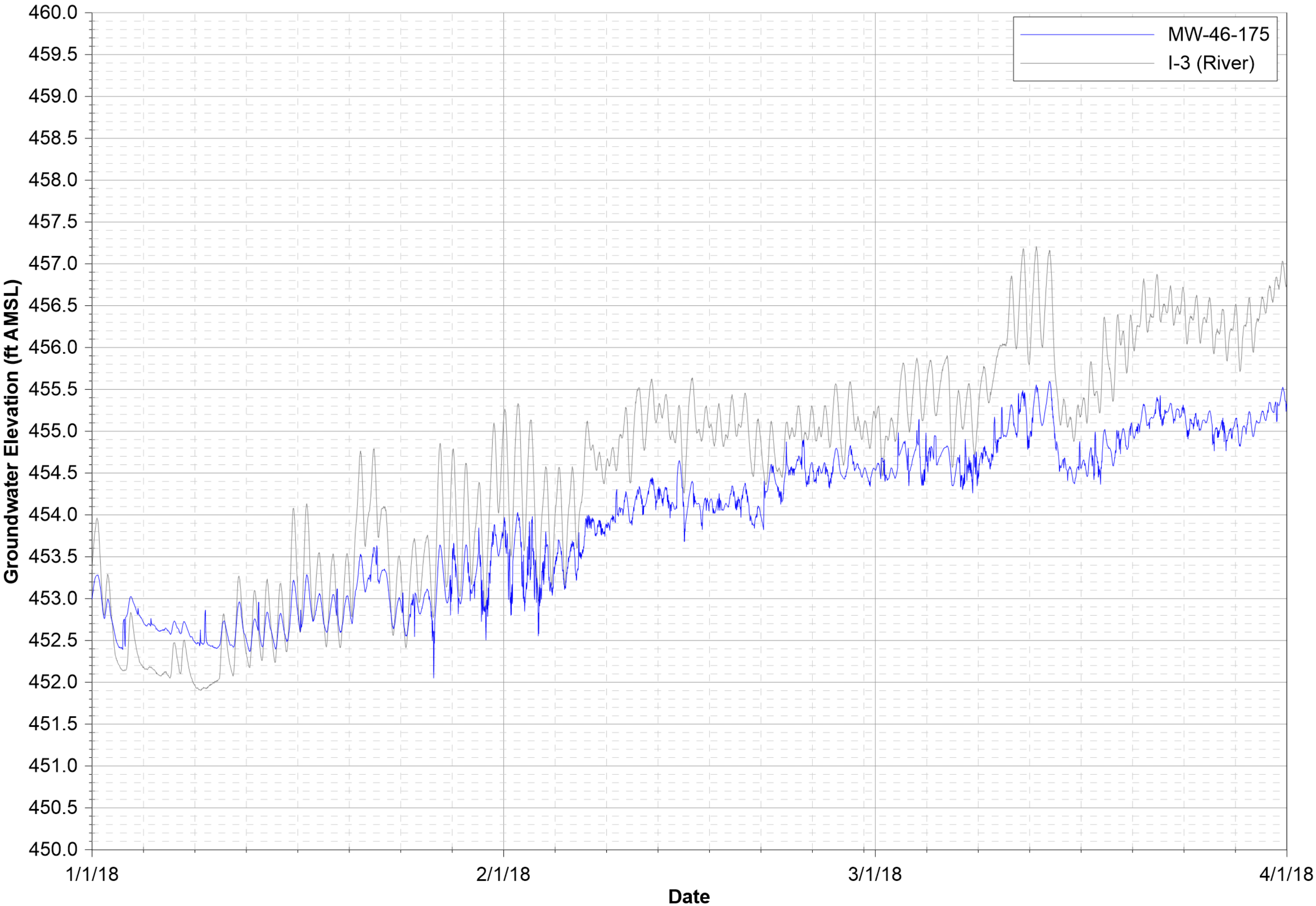


Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1P
MW-45-095a HYDROGRAPH

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

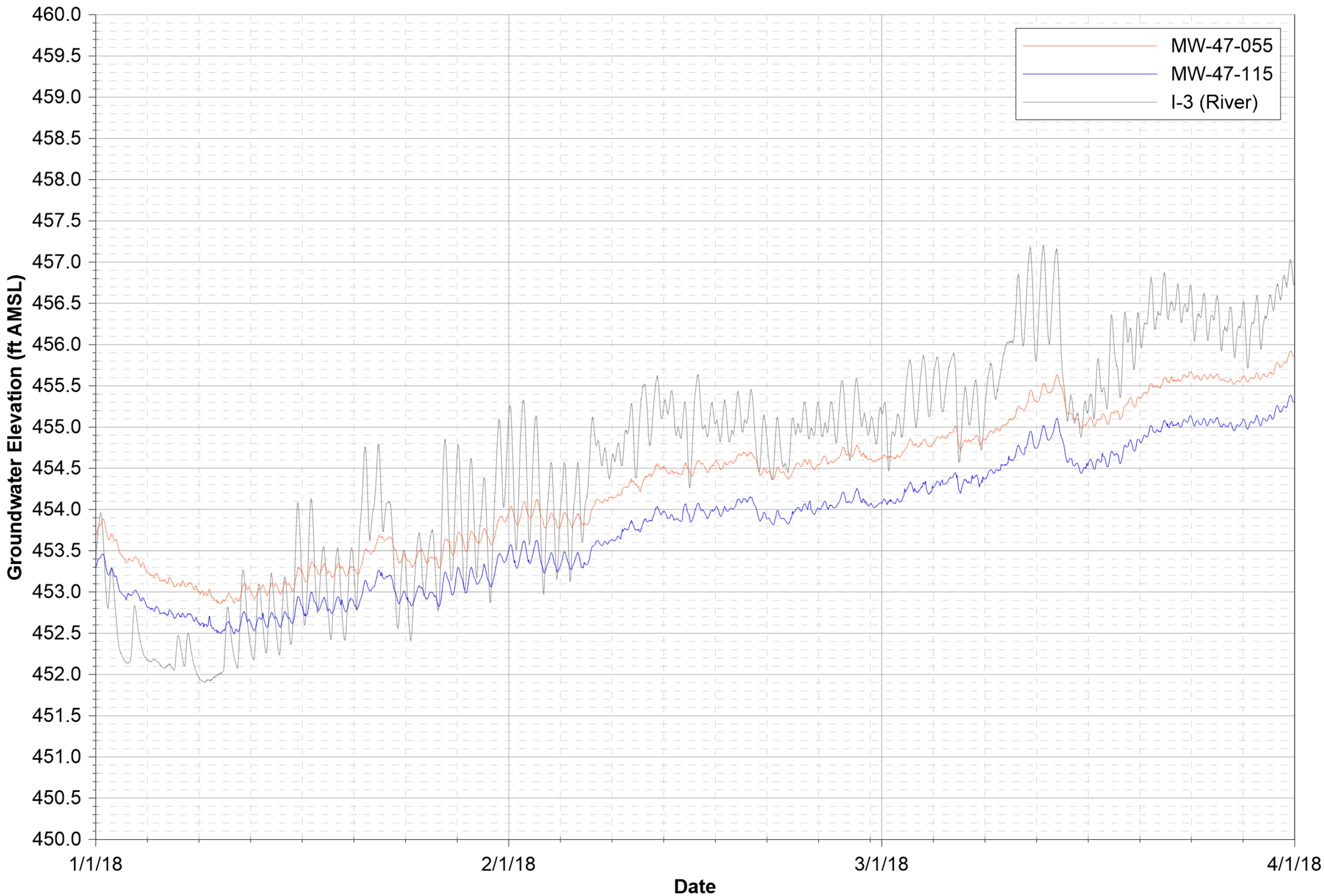
ARCADIS



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

FIGURE F-1Q
MW-46 HYDROGRAPH
FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS

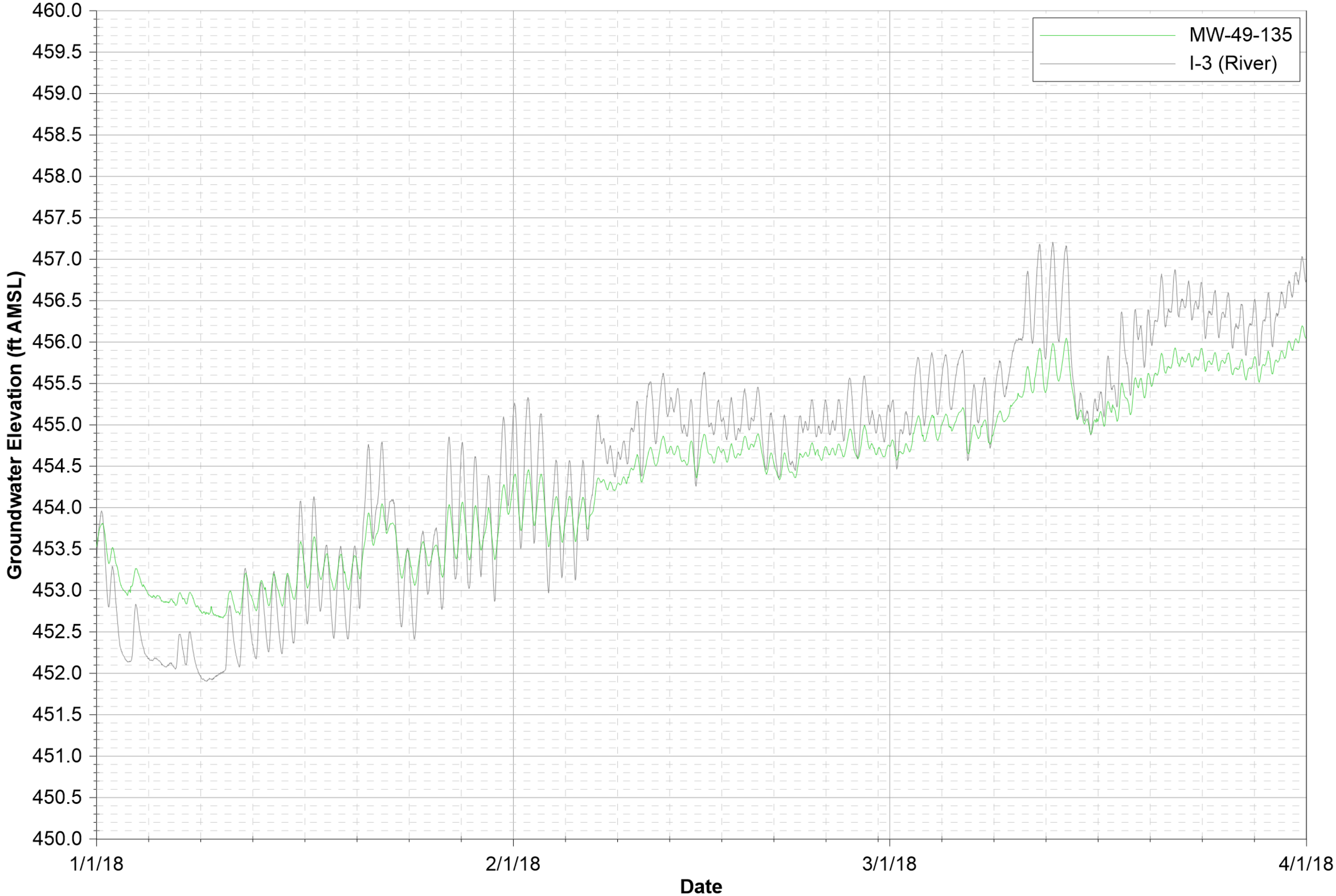


Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1R
MW-47 CLUSTER HYDROGRAPHS

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS

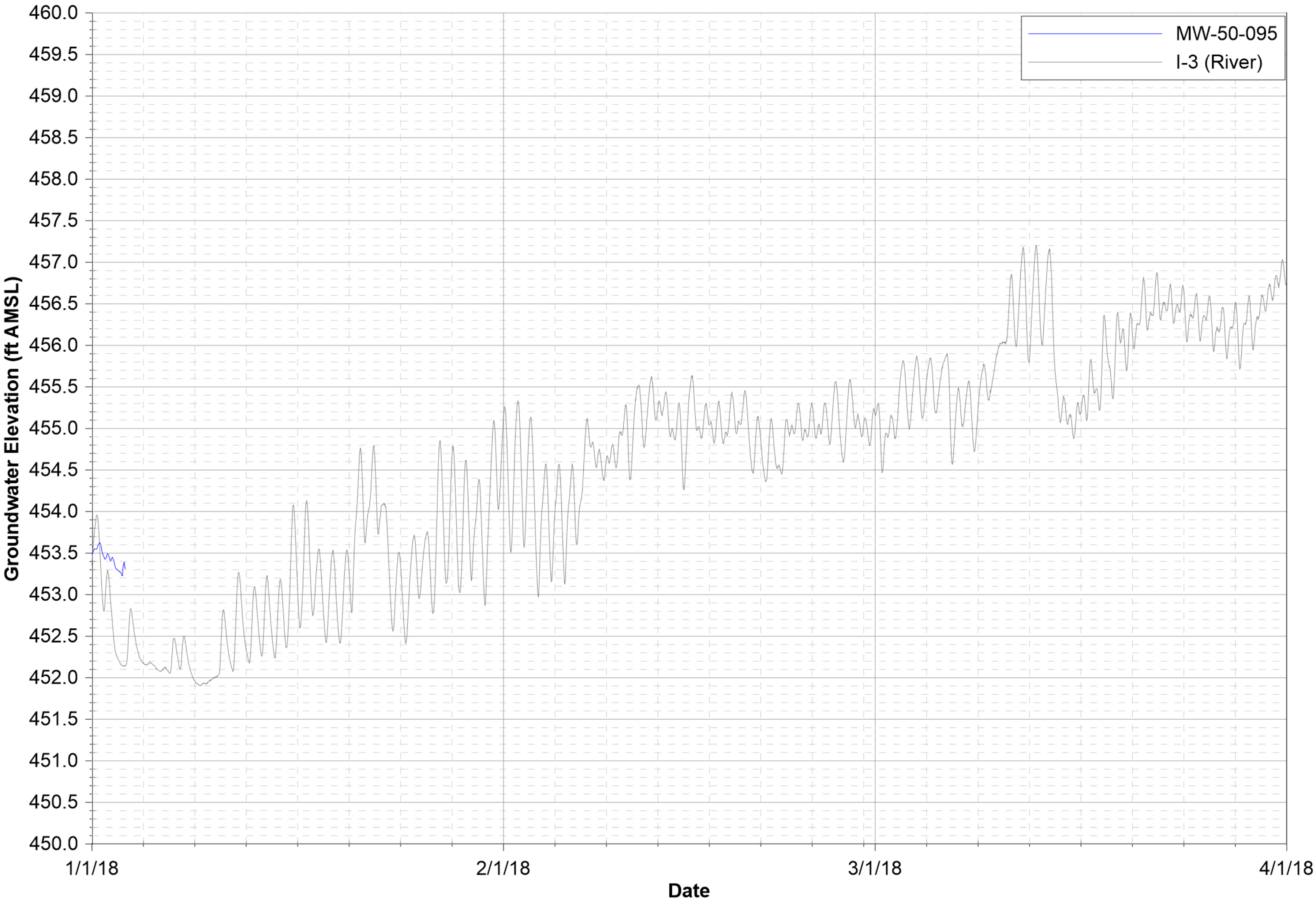


Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1S
MW-49 HYDROGRAPH

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS



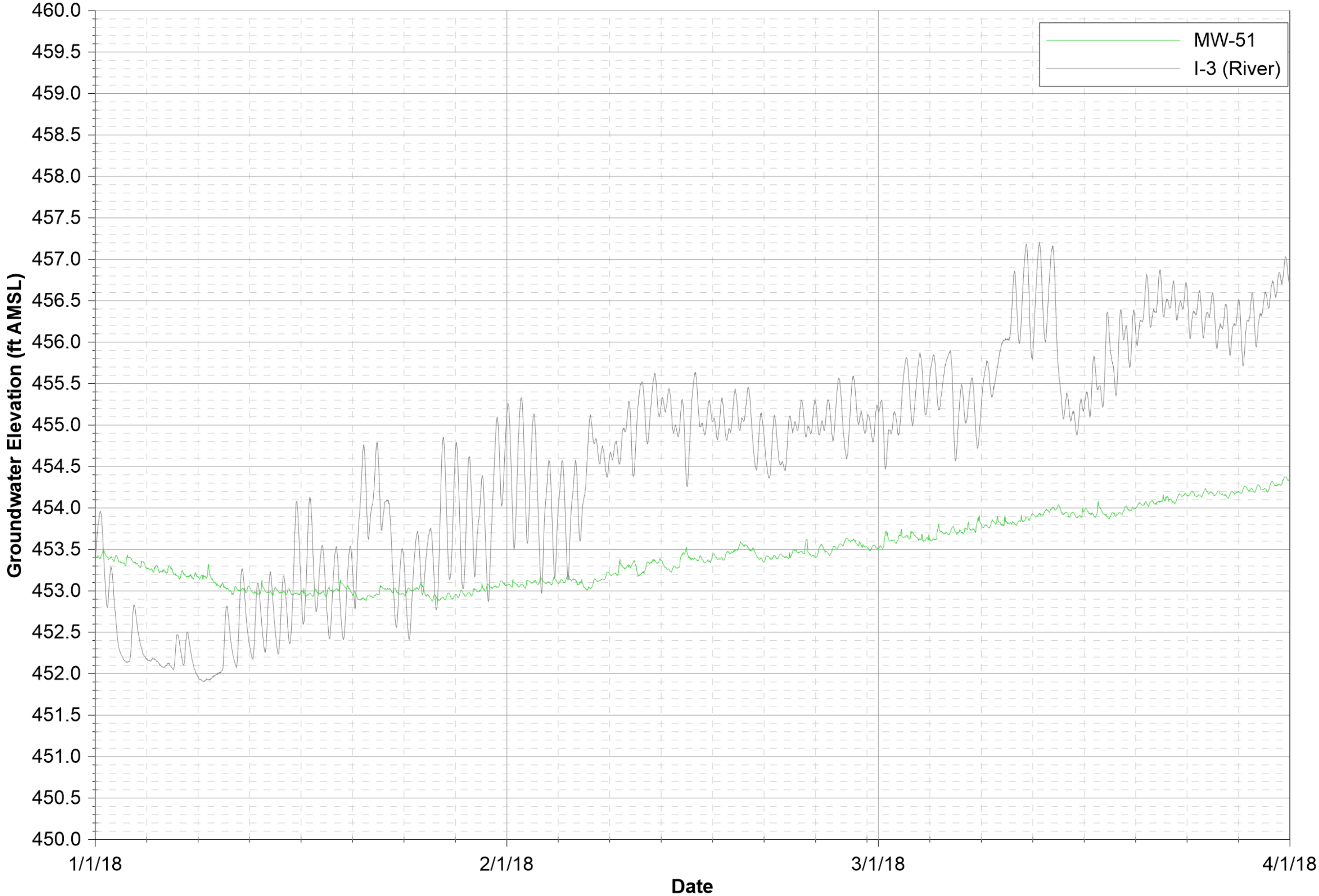
Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.
3. MW-50-095 data unavailable from January 3, 2018 through March 31, 2018 due to transducer malfunction.

FIGURE F-1T

MW-50 HYDROGRAPH

FIRST QUARTER 2018 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-1U
MW-51 HYDROGRAPHS

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS

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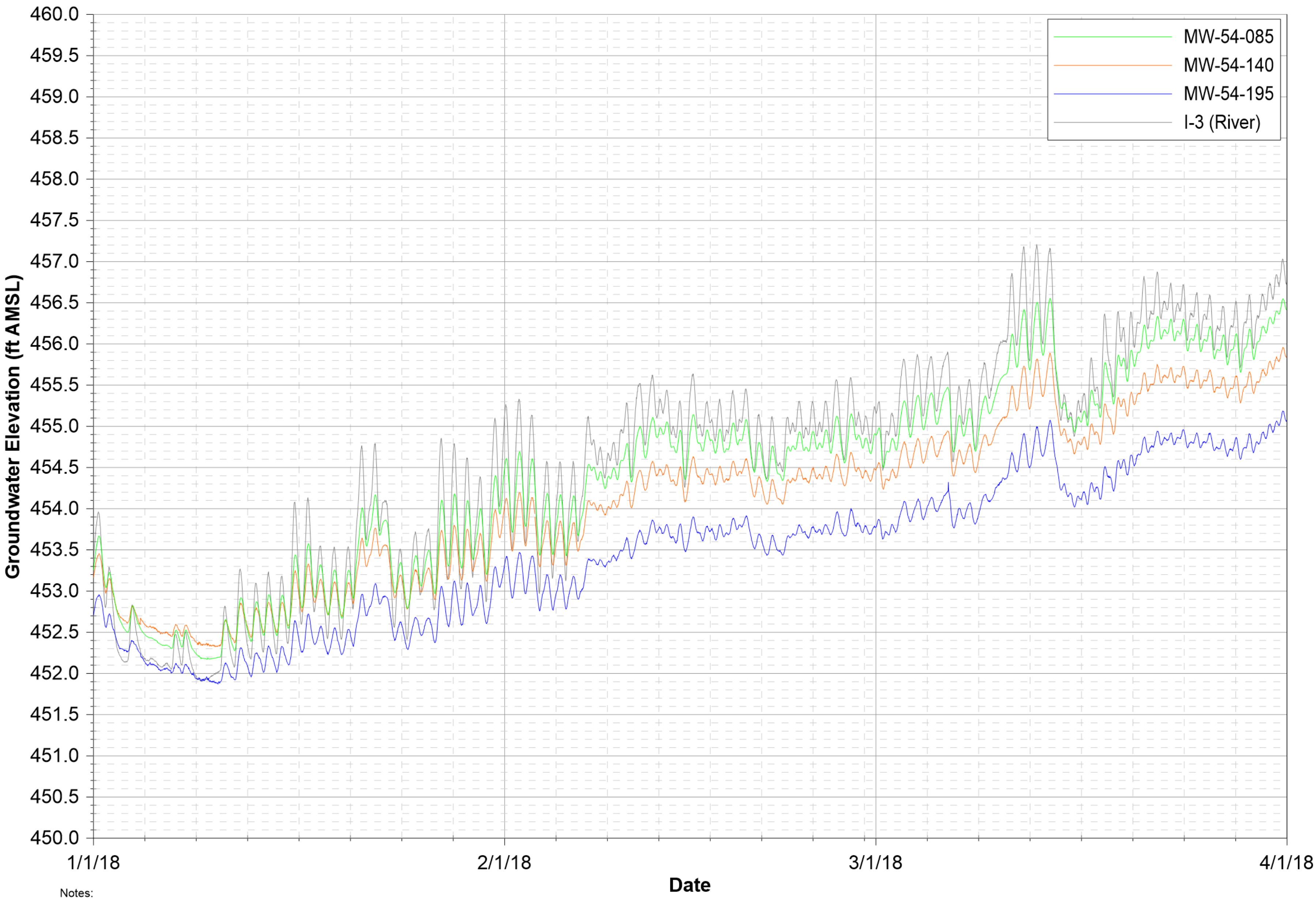
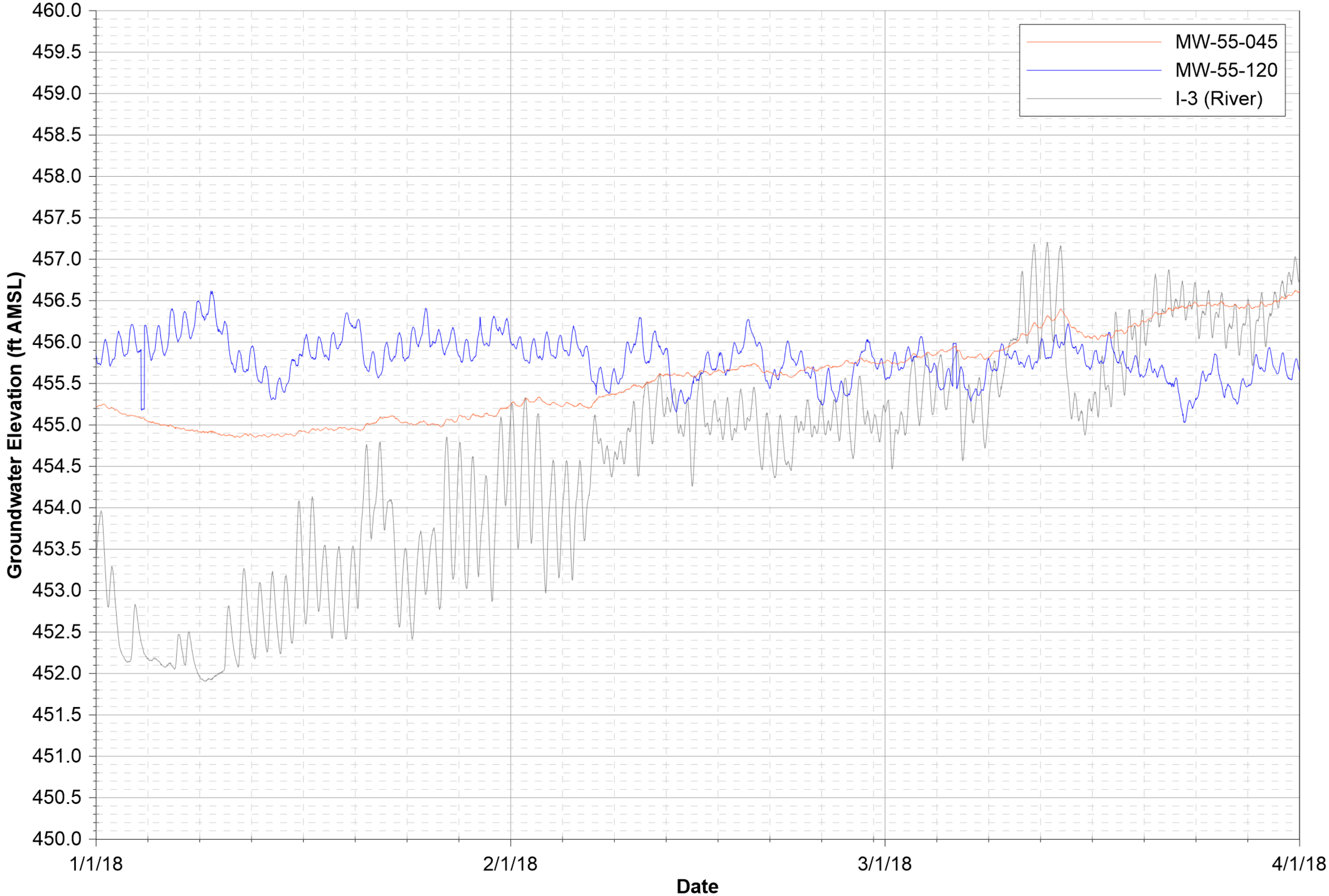


Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1V
MW-54 CLUSTER HYDROGRAPHS

FIRST QUARTER 2018 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-1W
MW-55 CLUSTER HYDROGRAPHS
FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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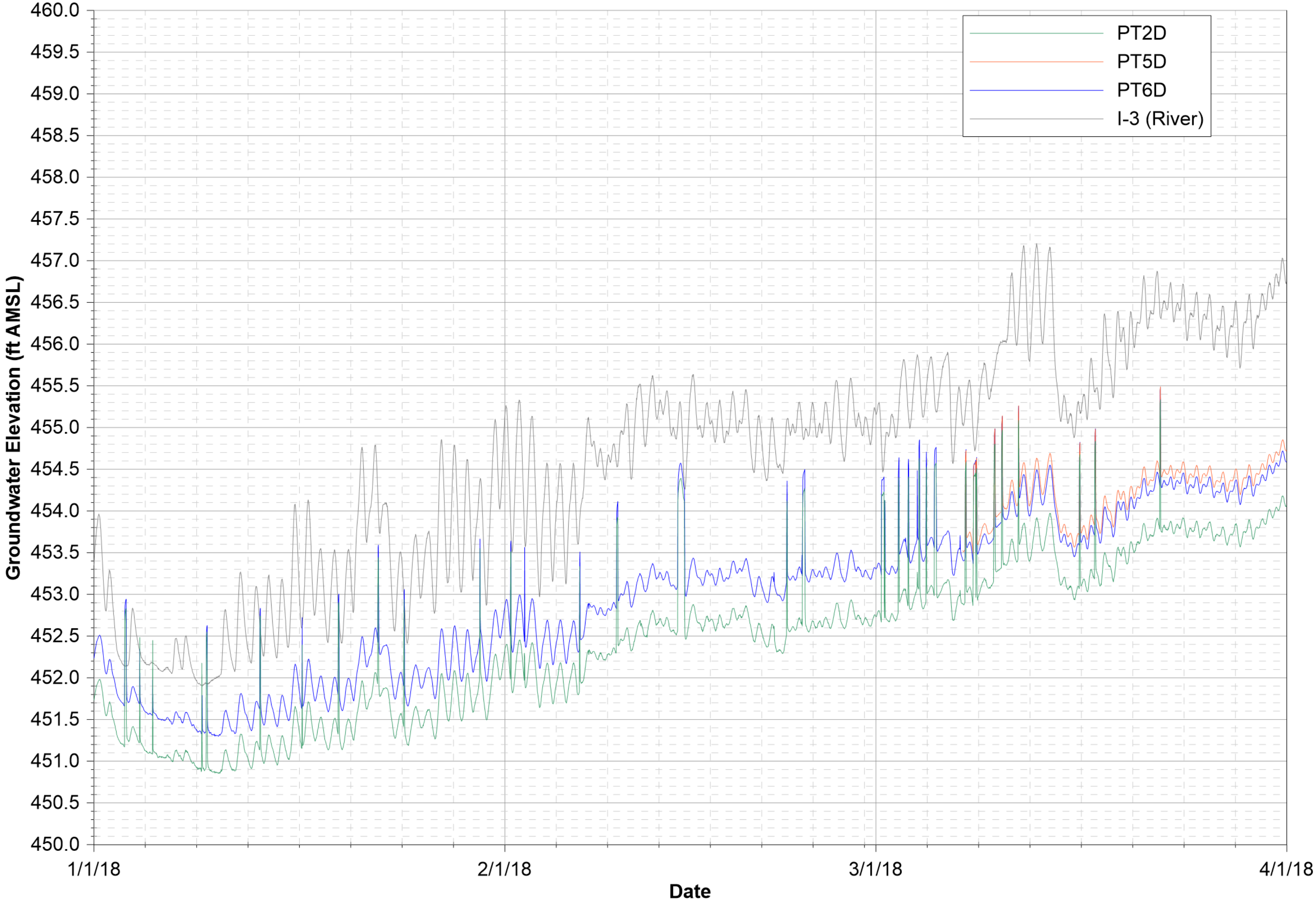

Note:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.
3. PT5D data unavailable from January 1, 2018 through March 7, 2018 due to transducer malfunction.

FIGURE F-1X
INSITU PILOT STUDY WELL HYDROGRAPHS

FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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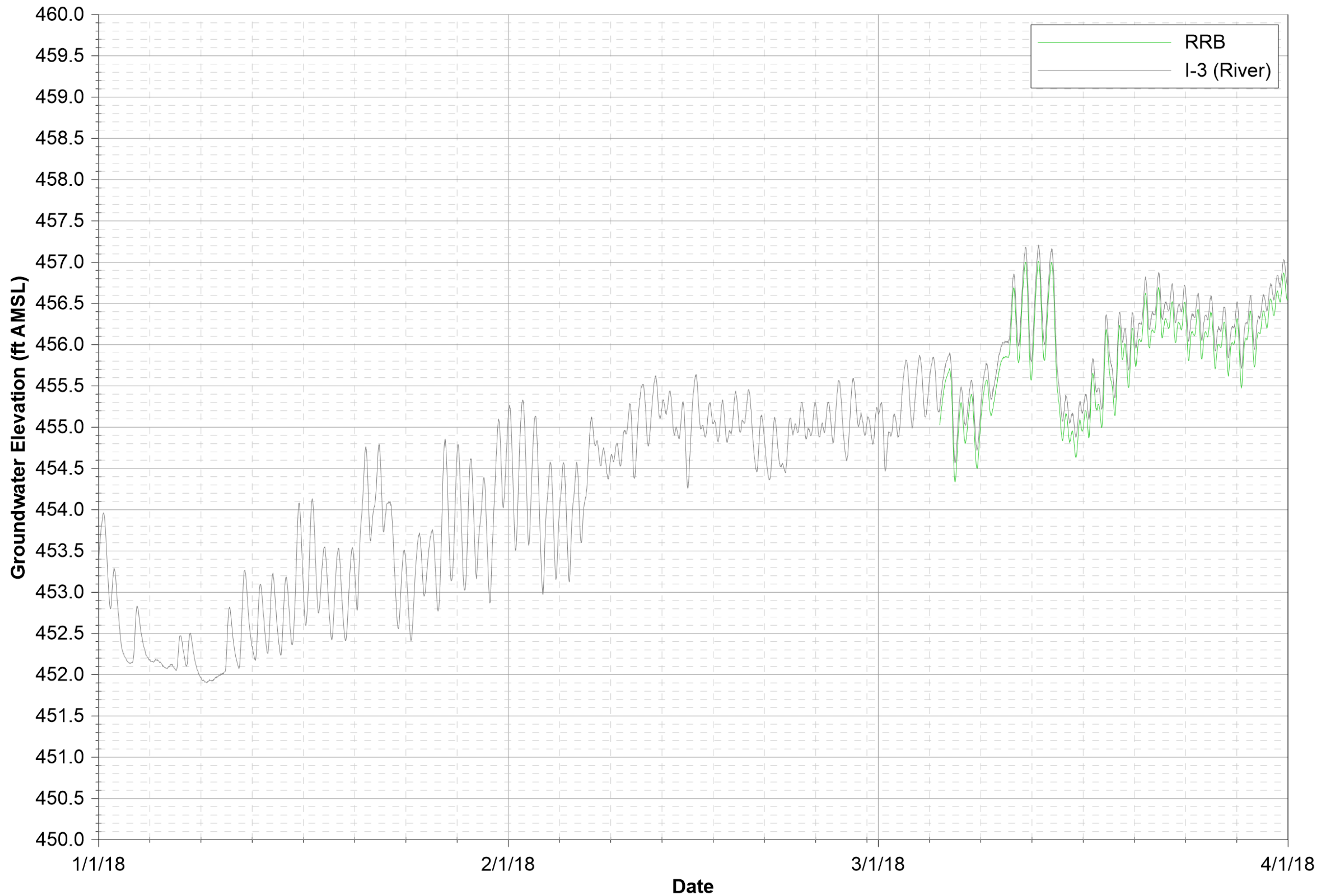

Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.
3. RRB data unavailable from January 1, 2018 through March 4, 2018 due to transducer malfunction.

FIGURE F-1Y
RRB HYDROGRAPH
FIRST QUARTER 2018 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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Table F-1

Average Monthly and Quarterly Groundwater Elevations, First Quarter 2018

First Quarter 2018 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles, California

Well ID	Aquifer Zone	January 2018	February 2018	March 2018	Quarter Average	Days in Quarter Average
I-3	River Station	453.04	454.82	455.94	454.59	90
MW-20-070	Shallow Zone	451.66	452.39	453.17	452.41	90
MW-20-100	Middle Zone	451.05	451.86	452.71	451.87	90
MW-20-130	Deep Zone	450.43	451.36	452.21	451.33	90
MW-22	Shallow Zone	INC	INC	INC	INC	INC
MW-25	Shallow Zone	453.80	454.03	454.63	454.15	90
MW-26	Shallow Zone	453.46	453.69	454.29	453.82	90
MW-27-020	Shallow Zone	452.69	454.28	455.38	454.11	90
MW-27-060	Middle Zone	452.68	454.27	455.37	454.10	90
MW-27-085	Deep Zone	452.64	454.17	455.28	454.03	90
MW-28-025	Shallow Zone	452.67	454.23	455.31	454.06	90
MW-28-090	Deep Zone	452.60	454.12	455.16	453.96	90
MW-30-050	Middle Zone	452.41	453.83	454.85	453.69	90
MW-31-060	Shallow Zone	452.60	453.49	454.33	453.47	90
MW-31-135	Deep Zone	451.85	452.75	453.60	452.73	90
MW-32-035	Shallow Zone	452.60	453.86	454.88	453.78	90
MW-33-040	Shallow Zone	452.89	453.96	453.80	453.54	90
MW-33-090	Middle Zone	452.77	454.10	455.05	453.97	90
MW-33-150	Deep Zone	453.01	454.13	455.03	454.06	90
MW-34-055	Middle Zone	452.69	454.33	455.44	454.15	90
MW-34-080	Deep Zone	452.97	454.52	455.58	454.35	90
MW-34-100	Deep Zone	452.71	454.23	455.30	454.08	90
MW-35-060	Shallow Zone	453.26	INC	INC	INC	INC
MW-35-135	Deep Zone	453.33	454.22	455.06	454.20	90
MW-36-020	Shallow Zone	452.74	454.01	454.96	453.90	90
MW-36-040	Shallow Zone	452.51	453.95	455.00	453.81	90
MW-36-050	Middle Zone	452.44	453.89	454.94	453.75	90
MW-36-070	Middle Zone	452.44	453.90	454.94	453.75	90
MW-36-090	Deep Zone	451.99	453.30	454.29	453.19	90
MW-36-100	Deep Zone	452.25	453.51	454.53	453.43	90
MW-39-040	Shallow Zone	452.36	453.69	454.70	453.58	90
MW-39-050	Middle Zone	452.27	453.57	454.57	453.46	90
MW-39-060	Middle Zone	452.11	453.36	454.34	453.27	90
MW-39-070	Middle Zone	451.39	452.50	453.45	452.44	90
MW-39-080	Deep Zone	451.58	452.71	453.65	452.64	90
MW-39-100	Deep Zone	452.26	453.41	454.36	453.34	90
MW-42-030	Shallow Zone	452.41	453.72	454.70	453.61	90
MW-42-065	Middle Zone	452.48	453.83	454.81	453.70	90
MW-43-025	Shallow Zone	452.64	454.30	455.43	454.11	90
MW-43-090	Deep Zone	452.70	454.33	455.34	454.11	90
MW-44-070	Middle Zone	452.52	454.06	455.10	453.89	90

Table F-1

Average Monthly and Quarterly Groundwater Elevations, First Quarter 2018

First Quarter 2018 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles, California

Well ID	Aquifer Zone	January 2018	February 2018	March 2018	Quarter Average	Days in Quarter Average
MW-44-115	Deep Zone	452.20	453.48	454.40	453.35	90
MW-44-125	Deep Zone	452.71	454.01	454.99	453.90	90
MW-45-095a	Deep Zone	452.33	453.78	454.82	453.64	90
MW-46-175	Deep Zone	452.88	454.08	454.92	453.96	90
MW-47-055	Shallow Zone	453.32	454.35	455.25	454.31	90
MW-47-115	Deep Zone	452.90	453.82	454.72	453.81	90
MW-49-135	Deep Zone	453.27	454.47	455.40	454.38	90
MW-50-095	Middle Zone	INC	INC	INC	INC	INC
MW-51	Middle Zone	453.07	453.33	453.95	453.46	90
MW-54-085	Deep Zone	453.03	454.58	455.64	454.41	90
MW-54-140	Deep Zone	452.95	454.20	455.17	454.11	90
MW-54-195	Deep Zone	452.43	453.53	454.45	453.47	90
MW-55-045	Middle Zone	455.00	455.54	456.17	455.57	90
MW-55-120	Deep Zone	455.95	455.75	455.68	455.80	90
PT2D	Deep Zone	451.42	452.52	453.48	452.47	90
PT5D	Deep Zone	INC	INC	454.24	INC	INC
PT6D	Deep Zone	451.89	453.06	454.01	452.99	90
RRB	River Station	INC	INC	455.85	INC	INC

Notes:

Average reported in ft amsl (feet above mean sea level).

Quarter Average = average of daily averages over reporting period.

INC = Data incomplete, less than 75% of data available over reporting period due to rejection or field equipment malfunction.

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