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December 15, 2017

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

Subject: **Third** *Quarter 2017 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles, California* (PGE20171215A)

Dear Mr. Yue:

Enclosed is the Third Quarter 2017 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 and the Groundwater Monitoring Program and Surface Water Monitoring Program for the Topock project. This report presents the Third Quarter (July through October 2017) performance monitoring results for the IM-3 hydraulic containment system. This report also presents groundwater and surface water monitoring activities, results, and analyses related to the Groundwater and Surface Water Monitoring Programs during the Third Quarter 2017 Reporting Period.

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; and July 20, 2015.

Please contact me at 760.326.5582 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: Third Quarter 2017 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: December 15, 2017 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 Third Quarter 2017 reporting period. On July 23, 2010, DTSC approved a revised reporting schedule for this report that included a revised IM-3 sample collection period from July 1, 2017 through October 31, 2017. The average pumping rate for the IM extraction system during Third Quarter 2017 was 128.1 gallons per minute, and an estimated 94.1 pounds (42.7 kilograms) of chromium were removed between June 1 and September 30, 2017. To date, the IM extraction system has removed 9,020 pounds (4,090 kilograms) of chromium.

Written by: PG&E

Recommendations:
This report does not present any recommended changes to the sampling program

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

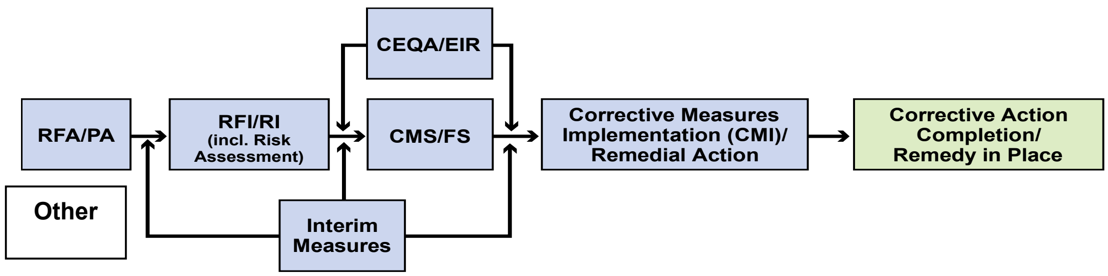
This report is required by DTSC as part of the Interim Measures Performance Monitoring Program.

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

THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT

Topock Compressor Station,
Needles, California

December 15, 2017

THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT

PG&E Topock Compressor Station,

Needles, California

Prepared for:

California Department of Toxic Substances Control

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Date:

December 15, 2017

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

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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
COPC	constituent of potential concern
Cr(VI)	hexavalent chromium
CMP	Compliance Monitoring Program
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
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 Third Quarter 2017. The average pumping rate for the IM extraction system during Third Quarter 2017 was 128.1 gallons per minute, and an estimated 94.1 pounds (42.7 kilograms) of chromium were removed between June 1 and September 30, 2017. To date, the IM extraction system has removed 9,020 pounds (4,090 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 July 1 and October 31, 2017 (hereafter referred to as Third Quarter 2017). 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 Third Quarter 2017 monitoring activities and site operations conducted in support of these programs.

Section 3 presents GMP and RMP monitoring results for the Third Quarter 2017 reporting period.

Section 4 presents PMP monitoring results and the IM evaluation for the Third Quarter 2017 reporting period.

Section 5 describes upcoming monitoring events for the Fourth Quarter 2017.

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 Recent Regulatory Communication

- On June 27, 2014, DTSC approved changes to the GMP sampling schedule, sample frequencies, and sampling methods (DTSC 2014b). This approval was based on recommendations documented in the Fourth Quarter 2013 and Annual edition of the Interim Measures Performance Monitoring and Site-Wide Groundwater and Surface Water Monitoring Report (henceforth referred to as the GMP/PMP Report; CH2M Hill 2014a). Starting in Third Quarter 2014, the groundwater sample collection method for most monitoring wells was conditionally switched from the traditional three-volume method to the low-flow (minimal drawdown) method (following the standard operating procedures detailed in the Sampling and Analysis Field Procedures Topock Program Manual, Revision 1, PG&E, Topock Project [CH2M Hill 2005a] and relevant updates).

- An updated listing of DTSC-approved purge methods and sampling frequencies, as well as a revised set of proposed GMP analytical suite modification, was provided in Table 7-1 of the Fourth Quarter 2014 and Annual GMP/PMP Report (CH2M Hill 2015a). Additional recommendations for updates to the GMP program sampling methods were outlined by PG&E in a letter to DTSC dated August 21, 2015 (PG&E 2015) and in Section 7 of the Fourth Quarter 2015 and Annual GMP/PMP Report (Arcadis 2016a). Recommendations made by PG&E in these documents remain under agency review.
- On June 29, 2015, the Arizona Department of Environmental Quality (ADEQ) recommended that PG&E increase the sampling frequency of MW-55-120 from semiannually to quarterly (ADEQ 2015). This was initiated by PG&E in Third Quarter 2015. On May 18, 2016, ADEQ recommended that quarterly sampling at MW-55-120 be extended for an additional year "where data are within the prescribed hold time and analyzed by an ADHS-certified lab (ADEQ 2016)." This was initiated by PG&E in Second Quarter 2016. Quarterly sampling continued through First Quarter 2017 at this location. Results of sampling at MW-55-120 were evaluated following First Quarter 2017 sampling, and a reduced (semi-annual) sampling frequency was proposed in the First Quarter 2017 GMP report (Arcadis 2017c), with an approval request letter sent to ADEQ on May 5, 2017 as part of the quarterly notification of GMP sampling results. Acceptance of the proposed change from ADEQ was received by email on June 1, 2017 (ADEQ 2017). Semi-annual sampling at this location went into effect during Second Quarter 2017.
- 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 hexavalent chromium [Cr(VI)] concentrations in select floodplain wells (DTSC 2015). Because PE-01 pumps water with low concentrations of chromium (typically less than 5 micrograms per liter [µg/L]), shifting the flow from this well to a higher concentration extraction well can increase the rate of chromium removal from the floodplain.

- As part of the conditional approval for PE-01 shutoff, GMP monitoring results from wells listed in the July 20, 2015 DTSC approval letter 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
- During Third Quarter 2017, PE-01 was run intermittently in July and August (July 29 to August 9, and August 26 to August 31) to maintain key well gradients. After August 31, PE-01 was not operated for gradient control for the remainder of the quarter. During the quarter, only one of the wells evaluated (i.e., within 800 feet of TW-03D, as required as part of the conditional shutdown of PE-01) met the criteria where either Cr(VI) or total dissolved chromium (or both) was detected at concentrations exceeding the notification levels. DTSC was notified of this exceedance (at extraction well PE-01) on October 17, 2017 (Arcadis 2017f).

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 where 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 September or October, 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. Installation of a solar powered telemetry system is planned at MW-20-130 in Fourth Quarter 2017. Addition of this well expands the network of “key” wells in the program from five to six.

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 2017a).

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 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 in the majority 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 Third Quarter 2017 GMP and RMP Report for the IM monitoring activities conducted from July 1, 2017 through October 31, 2017.

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	
5 test 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 Fourth Quarter 2016 and Annual GMP/PMP report (Arcadis 2017b).

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-c), this report presents the Third Quarter 2017 PMP evaluation results for the IM monitoring activities from July 1, 2017 through October 31, 2017.

The Topock IM project consists of groundwater extraction for hydraulic control of the 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 Third Quarter 2017, extraction wells TW-03D and PE-01 operated (with flow primarily from TW-03D) at a combined pumping rate of 128.1 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 2005b) was submitted to DTSC on April 15, 2005 (herein referred to as the Performance Monitoring Plan).

The February 2005 DTSC directive also defined the monitoring and reporting requirements for the IM (DTSC 2005b-c). In October 2007, DTSC modified 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; July 23, 2010; and June 27, 2014 (DTSC 2007a, 2008a-b, 2010a, 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 operated intermittently during Third Quarter 2017 to help maintain groundwater gradients, with no pumping after August 31. TW-02S and TW-02D did not run during Third Quarter 2017 except during brief periods of testing and sampling. TW-03D operated full time during Third Quarter 2017.

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, IM hydraulic monitoring, 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, and one well (PE-01) is located on the floodplain approximately 450 feet east of extraction well TW-03D.

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 Third Quarter 2017.

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, any sampled IMCP wells are evaluated against their established trigger levels. If any exceedances are observed at these wells, a notification process is initiated as outlined in the Revised Contingency Plan Flow Chart (Figure 1 in PG&E 2008). Results of IMCP well evaluations following Third Quarter 2017 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 2016 Annual GMP-PMP Report (Arcadis 2017b). The next scheduled assessment is planned for Fourth Quarter 2017.

1.4.3.5 Wells Monitored for Conditional Shut-Down 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 Third Quarter 2017 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. Additionally, 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 reduced courier travel mileage and increased field efficiency with less frequent sample pickups. 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. Installation of a solar powered telemetry system is planned 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 the 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, impacts from well access, and decontamination water volume to further decrease the monitoring footprint.

More recently, 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 THIRD QUARTER 2017 MONITORING ACTIVITIES

This section summarizes the monitoring and sampling activities completed during Third Quarter 2017 for the GMP, RMP, and PMP.

2.1 Groundwater Monitoring Program

2.1.1 Monthly Sampling

Groundwater was sampled from the active IM extraction wells (PE-01 and TW-03D) in July, August, September, and October 2017 and analyzed for Cr(VI), dissolved chromium, total dissolved solids (TDS), pH, and several additional analytes.

2.1.2 Quarterly Sampling

The Third Quarter 2017 GMP groundwater monitoring event was conducted between September 25 and October 6, 2017 and included sampling from 21 groundwater monitoring wells (with no samples 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) and pH.

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 (referred to as nitrate hereafter), selenium, and potential in situ byproducts (manganese and arsenic) from a subset of wells (DTSC 2010b, 2011, 2015).

2.1.3 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-b). Table A-1 in Appendix A summarizes the quarterly inspection log, field observations, and mitigation actions, if any, for well maintenance.

2.1.4 Implementation of Alternative Sampling Methods

2.1.4.1 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 Third Quarter 2017.

2.1.4.2 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. The purpose of the method trial is to directly compare two different sampling methods. An assessment of the method trials was performed following Fourth Quarter 2016 sampling and was included with the Fourth Quarter 2016 Annual GMP/PMP Report (Arcadis 2017b). The annual report presented the results after 2 years of method trials and made recommendations for updates to the trials (currently under agency review). Method trials continued through Third Quarter 2017 at these wells. The results from the next assessment will be presented in the Fourth Quarter 2017 Annual GMP/PMP Report.

2.2 Surface Water Monitoring Program

Quarterly surface water sampling for the Third Quarter 2017 was conducted August 16 and 17, 2017 from the RMP monitoring network. Samples from the event 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, 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 for the PMP were collected during the Third Quarter 2017 GMP sampling event. In addition, PMP pressure transducers, which monitor hydraulic gradients of the Alluvial Aquifer, were downloaded in the first 2 weeks of each month (July, August, September, and October) to obtain readings for the previous month. The transducers in the key monitoring wells (MW-27-085, MW-31-135, MW-33-150, MW-34-100, and MW-45-095; Figure 1-4) are also downloaded via a cellular telemetry system.

Installation of a telemetry system is planned 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.

In accordance with DTSC conditional approval (DTSC 2015), PE-01 was shut off February 3, 2016, with the pumping shifted to TW-03D and supplemented by TW-02D. Conditional approval included the requirement that PG&E notify DTSC if chromium from individual floodplain monitoring wells within approximately 800 feet of TW-3D exhibited concentrations greater than the maximum detected chromium concentrations from 2014 (or most recent year if a well was not sampled in 2014) when PE-01 is shut down. Samples from Third Quarter 2017 were evaluated in accordance with the DTSC conditional approval (for the shutoff of PE-01) letter. One well monitored during the Third Quarter 2017 (PE-01) met the criteria where either Cr(VI) or total dissolved chromium (or both) were detected at concentrations exceeding the notification levels. DTSC was notified of Third Quarter 2017 exceedances at this well on October 17, 2017 (Arcadis 2017f). A further discussion of these results is presented in Section 4.3.2 of this report.

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 Third Quarter 2017.

3.1 Groundwater Results for Cr(VI) and Dissolved Chromium

Table 3-1 presents the Third Quarter 2016 through Third Quarter 2017 groundwater sample results for Cr(VI) and chromium, among other parameters. The laboratory reports for samples analyzed during Third Quarter 2017 are provided in Appendix B.

Figures 3-1a and 3-1b present the Third Quarter 2017 Cr(VI) results in plan-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 Third Quarter 2017). 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 Third Quarter 2017, the maximum detected Cr(VI) concentration was 20,000 µg/L in well MW-68-180. The maximum detected dissolved chromium concentration was also in MW-68-180 at 20,000 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 Third Quarter 2017. The wells where maximum concentrations of these analytes were reported are summarized as follows:

- MW-46-175 with a molybdenum concentration of 160 µg/L
- MW-68-180 and MW-69-195 with a nitrate concentration of 17 milligrams per liter (mg/L)
- MW-68-180 with a selenium concentration of 14 µg/L
- MW-64BR with a manganese concentration of 950 µg/L

3.2.2 Arsenic Sampling in Monitoring Wells

Select Alluvial Aquifer and bedrock wells were sampled for arsenic during the Third Quarter 2017 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 11 µg/L at well TW-02D.

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

During the Third Quarter 2017 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 for surface water samples from the Third Quarter 2017 sampling event. The surface water locations where maximum concentrations of these analytes were reported in Third Quarter 2017 are summarized below (results for these analytes were within expected ranges for Third Quarter 2017):

- R-28 with a molybdenum concentration of 4.8 µg/L
- RRB with a nitrate concentration of 0.44 mg/L
- RRB with a selenium concentration of 1.7 µg/L
- C-MAR-S with a manganese concentration of 5.5 µg/L
- C-I-3-D with a dissolved iron concentration of 34 µg/L
- C-MAR-D with a total iron concentration of 440 µg/L
- C-R27-D with an arsenic concentration of 2.3 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 out 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.

3.4 Data Validation and Completeness

Laboratory analytical data from the Third Quarter 2017 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 Third Quarter 2017:

- Nine 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 results as N were qualified as non-detect (due to the results being determined as laboratory artifacts in the instrument blanks) and “U” flagged at the measured concentrations in samples MW-60BR-245-Q317 and MW-64BR-Q317.
- Hexavalent chromium demonstrated a relative percent difference greater than QC criteria for the field duplicate pair of sample MW-38S-Q317/MW-901-Q317. 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 Third Quarter 2017 sampling events analyzed in a certified lab are considered estimated.

No other significant analytical deficiencies were identified in the Third Quarter 2017 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 THIRD QUARTER INTERIM MEASURES PERFORMANCE MONITORING PROGRAM EVALUATION

This section presents the quarterly PMP evaluation summary.

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 2016 GMP/PMP Report (Arcadis 2017b). The next round of Chemical Performance Monitoring sampling is planned for Fourth Quarter 2017.

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

The Third Quarter 2017 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 Third Quarter 2017 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 July 2016 through October 2017 are presented in Table 3-1. Appendix D includes graphs of Cr(VI) concentration vs time in selected monitoring well clusters through October 2017. Figure 4-3 presents graphs of Cr(VI) concentration vs time for the following deep monitoring wells in the floodplain area through October 2017: 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.

[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.

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 Third Quarter 2017 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).

Key long-term Cr(VI) concentration trends through Third Quarter 2017 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 2007, 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. Cr(VI) results for the IMCP wells sampled during the Third Quarter 2017 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 hexavalent chromium [Cr(VI)] concentrations in select floodplain wells (DTSC 2015). During the Third Quarter 2017, one of the four wells monitored met the criteria where either Cr(VI) or total dissolved chromium (or both) was detected at concentrations exceeding the notification levels. This exceedance was observed at PE-01 during monthly sampling in September (Appendix Table D-1). For the other three wells monitored during the Third Quarter 2017, total dissolved chromium and Cr(VI) concentrations were below their notification levels and/or were non-detect. DTSC was notified of the Third Quarter 2017 exceedance at PE-01 on October 17, 2017 (Arcadis 2017f).

4.4 Extraction Systems Operations

From July 1, 2017 through October 31, 2017, the volume of groundwater extracted and treated by the IM-3 system was 22,678,524 gallons, and an estimated 94.1 pounds (42.7 kilograms) of chromium was removed from the aquifer between June 1 and September 30, 2017 (Table 4-1). Groundwater extraction is reported on a different schedule than chromium removal reporting (i.e., July-October and June-September, respectively; see Tables 1-1 and 4-1).

During Third Quarter 2017, extraction wells TW-03D and PE-01 operated at a combined average pumping rate of 128.1 gpm, including periods of planned and unplanned downtime. The average monthly pumping rates were 132.9 gpm (July 2017), 118.2 gpm (August 2017), 131.0 gpm (September 2017), and 130.2 gpm (October 2017) during the Third Quarter 2017. Extraction wells TW-02S and TW-02D were not operated during Third Quarter 2017. Table 4-1 shows the average pumping rate and total volume pumped for the system during Third Quarter 2017, 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 95.4 percent during this reporting period. The operations log for the extraction system during Third Quarter 2017, including planned downtime (such as the August maintenance shutdown) 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 2017c).

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. Six containers of solids from the IM-3 facility were disposed of at the U.S. Ecology Chemical Waste Management facility in Beatty, Nevada during Third Quarter 2017. 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 in TW-03D remained stable, ranging from a maximum value of 560 µg/L in July and October to a minimum value of 540 µg/L in August , as shown in Table 4-2. TDS concentrations in TW-3D for this reporting period have also remained stable, as shown in Table 4-2.

During the reporting period, Cr(VI) concentrations in PE-01 (on the floodplain) were detected only in September (9 µg/L); Cr(VI) was not detected in July, August, or October, as shown in Table 4-2. PE-01 was operated intermittently during Third Quarter 2017, primarily to support IM-3 system maintenance and to help maintain key well gradients; however, it was not operated for gradient control after August 31. TDS concentrations in PE-1 for this reporting period have remained stable.

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 Third Quarter 2017, and only operated for brief periods for sampling. Sampling results at this well during the quarter showed results of 200 µg/L Cr(VI) and 190 µg/L total dissolved chromium. 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 2017.

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 subsequent months September or October, 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. Installation of a solar powered telemetry system is planned 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 52 wells (excluding five Arizona locations) and two river monitoring stations (I-3 and RRB; Figure 4-4a). The data are typically continuous, with only short interruptions for sampling or maintenance.

Hydraulic gradients were measured during the Third Quarter 2017 for well pairs 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 July, August, September, and October 2017 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 0.0039, 0.0064, 0.0035, and 0.0035 ft/ft for July, August, September, and October, respectively. This is 3.9, 6.4, 3.5, and 3.5 times greater than the required gradient of 0.001 ft/ft, respectively. The monthly average gradients for the northern well pair were 3.0, 2.4, 2.7, and 2.8 times the target gradient of 0.001 ft/ft. For the central well pair, the monthly average gradients were 6.8, 12.8, 4.3, and 4.3 times the target gradient. The southern well pair average gradients were 1.9, 4.1, 3.5, and 3.5 times the target gradient.

Daily average groundwater and river elevations calculated from the pressure transducer data for the Third Quarter 2017 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 Third Quarter 2017 groundwater elevations for the upper-depth, middle-depth, and lower-depth 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 in the plan views on Figures 4-4a through 4-4c and in the cross-section on 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 Third Quarter 2017 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 Third Quarter 2017 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 November 2017 is based on the October 2017 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 4 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 October 2017. 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 November 2017 (10,400 cubic feet per second) will be less than the actual release in October 2017 (10,900 cubic feet per second). Based on October 2017 USBR projections, it is anticipated that the Colorado River level at the I-3 gage location in November 2017 will be approximately 0.95 ft lower compared to the actual levels in October 2017.

4.7 Quarterly Performance Monitoring Program Evaluation Summary

The groundwater elevation and hydraulic gradient data from July, August, September, and October 2017 performance monitoring indicate that the minimum landward gradient target of 0.001 ft/ft was exceeded each month during the Third Quarter 2017. The overall average landward gradients during Third Quarter 2017 were 3.9, 6.4, 3.5, and 3.5 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 Third Quarter 2017 reporting period.

A total of 22,678,524 gallons of groundwater was extracted during Third Quarter 2017 by the IM-3 treatment facility. The average pumping rate for the IM extraction system during Third Quarter 2017, including system downtime, was 128.1 gpm. An estimated 94.1 pounds (42.7 kilograms) of chromium was removed from groundwater during June, July, August, and September 2017, as presented in Table 4-1. Chromium removal is reported on a different schedule than groundwater extraction (i.e., June-September and July-October, 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. Presentation and evaluation of the Cr(VI) trends observed in the performance monitoring area during the Third Quarter 2017 reporting period are discussed 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. Monitoring results, operations, and performance monitoring data will be further reported in the Fourth Quarter 2017 (and Annual) GMP/PMP Report, which will be submitted by March 15, 2018.

5.1 Groundwater Monitoring Program

5.1.1 Quarterly Monitoring

Consistent with the July 23, 2010 DTSC sampling schedule approval (DTSC 2010a), the Fourth Quarter 2017 groundwater monitoring event is scheduled for December, 2017. This event includes groundwater sampling at 144 wells. Results will be reported in the Fourth Quarter 2017 Quarterly Monitoring Report.

5.1.2 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 Fourth Quarter 2017 Quarterly Monitoring 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-b). Necessary repairs will be conducted in a timely manner.

5.2 Surface Water Monitoring Program

The Fourth Quarter 2017 surface water monitoring event is planned for mid-November 2017 at 25 locations in the RMP monitoring network. Results will be reported in the Fourth Quarter 2017 Quarterly Monitoring 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 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 (primarily used 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 Third Quarter 2017, PE-01 was run intermittently to help maintain groundwater gradient for the first 2 months of the quarter, but was not run at all past August 31. When PE-01 is shut off, pumping is supplemented as needed by TW-02D to maintain total flow. During Fourth Quarter 2017, 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) and the MW-33 cluster will continue during Fourth Quarter 2017 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.

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 2017c). The next monthly data snapshot for November 2017 will be submitted by December 21, 2017.

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TABLES

Table 1-1
Topock Monitoring Reporting Schedule
Third Quarter 2017 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, July 2016 through October 2017

Third Quarter 2017 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles, California

									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-09	SA	12/7/2016		LF	160	160	---	3,000	20	7.5	1
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-10	SA	12/7/2016		LF	180	200	---	2,400	18	7.5	11
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-11	SA	12/7/2016		LF	79	84	---	2,300	1.9	7.6	3
MW-11	SA	12/7/2016	FD	LF	80	81	---	2,400	---	---	---
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-12	SA	12/7/2016		3V	1,900	2,000	---	7,100	-100	8.2	14
MW-12	SA	5/1/2017		LF	1,900	2,000	---	---	-35	8.4	38
MW-13	SA	12/8/2016		LF	21	21	---	2,300	-89	7.6	1
MW-14	SA	12/8/2016		LF	14	16	---	2,300	23	7.6	3
MW-14	SA	5/1/2017		LF	13	13	---	---	67	7.6	21
MW-14	SA	5/1/2017	FD	3V	13	13	---	---	---	---	---
MW-15	SA	12/12/2016		LF	12	13	---	1,800	100	7.7	5
MW-18	SA	12/8/2016		LF	20	20	---	1,500	26	7.7	1
MW-19	SA	12/8/2016		LF	59	57	---	2,000	47	7.5	3
MW-19	SA	4/28/2017		LF	440	430	---	---	37	8.0	9
MW-20-070	SA	12/9/2016		LF	1,800	1,900	---	1,800	41	7.8	2
MW-20-070	SA	4/27/2017		LF	1,800	1,900	---	---	12	8.1	5
MW-20-100	MA	12/9/2016		LF	1,400	1,600	---	2,200	60	7.4	4
MW-20-100	MA	4/27/2017		LF	2,000	2,100	---	---	15	7.8	9
MW-20-130	DA	12/9/2016		LF	7,600	7,500	---	11,000	60	7.7	6
MW-20-130	DA	12/9/2016	FD	LF	7,800	7,900	---	11,000	---	---	---
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-21	SA	12/14/2016		LF	1.3	1.3	---	16,000	25	7.2	15

Table 3-1

Groundwater Sampling Results, July 2016 through October 2017

Third Quarter 2017 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-21	SA	5/3/2017		3V	2.1	2.7	---	---	150	7.2	10
MW-22	SA	12/6/2016		LF	ND (1)	ND (5)	---	21,000	-96	6.7	43
MW-22	SA	4/28/2017		LF	ND (1)	ND (1)	---	---	-96	6.9	23
MW-23-060	BR	12/14/2016		LF	39	34	---	18,000	76	9.7	1
MW-23-060	BR	4/28/2017		LF	38	34	---	---	-66	9.3	37
MW-23-080	BR	12/14/2016		LF	2.2	2.5	---	18,000	24	10	2
MW-23-080	BR	12/14/2016	FD	LF	2	2.3	---	18,000	---	---	---
MW-23-080	BR	4/28/2017		LF	1.2	ND (1)	---	---	-180	10	4
MW-24A	SA	12/6/2016		LF	ND (0.2)	ND (1)	---	1,600	-180	8.4	2
MW-24A	SA	5/3/2017		LF	ND (0.2)	ND (1)	---	---	-210	8.4	2
MW-24B	DA	12/6/2016		LF	ND (1)	1	---	19,000	-190	7.8	4
MW-24B	DA	5/3/2017		LF	230	220	---	---	-66	7.8	3
MW-24B	DA	5/3/2017	FD	LF	230	210	---	---	---	---	---
MW-24BR	BR	12/7/2016		3V	ND (1)	ND (1)	---	15,000	-220	8.2	3
MW-25	SA	12/8/2016		LF	120	120	---	1,800	47	7.3	4
MW-25	SA	5/1/2017		LF	76	74	---	---	95	7.3	6
MW-26	SA	12/8/2016		LF	2,500	2,500	---	3,900	56	7.4	3
MW-26	SA	12/8/2016	FD	LF	2,500	2,100	---	4,000	---	---	---
MW-26	SA	4/26/2017		LF	2,300	2,600	---	---	---	---	---
MW-27-020	SA	12/6/2016		LF	ND (0.2)	ND (1)	---	1,000	40	7.6	3
MW-27-060	MA	12/6/2016		LF	ND (0.2)	ND (1)	---	960	-63	7.6	2
MW-27-060	MA	12/6/2016	FD	LF	ND (0.2)	ND (1)	---	950	---	---	---
MW-27-085	DA	12/6/2016		LF	ND (0.2)	ND (1)	---	9,400	32	7.3	5
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-28-025	SA	12/8/2016		LF	ND (0.2)	ND (1)	---	1,200	51	7.3	2
MW-28-025	SA	4/26/2017		LF	ND (0.2)	ND (1)	---	---	-210	7.4	3
MW-28-090	DA	12/8/2016		LF	ND (0.2)	ND (1)	---	4,500	-46	7.2	4
MW-28-090	DA	4/26/2017		LF	ND (0.2)	1.2	---	---	-170	7.1	43

Table 3-1

Groundwater Sampling Results, July 2016 through October 2017

Third Quarter 2017 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report,
PG&E Topock Compressor Station, Needles, California

									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-29	SA	12/8/2016		LF	ND (0.2)	ND (1)	---	2,200	-37	7.3	3
MW-29	SA	4/26/2017		LF	ND (0.2)	ND (1)	---	---	-180	7.3	4
MW-30-030	SA	12/6/2016		LF	ND (1)	ND (1)	---	17,000	-140	7.6	8
MW-30-050	MA	12/6/2016		LF	ND (0.2)	ND (1)	---	1,000	49	7.6	1
MW-31-060	SA	12/9/2016		LF	590	590	---	2,800	-72	7.6	9
MW-31-060	SA	12/9/2016	FD	LF	580	590	---	2,900	---	---	---
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-31-135	DA	12/9/2016		LF	12	11	---	11,000	-91	7.7	17
MW-32-020	SA	12/6/2016		LF	ND (1)	ND (5)	---	36,000	-93	7.0	3
MW-32-035	SA	12/6/2016		LF	ND (0.2)	ND (1)	---	10,000	-82	7.0	8
MW-32-035	SA	4/27/2017		LF	ND (1)	ND (1)	---	---	-150	7.4	38
MW-33-040	SA	12/8/2016		LF	ND (1)	ND (1)	---	17,000	32	7.7	6.9
MW-33-040	SA	4/26/2017		LF	ND (0.2)	ND (1)	---	---	200	8.0	32
MW-33-090	MA	12/8/2016		LF	5.2	4.8	---	9,600	22	7.2	3.1
MW-33-090	MA	4/26/2017		LF	5	4.9	---	---	170	7.1	4
MW-33-150	DA	12/8/2016		LF	4.6	5.2	---	15,000	57	7.4	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-33-210	DA	12/8/2016		3V	11	12	---	19,000	55	7.4	5
MW-33-210	DA	4/26/2017		LF	9.5	8.3	---	---	140	7.4	30
MW-34-055	MA	12/6/2016		LF	ND (0.2)	ND (1)	---	1,000	21	7.7	1
MW-34-080	DA	12/6/2016		LF	ND (0.2)	ND (1)	---	6,800	-4.4	7.2	1
MW-34-080	DA	12/6/2016	FD	LF	ND (0.2)	ND (1)	---	6,800	---	---	---
MW-34-080	DA	4/27/2017		LF	ND (0.2)	ND (1)	---	---	-250	7.4	3.5
MW-34-100	DA	10/6/2016		LF	1.3	1.7	---	---	---	---	---
MW-34-100	DA	12/6/2016		LF	18	17	---	16,000	-53	7.6	4
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	---	---	---	---	---

Table 3-1

Groundwater Sampling Results, July 2016 through October 2017

Third Quarter 2017 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	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	-140	7.3	10
MW-35-060	SA	12/9/2016		LF	20	20	---	7,100	46	7.3	6
MW-35-060	SA	5/1/2017		LF	21	20	---	---	-28	7.5	31
MW-35-135	DA	12/9/2016		LF	31	28	---	10,000	48	7.7	5
MW-35-135	DA	12/9/2016	FD	LF	30	28	---	10,000	---	---	---
MW-35-135	DA	5/1/2017		LF	25	22	---	---	100	7.7	9
MW-36-020	SA	12/7/2016		LF	ND (0.2)	ND (1)	---	9,400	-99	7.3	4.2
MW-36-040	SA	12/7/2016		LF	ND (0.2)	ND (1)	---	1,300	-150	7.8	1
MW-36-050	MA	12/7/2016		LF	ND (0.2)	ND (1)	---	1,100	-52	7.6	1
MW-36-070	MA	12/7/2016		LF	ND (0.2)	ND (1)	---	1,000	66	7.9	1
MW-36-090	DA	12/7/2016		LF	ND (0.2)	ND (1)	---	1,100	-4.1	8.2	1
MW-36-090	DA	4/27/2017		LF	ND (0.2)	ND (1)	---	---	-1.0	8.4	1
MW-36-100	DA	12/7/2016		LF	28	28	---	7,500	-40	7.4	4
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-37D	DA	12/8/2016		LF	4.4	ND (5)	---	14,000	-71	7.7	8
MW-37D	DA	5/1/2017		LF	6.6	6.3	---	---	3.9	7.7	7
MW-37S	MA	12/8/2016		LF	11	11	---	6,100	-98	7.6	19
MW-38D	DA	9/29/2016		LF	---	---	---	---	-62	7.8	1
MW-38D	DA	12/7/2016		3V	21	21	---	22,000	-71	7.9	3
MW-38D	DA	12/7/2016		LF	20	21	---	23,000	-140	8.0	9
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-38S	SA	9/29/2016		3V	0.99	2.3	---	---	-80	7.8	1
MW-38S	SA	9/29/2016		LF	ND (0.2)	1.4	---	---	---	---	---
MW-38S	SA	12/7/2016		3V	2.7	2.3	---	1,500	-100	8.0	2
MW-38S	SA	12/7/2016		LF	2.2	2.1	---	1,600	-87	8.0	3
MW-38S	SA	12/7/2016	FD	3V	2.5	2.5	---	1,600	---	---	---

Table 3-1

Groundwater Sampling Results, July 2016 through October 2017

Third Quarter 2017 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	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
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-39-040	SA	12/7/2016		LF	ND (0.2)	ND (1)	---	1,200	-150	8.0	4.8
MW-39-050	MA	12/7/2016		LF	ND (0.2)	ND (1)	---	1,100	12	7.6	1
MW-39-060	MA	12/7/2016		LF	ND (0.2)	ND (1)	---	1,200	23	7.7	1
MW-39-070	MA	12/7/2016		LF	ND (0.2)	ND (1)	---	1,800	77	7.7	2
MW-39-080	DA	12/7/2016		LF	ND (0.2)	ND (1)	---	2,200	33	7.9	1
MW-39-100	DA	12/7/2016		LF	77	67	---	15,000	87	6.8	1
MW-39-100	DA	4/27/2017		LF	71	67	---	---	-220	6.9	2
MW-41D	DA	12/8/2016		LF	ND (1)	ND (5)	---	22,000	-130	7.7	3
MW-41D	DA	5/1/2017		LF	ND (1)	ND (5)	---	---	69	7.7	1
MW-41M	DA	12/8/2016		LF	9.2	8.9	---	15,000	-120	7.6	30
MW-41S	SA	12/8/2016		LF	15	14	---	5,900	-120	7.8	47
MW-42-030	SA	12/6/2016		LF	ND (0.2)	ND (1)	---	2,700	-110	7.9	8.2
MW-42-055	MA	12/6/2016		LF	ND (0.2)	1.4	---	1,100	26	8.5	2
MW-42-055	MA	4/28/2017		LF	ND (0.2)	1.3	---	---	-110	8.7	7
MW-42-065	MA	12/6/2016		LF	ND (0.2)	ND (1)	---	4,500	52	7.5	1
MW-42-065	MA	12/6/2016	FD	LF	ND (0.2)	ND (1)	---	4,500	---	---	---
MW-42-065	MA	4/28/2017		LF	ND (0.2)	ND (1)	---	---	92	7.4	8
MW-43-025	SA	12/7/2016		LF	ND (0.2)	ND (1)	---	1,400	-71	7.4	2
MW-43-075	DA	12/9/2016		LF	ND (1)	ND (1)	---	10,000	-110	7.2	5
MW-43-090	DA	12/9/2016		LF	ND (1)	ND (5)	---	16,000	22	7.3	4.6
MW-44-070	MA	12/7/2016		LF	ND (0.2)	ND (1)	---	1,700	-39	7.7	2
MW-44-070	MA	4/27/2017		3V	ND (0.2)	ND (1)	---	---	140	7.4	3

Table 3-1

Groundwater Sampling Results, July 2016 through October 2017

Third Quarter 2017 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-44-115	DA	10/6/2016		LF	16	18	---	---	---	---	---
MW-44-115	DA	10/6/2016	FD	LF	16	18	---	---	---	---	---
MW-44-115	DA	12/7/2016		LF	25	24	---	12,000	25	7.9	225
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	-130	7.8	8
MW-44-125	DA	12/7/2016		LF	10	9.4	---	12,000	-45	7.7	1
MW-44-125	DA	12/7/2016	FD	LF	10	11	---	11,000	---	---	---
MW-44-125	DA	4/27/2017		LF	ND (0.2)	ND (1)	---	---	140	7.5	2
MW-46-175	DA	10/6/2016		LF	9.1	10	---	---	---	---	---
MW-46-175	DA	12/8/2016		LF	16	16	---	19,000	-11	8.3	5
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	-150	8.2	1
MW-46-205	DA	12/8/2016		LF	ND (1)	ND (5)	---	23,000	31	8.3	2
MW-46-205	DA	4/26/2017		LF	1.2	1.1	---	---	210	8.4	5
MW-47-055	SA	12/8/2016		LF	17	16	---	5,200	25	7.5	6.2
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-47-115	DA	12/8/2016		LF	17	18	---	14,000	52	7.5	5
MW-47-115	DA	4/26/2017		LF	23	22	---	---	-110	7.4	9
MW-48	BR	12/14/2016		G	ND (1)	ND (1)	---	20,000	48	8.1	5
MW-48	BR	5/3/2017		G	ND (1)	ND (1)	---	---	30	8.0	11
MW-49-135	DA	12/8/2016		3V	1.5	ND (5)	---	13,000	-54	7.8	5
MW-49-135	DA	12/8/2016	FD	3V	1.4	1.2	---	13,000	---	---	---
MW-49-275	DA	12/8/2016		LF	ND (1)	ND (5)	---	26,000	2.0	8.0	2
MW-49-365	DA	12/8/2016		LF	ND (1)	ND (5)	---	38,000	-100	7.8	1
MW-50-095	MA	12/9/2016		LF	9.2	9.1	---	5,500	-98	7.8	9
MW-50-095	MA	4/28/2017		LF	10	10	---	---	30	8.3	8

Table 3-1

Groundwater Sampling Results, July 2016 through October 2017

Third Quarter 2017 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-50-200	DA	12/9/2016		LF	6,000	5,900	---	21,000	-93	7.5	14
MW-50-200	DA	4/28/2017		LF	7,000	7,400	---	---	39	8.2	37
MW-51	MA	12/9/2016		LF	4,200	4,100	---	13,000	62	7.4	1
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-52D	DA	12/5/2016		LF	ND (1)	ND (5)	---	22,000	-90	7.0	2
MW-52D	DA	4/27/2017		LF	ND (1)	ND (5)	---	---	-230	7.8	1
MW-52M	DA	12/5/2016		LF	ND (1)	ND (1)	---	16,000	-120	7.0	1
MW-52M	DA	4/27/2017		LF	ND (1)	ND (1)	---	---	-190	6.6	2
MW-52S	MA	12/5/2016		LF	ND (1)	ND (1)	---	9,800	-87	7.1	15
MW-52S	MA	12/5/2016	FD	LF	ND (0.2)	ND (1)	---	9,300	---	---	---
MW-52S	MA	4/27/2017		LF	ND (1)	ND (1)	---	---	-210	6.9	2
MW-53D	DA	12/5/2016		LF	ND (1)	ND (5)	---	27,000	-82	6.9	2
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-53M	DA	12/5/2016		LF	ND (1)	ND (1)	---	5,700	-150	8.0	2
MW-53M	DA	4/27/2017		LF	ND (1)	ND (5)	---	---	-240	7.9	2
MW-54-085	DA	12/15/2016		3V	---	---	---	---	-110	7.4	3
MW-54-085	DA	12/15/2016	(a)	3V	ND (0.5)	ND (0.2)	---	---	---	---	---
MW-54-085	DA	5/4/2017		LF	---	---	---	---	-77	8.1	4
MW-54-085	DA	5/4/2017	(a)	LF	ND (0.1)	ND (0.2)	---	---	---	---	---
MW-54-140	DA	12/15/2016		3V	---	---	---	---	-120	7.7	24
MW-54-140	DA	12/15/2016	(a)	3V	ND (0.5)	ND (0.2)	---	---	---	---	---
MW-54-140	DA	5/4/2017		LF	---	---	---	---	-14	8.2	3
MW-54-140	DA	5/4/2017	(a)	LF	ND (0.1)	ND (0.2)	---	---	---	---	---
MW-54-195	DA	12/15/2016		LF	---	---	---	---	-97	8.2	1
MW-54-195	DA	12/15/2016	(a)	LF	ND (0.5)	ND (1)	---	---	---	---	---
MW-54-195	DA	12/15/2016	FD(a)	LF	ND (0.5 J)	ND (1)	---	---	---	---	---
MW-54-195	DA	5/4/2017		3V	---	---	---	---	-220	8.2	1

Table 3-1

Groundwater Sampling Results, July 2016 through October 2017

Third Quarter 2017 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-54-195	DA	5/4/2017	(a)	3V	ND (0.5)	ND (0.2)	---	---	---	---	---
MW-55-045	MA	12/15/2016		LF	---	---	---	---	-14	7.8	22
MW-55-045	MA	12/15/2016	(a)	LF	ND (0.1)	ND (0.2)	---	---	---	---	---
MW-55-045	MA	5/2/2017		LF	---	---	---	---	-130	7.8	6
MW-55-045	MA	5/2/2017	(a)	LF	ND (0.1)	ND (0.2)	---	---	---	---	---
MW-55-120	DA	9/30/2016		LF	---	---	---	---	140	8.0	1
MW-55-120	DA	9/30/2016	(a)	LF	6.39	6.83	---	---	---	---	---
MW-55-120	DA	12/15/2016		3V	---	---	---	---	-110	7.9	13
MW-55-120	DA	12/15/2016	(a)	3V	8.4	8.17	---	---	---	---	---
MW-55-120	DA	2/10/2017		LF	---	---	---	---	-130	8.1	5
MW-55-120	DA	2/10/2017	(a)	LF	7.5	8.3	---	---	---	---	---
MW-55-120	DA	2/10/2017	FD(a)	LF	7.33	8.28	---	---	---	---	---
MW-55-120	DA	5/2/2017		LF	---	---	---	---	-1.2	8.0	8
MW-55-120	DA	5/2/2017	(a)	LF	8.1	8.2	---	---	---	---	---
MW-56D	DA	12/14/2016		LF	---	---	---	---	-34	7.6	2
MW-56D	DA	12/14/2016	(a)	LF	ND (0.5)	ND (1)	---	---	---	---	---
MW-56D	DA	5/4/2017		LF	---	---	---	---	-160	7.3	1
MW-56D	DA	5/4/2017	(a)	LF	ND (0.5)	ND (0.2)	---	---	---	---	---
MW-56M	DA	12/14/2016		LF	---	---	---	---	-110	7.2	6
MW-56M	DA	12/14/2016	(a)	LF	ND (0.5)	ND (1)	---	---	---	---	---
MW-56M	DA	5/4/2017		LF	---	---	---	---	-110	7.2	1
MW-56M	DA	5/4/2017	(a)	LF	ND (0.5)	ND (0.2)	---	---	---	---	---
MW-56S	SA	12/14/2016		LF	---	---	---	---	-110	6.9	2
MW-56S	SA	12/14/2016	(a)	LF	ND (0.1)	ND (0.2)	---	---	---	---	---
MW-56S	SA	5/4/2017		LF	---	---	---	---	-110	7.6	7
MW-56S	SA	5/4/2017	(a)	LF	ND (0.1)	ND (0.2)	---	---	---	---	---
MW-57-070	BR	12/13/2016		LF	400	420	---	2,400	85	7.2	28
MW-57-070	BR	5/1/2017		LF	350	340	---	---	-6.3	7.3	27
MW-57-185	BR	12/13/2016		3V	7.1	7.3	---	20,000	32	8.9	1

Table 3-1

Groundwater Sampling Results, July 2016 through October 2017

Third Quarter 2017 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles, California

									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-57-185	BR	5/1/2017		3V	5.9	5.2	---	---	-47	9.4	2
MW-58BR	BR	9/27/2016		LF	2.7	2.7	---	---	-170	7.2	6
MW-58BR	BR	12/13/2016		LF	4.3	3.9	---	8,600	66	7.6	2
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-59-100	SA	12/7/2016		LF	3,600	3,500	---	9,500	77	7.0	5
MW-59-100	SA	12/7/2016	FD	LF	3,400	3,500	---	9,300	---	---	---
MW-59-100	SA	5/1/2017		LF	2,500	2,600	---	---	120	7.1	8
MW-60-125	BR	12/14/2016		LF	880	840	---	9,100	84	7.4	18
MW-60-125	BR	5/2/2017		LF	830	830	---	---	58	7.4	10
MW-60BR-245	BR	9/29/2016		3V	ND (1)	37	---	---	-150	8.0	1
MW-60BR-245	BR	12/14/2016		3V	ND (1)	ND (1)	---	19,000	-65	8.2	1
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-61-110	BR	12/13/2016		3V	520	500	---	17,000	-67	7.4	7
MW-61-110	BR	5/2/2017		3V	370	340	---	---	-23	7.4	5
MW-62-065	BR	9/28/2016		LF	350	340	---	---	-46	7.4	5
MW-62-065	BR	12/13/2016		LF	600	550	---	6,500	-70	7.4	14
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-62-110	BR	9/28/2016		Flute	ND (1)	ND (1)	---	---	-130	8.0	31
MW-62-110	BR	12/14/2016		G	ND (1)	ND (1)	---	10,000	20	7.3	4
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

Table 3-1

Groundwater Sampling Results, July 2016 through October 2017

Third Quarter 2017 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report,
PG&E Topock Compressor Station, Needles, California

									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-62-190	BR	12/14/2016		G	ND (1)	ND (5)	---	20,000	-210	7.4	4
MW-62-190	BR	5/3/2017		Tap	ND (1)	ND (1)	---	---	-270	7.6	1
MW-63-065	BR	9/30/2016		LF	1.4	1.7	---	---	150	7.1	7
MW-63-065	BR	9/30/2016	FD	LF	1.3	1.7	---	---	---	---	---
MW-63-065	BR	12/13/2016		LF	1.3	2.2	---	7,000	-65	7.1	7
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-64BR	BR	9/28/2016		LF	ND (1)	ND (1)	---	---	-65	7.3	3
MW-64BR	BR	12/13/2016		LF	ND (1)	ND (5)	---	14,000	-84	7.4	7
MW-64BR	BR	12/13/2016	FD	LF	ND (1)	ND (5)	---	14,000	---	---	---
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-65-160	SA	9/29/2016		LF	150	160	---	---	10	7.1	6
MW-65-160	SA	12/6/2016		LF	160	150	---	3,700	41	7.2	2
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-65-225	DA	9/29/2016		LF	87	110	---	---	-45	7.5	10
MW-65-225	DA	12/6/2016		LF	150	140	---	16,000	-37	7.6	22
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-66-165	SA	12/5/2016		LF	460	450	---	3,900	61	7.3	6
MW-66-165	SA	4/25/2017		LF	430	460	---	---	-20	7.7	49
MW-66-230	DA	12/5/2016		LF	7,000	7,300	---	18,000	51	7.9	4
MW-66-230	DA	4/25/2017		LF	6,800	7,100	---	---	-110	7.8	4.6

Table 3-1

Groundwater Sampling Results, July 2016 through October 2017

Third Quarter 2017 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-66BR-270	BR	12/15/2016		3V	ND (0.2)	ND (1)	---	5,400	---	---	---
MW-66BR-270	BR	5/4/2017		3V	ND (0.2)	ND (1)	---	---	-290	9.2	20
MW-67-185	SA	12/5/2016		LF	1,600	1,600	---	6,900	-26	7.2	9
MW-67-185	SA	5/3/2017		LF	1,600	1,700	---	---	96	7.2	28
MW-67-225	MA	12/5/2016		LF	3,000	2,900	---	7,100	-86	7.8	1,000
MW-67-225	MA	5/4/2017		LF	2,700	3,000	---	---	67	7.5	37
MW-67-260	DA	12/5/2016		LF	1,000	950	---	18,000	-180	9.7	10
MW-67-260	DA	12/5/2016	FD	LF	1,000	1,000	---	18,000	---	---	---
MW-67-260	DA	5/3/2017		LF	440	400	---	---	-150	11	9
MW-68-180	SA	9/29/2016		LF	31,000	34,000	---	---	77	7.5	3
MW-68-180	SA	12/6/2016		LF	38,000	42,000	---	4,700	-55	7.5	4
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-68-240	DA	12/6/2016		LF	2,100	2,200	---	16,000	-99	7.5	10
MW-68-240	DA	5/3/2017		LF	2,100	2,200	---	---	-100	7.3	2
MW-68BR-280	BR	12/6/2016		3V	ND (1)	ND (1)	---	21,000	-210	9.1	5
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-69-195	BR	9/29/2016		LF	640	680	---	---	81	7.3	1
MW-69-195	BR	12/6/2016		LF	670	740	---	3,500	2.2	7.4	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-70-105	BR	12/14/2016		LF	140	140	---	3,700	-85	7.7	13
MW-70-105	BR	5/2/2017		LF	130	120	---	---	-45	8.2	7
MW-70BR-225	BR	12/14/2016		3V	1,900	1,800	---	14,000	-57	7.3	2
MW-70BR-225	BR	12/14/2016	FD	3V	1,900	1,800	---	14,000	---	---	---

Table 3-1

Groundwater Sampling Results, July 2016 through October 2017

Third Quarter 2017 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles, California

									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-70BR-225	BR	5/2/2017		3V	1,800	1,800	---	---	-36	7.9	1
MW-71-035	SA	12/14/2016		G	ND (1)	ND (1)	---	15,000	50	6.7	48
MW-71-035	SA	5/3/2017		LF	ND (1)	ND (1)	---	---	190	6.8	15
MW-72-080	BR	9/28/2016		LF	86	84	---	---	-120	7.8	5
MW-72-080	BR	12/12/2016		LF	---	120	---	17,000	-94	7.7	15
MW-72-080	BR	12/15/2016		LF	120	---	---	---	---	---	---
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	LF	110	97	---	16,000	---	---	---
MW-72BR-200	BR	9/28/2016		3V	4.2	4.3	---	---	-170	8.2	1
MW-72BR-200	BR	12/12/2016		3V	5.3	4.8	---	15,000	-120	8.2	4
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-73-080	BR	9/28/2016		G	23	22	---	---	-100	7.3	7
MW-73-080	BR	12/12/2016		LF	26	25 J	---	11,000	-80	7.4	34
MW-73-080	BR	12/12/2016	FD	LF	29	33 J	---	11,000	---	---	---
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-74-240	BR	12/8/2016		LF	0.38	ND (1)	---	850	150	8.4	19
MW-74-240	BR	4/27/2017		LF	ND (0.2)	ND (1)	---	---	-21	8.8	9
OW-03D	DA	12/8/2016		LF	12	13	---	9,800	28	8.9	1
OW-03M	MA	12/8/2016		LF	15	16	---	6,300	22	7.9	7
OW-03S	SA	12/8/2016		3V	21	22	---	1,500	28	7.8	2
PE-01	DA	7/6/2016		Tap	ND (0.2)	ND (1)	---	4,100	---	---	---
PE-01	DA	8/3/2016		Tap	0.8	ND (1)	---	4,000	---	---	---
PE-01	DA	9/8/2016		Tap	1.1	1.1	---	4,200	-5.3	7.3	1

Table 3-1

Groundwater Sampling Results, July 2016 through October 2017

Third Quarter 2017 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
PE-01	DA	10/6/2016		Tap	0.57	ND (1)	---	4,500	---	---	---
PE-01	DA	10/6/2016	FD	Tap	0.82	ND (1)	---	4,500	---	---	---
PE-01	DA	11/2/2016		Tap	2	1.7	---	4,700	---	---	---
PE-01	DA	12/6/2016		Tap	1.2	1.1	---	4,400	7.3	7.6	3
PE-01	DA	1/4/2017		Tap	ND (0.2)	ND (1)	---	4,500	-9.6	7.7	24
PE-01	DA	2/7/2017		Tap	1.9	1.8	---	4,600	---	---	---
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	---	---	---
PGE-07BR	BR	12/7/2016		3V	ND (1)	ND (1)	---	20,000	-280	7.3	38
PGE-08	BR	12/7/2016		3V	ND (1)	ND (1)	---	19,000	-190	8.3	5
PM-03	---	12/9/2016		Tap	9.4	9.4	8.7	1,500	46	7.5	2
PM-04	---	12/9/2016		Tap	4.8	4.1	15	1,900	42	8.0	4
PM-04	---	12/9/2016	FD	Tap	4.9	4.4	14	1,900	---	---	---
TW-01	SA	5/3/2017		LF	2,200	2,400	---	---	110	7.5	1
TW-02D	DA	7/6/2016		Tap	52	57	---	6,200	---	---	---
TW-02D	DA	12/13/2016		Tap	ND (0.2)	ND (1)	---	6,800	120	7.2	3
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	6.9	5
TW-02S	SA	12/13/2016		Tap	64	93	---	3,900	130	7.7	1
TW-03D	DA	7/6/2016		Tap	610	650	---	7,800	---	---	---

Table 3-1

Groundwater Sampling Results, July 2016 through October 2017

Third Quarter 2017 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	8/3/2016		Tap	530	630	---	7,300	---	---	---
TW-03D	DA	9/8/2016		Tap	600	580	---	7,400	12	6.9	2
TW-03D	DA	10/6/2016		Tap	580	650	---	7,700	---	---	---
TW-03D	DA	11/2/2016		Tap	590	630	---	8,100	---	---	---
TW-03D	DA	11/2/2016	FD	Tap	590	620	---	8,000	---	---	---
TW-03D	DA	12/6/2016		Tap	630	610	---	7,800	16	7.4	4
TW-03D	DA	1/4/2017		Tap	620	620	---	7,800	-3.7	7.4	9
TW-03D	DA	2/7/2017		Tap	600	630	---	7,800	---	---	---
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	4/25/2017		Tap	560	570	---	7,400	---	---	---
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
TW-03D	DA	9/7/2017		Tap	550	540	---	7,300	---	---	---
TW-03D	DA	10/3/2017		Tap	560	580	---	7,500	---	---	---

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.

Table 3-1

Groundwater Sampling Results, July 2016 through October 2017

Third Quarter 2017 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report,

PG&E Topock Compressor Station, Needles, California

								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

UF = unfiltered.
µg/L = micrograms per liter.
µS/cm = microSiemens per centimeter.

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

Table 3-1

Groundwater Sampling Results, July 2016 through October 2017

Third Quarter 2017 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

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, Third Quarter 2017

Third Quarter 2017 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-34-100	DA	10/2/2017		LF	1.4	20	ND (0.5)	230	ND (0.05)
MW-38S	SA	9/26/2017		3V	7.7	38	1.2	100	2.5
MW-38S	SA	9/26/2017		LF	7.7	37	1.3	100	2.9
MW-38S	SA	9/26/2017	FD	LF	7.5	36	1.3	98	2.7
MW-44-115	DA	10/2/2017		LF	5.4	79	ND (0.5)	7.6	0.073
MW-46-175	DA	10/2/2017		LF	--	160	ND (2.5)	--	1.1
MW-58BR	BR	9/27/2017		LF	1.6	21	1.8	340	1.1
MW-60BR-245	BR	9/26/2017		3V	5.3	56	3.4	14	ND (0.069)
MW-62-065	BR	9/25/2017		LF	1.6	14	3.4	2.8	4.3
MW-62-065	BR	9/25/2017	FD	LF	1.5	14	3.6	3	3.8
MW-62-110	BR	9/27/2017		Tap	4.3	40	ND (2.5)	110	ND (0.05)
MW-63-065	BR	9/28/2017		LF	1.4	16	0.97	1.7	1.4
MW-64BR	BR	9/25/2017		LF	4.2	62	ND (0.5)	950	ND (0.051)
MW-65-160	SA	9/26/2017		LF	0.43	31	9	170	13
MW-65-225	DA	9/26/2017		LF	1.9	27	6.5	8.5	8.6
MW-68-180	SA	9/26/2017		LF	2.7	36	14	2.5	17
MW-69-195	BR	9/26/2017		LF	2.2	81	11	6.2	17
MW-72-080	BR	9/28/2017		LF	11	78	ND (2.5)	57	0.85
MW-72-080	BR	9/28/2017	FD	LF	11	75	ND (2.5)	60	0.88
MW-72BR-200	BR	9/27/2017		3V	15	78	ND (2.5)	8.8	0.12
MW-73-080	BR	9/27/2017		LF	1.3	30	4.3	34	3.2
PE-01	DA	7/18/2017		Tap	--	--	--	240	ND (0.05)
PE-01	DA	8/2/2017		Tap	--	--	--	150	ND (0.05)
PE-01	DA	9/7/2017		Tap	--	--	--	68	0.15
PE-01	DA	10/3/2017		Tap	--	--	--	330	ND (0.05)
TW-02D	DA	10/24/2017		Tap	--	11	2.2	2.4	--
TW-03D	DA	7/18/2017		Tap	--	--	--	9.8	3
TW-03D	DA	8/2/2017		Tap	--	--	--	8.6	2.9
TW-03D	DA	9/7/2017		Tap	--	--	--	9.5	2.8
TW-03D	DA	10/3/2017		Tap	--	--	--	10	2.9

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 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

Table 3-2

Groundwater COPCs and In Situ Byproducts Sampling Results, Third Quarter 2017

Third Quarter 2017 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)

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, Third Quarter 2017

Third Quarter 2017 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	8/16/2017		ND (0.2)	ND (1)	1,020	8.0
C-CON-D	8/17/2017		ND (0.2)	ND (1)	1,020	8.0
C-CON-S	8/17/2017		ND (0.2)	ND (1)	1,020	8.1
C-I-3-D	8/16/2017		ND (0.2)	ND (1)	1,020	8.1
C-I-3-D	8/16/2017	FD	ND (0.2)	ND (1)	--	8.1
C-I-3-S	8/16/2017		ND (0.2)	ND (1)	1,020	8.1
C-MAR-D	8/17/2017		ND (0.2)	ND (1)	1,030	8.0
C-MAR-S	8/17/2017		ND (0.2)	ND (1)	1,020	8.1
C-NR1-D	8/17/2017		ND (0.2)	ND (1)	1,020	8.1
C-NR1-S	8/17/2017		ND (0.2)	ND (1)	1,020	8.1
C-NR3-D	8/17/2017		ND (0.2)	ND (1)	1,020	8.0
C-NR3-S	8/17/2017		ND (0.2)	ND (1)	1,020	8.1
C-NR4-D	8/17/2017		ND (0.2)	ND (1)	1,020	8.0
C-NR4-S	8/17/2017		ND (0.2)	ND (1)	1,020	8.1
C-NR4-S	8/17/2017	FD	ND (0.2)	ND (1)	--	8.0
C-R22A-D	8/16/2017		ND (0.2)	ND (1)	1,030	8.0
C-R22A-S	8/16/2017		ND (0.2)	ND (1)	1,030	8.1
C-R27-D	8/16/2017		ND (0.2)	ND (1)	1,020	8.1
C-R27-S	8/16/2017		ND (0.2)	ND (1)	1,020	8.1
C-TAZ-D	8/16/2017		ND (0.2)	ND (1)	1,020	8.1
C-TAZ-S	8/16/2017		ND (0.2)	ND (1)	1,020	8.1
C-TAZ-S	8/16/2017	FD	ND (0.2)	ND (1)	--	8.0
Shoreline Samples						
R-19	8/17/2017		ND (0.2)	ND (1)	1,020	8.2
R-28	8/16/2017		ND (0.2)	ND (1)	1,030	8.2
R63	8/16/2017		ND (0.2)	ND (1)	1,030	8.0
RRB	8/17/2017		ND (0.2)	ND (1)	1,020	8.2
RRB	8/17/2017	FD	ND (0.2)	ND (1)	--	8.0
SW1	8/16/2017		ND (0.2)	ND (1)	1,100	8.0
SW2	8/16/2017		ND (0.2)	ND (1)	1,050	7.9

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, Third Quarter 2017

Third Quarter 2017 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	8/16/2017		2.2	110	62	32	ND (0.5)	4.7	0.4	1.4	ND (10)
C-CON-D	8/17/2017		2.2	110	140	ND (20)	ND (0.5)	4.5	0.39	1.5	ND (10)
C-CON-S	8/17/2017		2.2	110	40	ND (20)	ND (0.5)	4.5	0.39	1.4	ND (10)
C-I-3-D	8/16/2017		2.1	110	89	ND (20)	ND (0.5)	4.3	0.41	1.4	16
C-I-3-D	8/16/2017	FD	2.1	110	120	34	ND (0.5)	4.5	0.41	1.5	ND (10)
C-I-3-S	8/16/2017		2.2	110	28	ND (20)	ND (0.5)	4.6	0.42	1.5	ND (10)
C-MAR-D	8/17/2017		2.2	110	440	ND (20)	3.7	4.6	0.43	1.5	13
C-MAR-S	8/17/2017		2.2	110	380	ND (20)	5.5	4.4	0.4	1.5	14
C-NR1-D	8/17/2017		2.1	110	40	ND (20)	ND (0.5)	4.4	0.41	1.5	ND (10)
C-NR1-S	8/17/2017		2.1	110	49	ND (20)	ND (0.5)	4.4	0.4	1.5	ND (10)
C-NR3-D	8/17/2017		2.1	110	70	ND (20)	ND (0.5)	4.4	0.4	1.5	ND (10)
C-NR3-S	8/17/2017		2.1	110	29	ND (20)	ND (0.5)	4.5	0.41	1.5	ND (10)
C-NR4-D	8/17/2017		2.1	110	43	ND (20)	ND (0.5)	4.5	0.41	1.5	ND (10)
C-NR4-S	8/17/2017		2.1	100	59	ND (20)	ND (0.5)	4.3	0.39	1.4	ND (10)
C-NR4-S	8/17/2017	FD	2.1	110	120	ND (20)	ND (0.5)	4.5	0.42	1.5	ND (10)
C-R22A-D	8/16/2017		2.2	120	28	ND (20)	ND (0.5)	4.7	0.41	1.4	ND (10)
C-R22A-S	8/16/2017		2.2	110	24	ND (20)	ND (0.5)	4.6	0.4	1.4	ND (10)
C-R27-D	8/16/2017		2.3	120	47	ND (20)	ND (0.5)	4.6	0.4	1.5	ND (10)
C-R27-S	8/16/2017		2.1	110	45	ND (20)	ND (0.5)	4.7	0.39	1.5	ND (10)
C-TAZ-D	8/16/2017		2.2	110	21	ND (20)	ND (0.5)	4.6	0.4	1.5	ND (10)
C-TAZ-S	8/16/2017		2.1	110	ND (20)	ND (20)	ND (0.5)	4.5	0.41	1.5	ND (10)
C-TAZ-S	8/16/2017	FD	2.2	110	110	ND (20)	ND (0.5)	4.7	0.4	1.4	ND (10)
Shoreline Samples											
R-19	8/17/2017		2.2	110	120	ND (20)	ND (0.5)	4.5	0.4	1.5	ND (10)
R-28	8/16/2017		2.2	120	93	ND (20)	ND (0.5)	4.8	0.39	1.5	ND (10)
R63	8/16/2017		2.1	110	100	ND (20)	3.8	4.4	0.4	1.4	ND (10)
RRB	8/17/2017		2.1	110	33	ND (20)	ND (0.5)	4.5	0.44	1.7	ND (10)
RRB	8/17/2017	FD	2.1	110	22	ND (20)	ND (0.5)	4.4	0.42	1.5	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.

Table 3-4

COPCs, In Situ Byproducts, and Geochemical Indicator Parameters in Surface Water Samples, Third Quarter 2017

Third Quarter 2017 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)

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, Third Quarter 2017
Third Quarter 2017 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles, California

Extraction Well ID	July 2017		August 2017		September 2017		October 2017		Third Quarter 2017	
	Average Pumping Rate (gpm) [a]	Volume Pumped (gal)	Average Pumping Rate (gpm) [a]	Volume Pumped (gal)	Average Pumping Rate (gpm) [a]	Volume Pumped (gal)	Average Pumping Rate (gpm) [a]	Volume Pumped (gal)	Average Pumping Rate (gpm) [a]	Volume Pumped (gal)
TW-02S	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0
TW-02D	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0
TW-03D	130.78	5,837,836	107.89	4,816,052	130.64	5,643,708	130.19	5,811,842	124.87	22,109,438
PE-01	2.11	94,336	10.28	458,790	0.34	14,788	0.03	1,172	3.19	569,087
TOTAL	**132.9**	**5,932,172**	**118.2**	**5,274,842**	**131.0**	**5,658,496**	**130.2**	**5,813,015**	**128.1**	**22,678,524**

Chromium Removed This Quarter (kg)	42.7
Chromium Removed Project to Date (kg)	4090
Chromium Removed This Quarter (lb)	94.1
Chromium Removed Project to Date (lb)	9020

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 June 1, 2017 through September 30, 2017. On July 23, 2010 DTSC approved a revised reporting schedule for this report that included a revised IM-3 sample collection period from June 1, 2017 through September 30, 2017.

Table 4-2

Analytical Results for Extraction Wells, Third Quarter 2017

Third Quarter 2017 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	7/18/2017	ND (0.2)	ND (1)	2,600	7.6
PE-01	8/2/2017	ND (0.2)	ND (1)	2,400	7.2
PE-01	9/7/2017	9	4.5	2,600	7.4
PE-01	10/3/2017	ND (0.2)	ND (1)	1,900	7.6
TW-02D	10/24/2017	200	190	2,200	--
TW-03D	7/18/2017	560	570	4,700	7.4
TW-03D	8/2/2017	540	520	4,000	7.5
TW-03D	9/7/2017	550	540	4,300	7.2
TW-03D	10/3/2017	560	580	4,300	7.3

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.
ug/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, Third Quarter 2017

Third Quarter 2017 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	July	0.0039	NA	NA (pre-change approval)
	August	0.0064	NA	NA (pre-change approval)
	September	0.0035	NA	no
	October	0.0035	NA	no
Northern Gradient Pair MW-31-135 / MW-33-150	July	0.0030	31	NA (pre-change approval)
	August	0.0024	31	NA (pre-change approval)
	September	0.0027	30	no
	October	0.0028	31	no
Central Gradient Pair (used when PE-01 is run for gradient control)[d] MW-45-095[e] / MW-34-100	July	0.0068	31	NA (pre-change approval)
	August	0.0128	31	NA (pre-change approval)
	September	--	30	no
	October	--	31	no
Central Gradient Pair (used when PE-01 is not run for gradient control)[d] MW-20-130[e] / MW-34-100	July	--	31	NA (pre-change approval)
	August	--	31	NA (pre-change approval)
	September	0.0043	30	no
	October	0.0043	31	no
Southern Gradient Pair (used when PE-01 is run for gradient control)[d] MW-45-095[e] / MW-27-085	July	0.0019	31	NA (pre-change approval)
	August	0.0041	31	NA (pre-change approval)
	September	--	30	no
	October	--	31	no
Southern Gradient Pair (used when PE-01 is not run for gradient control)[d] MW-20-130[e] / MW-27-085	July	--	31	NA (pre-change approval)
	August	--	31	NA (pre-change approval)
	September	0.0035	30	no
	October	0.0035	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

Third Quarter 2017 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

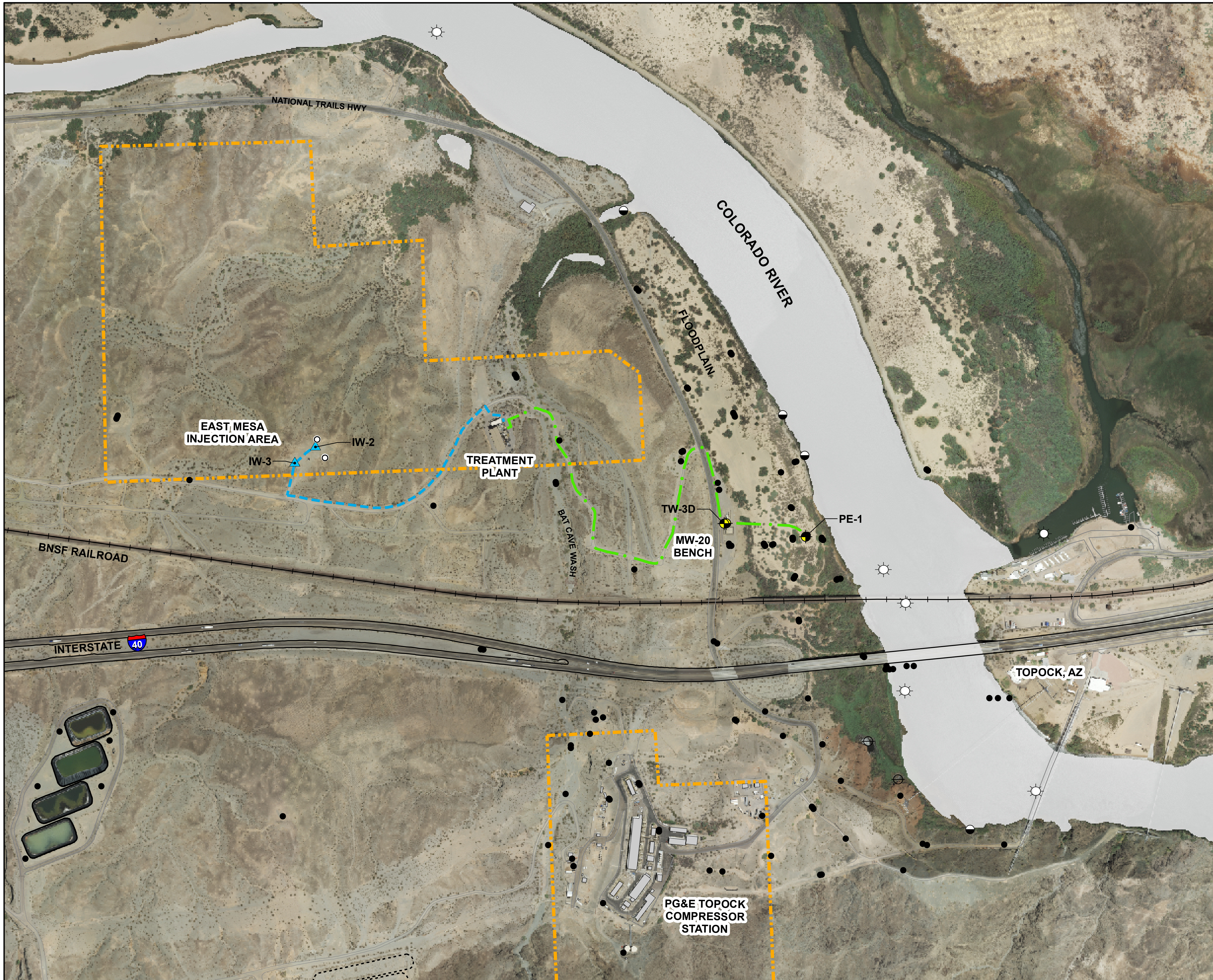
Third Quarter 2017 Interim Measures Performance Monitoring and
Sitewide Groundwater and Surface Water Monitoring Report,
PG&E Topock Compressor Station, Needles, California

	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			454.2		

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. Future projections of river level at I-3 are based upon October 2017 USBR projections.
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



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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.

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

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

THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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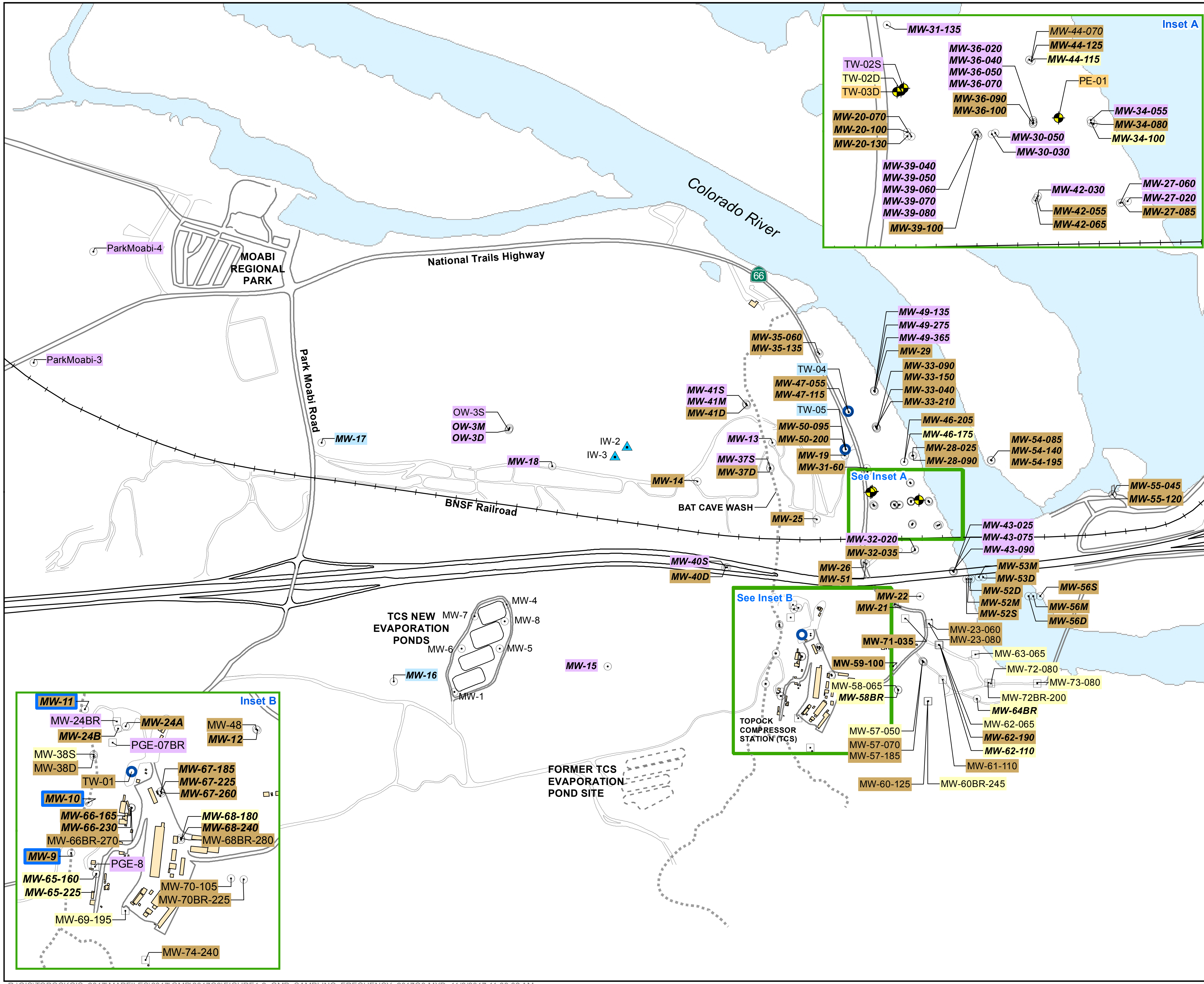

ARCADIS Design & Consultancy for natural and built assets

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.
- 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.

N

0 500 1,000
Feet

FIGURE 1-2
MONITORING LOCATIONS AND SAMPLING FREQUENCY FOR GMP

THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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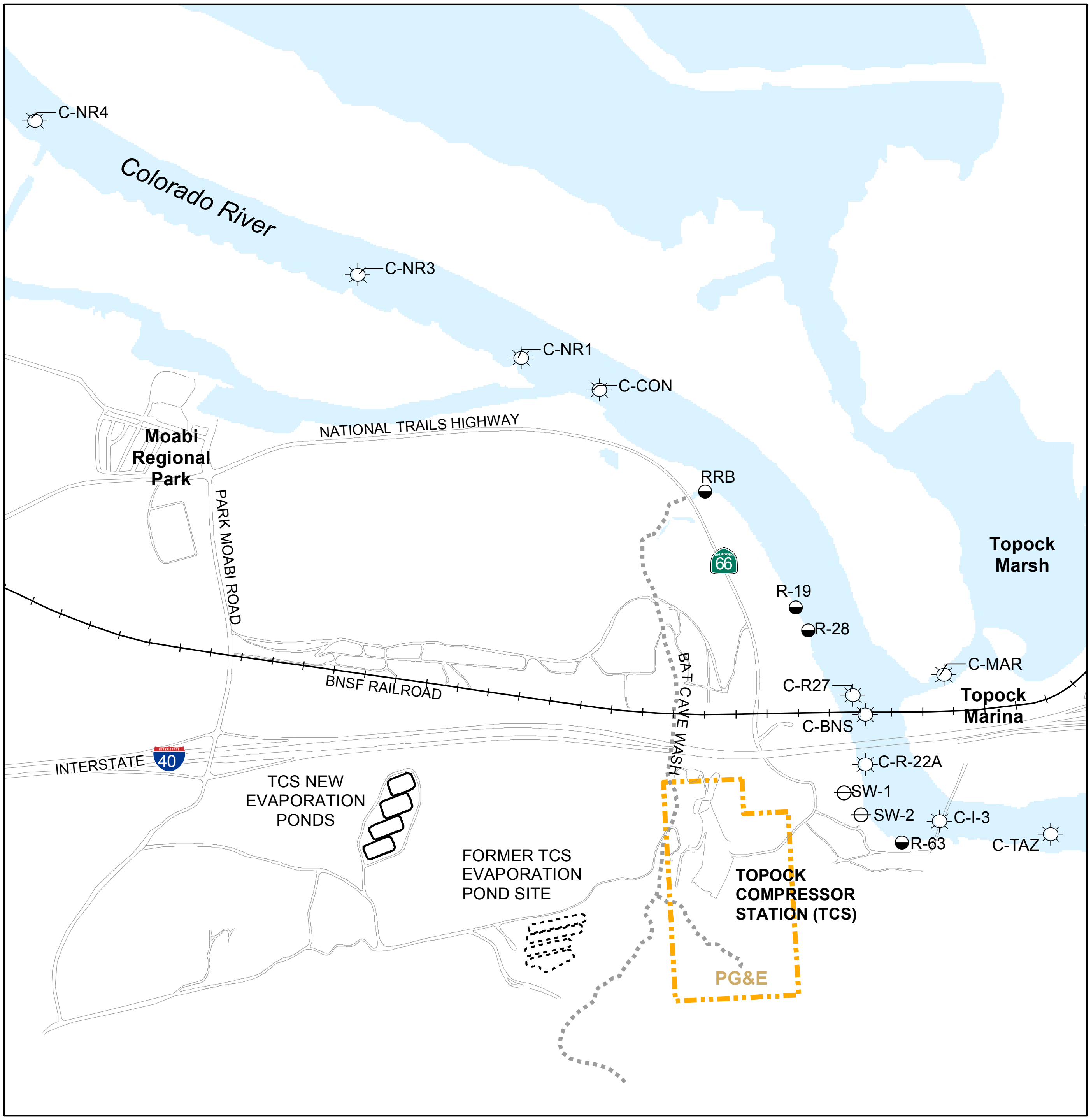

LEGEND

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

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 = River Monitoring Program
4. TCS = Topock Compressor Station

FIGURE 1-3
MONITORING LOCATIONS AND SAMPLING FREQUENCY FOR RMP

THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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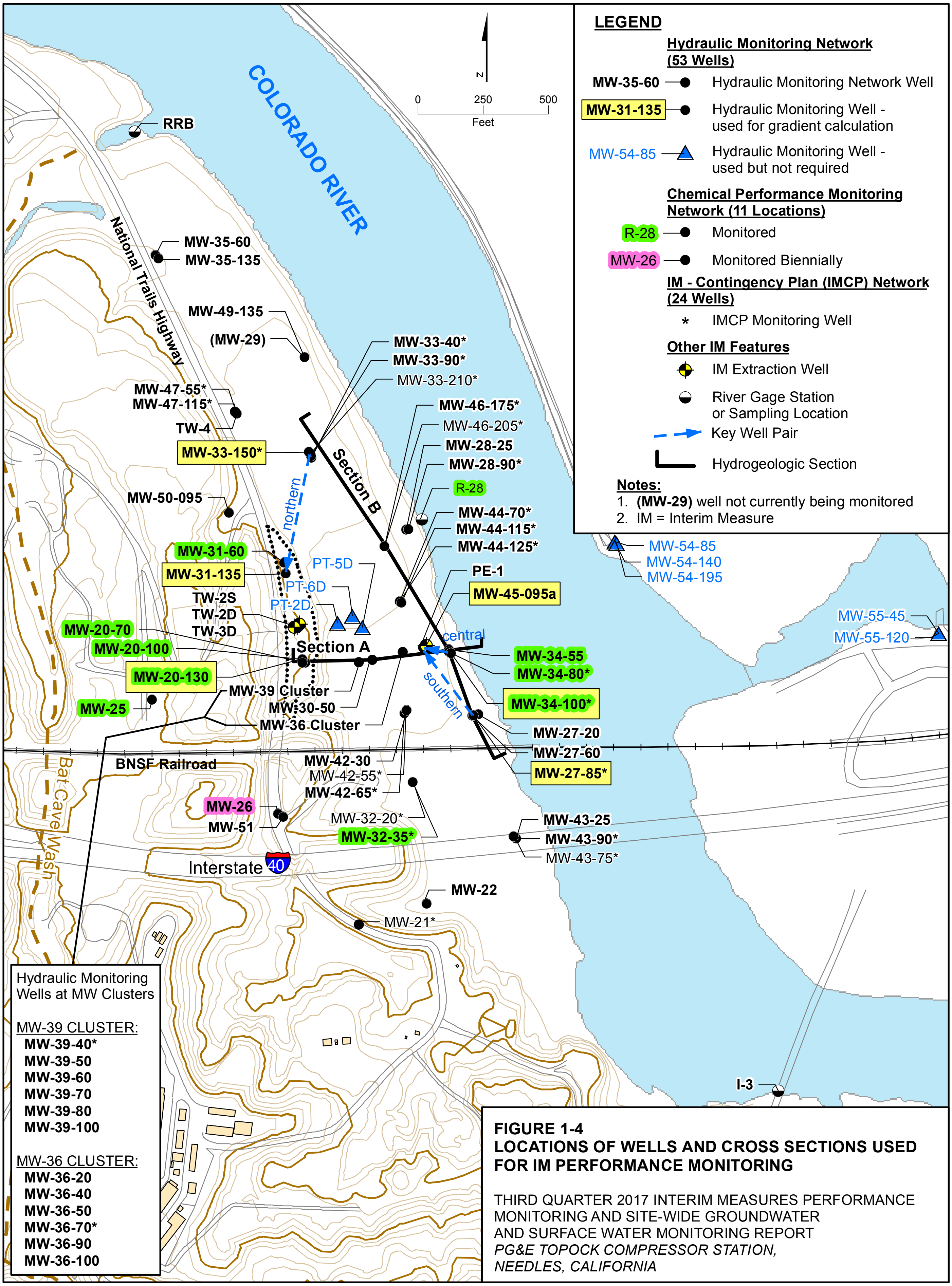
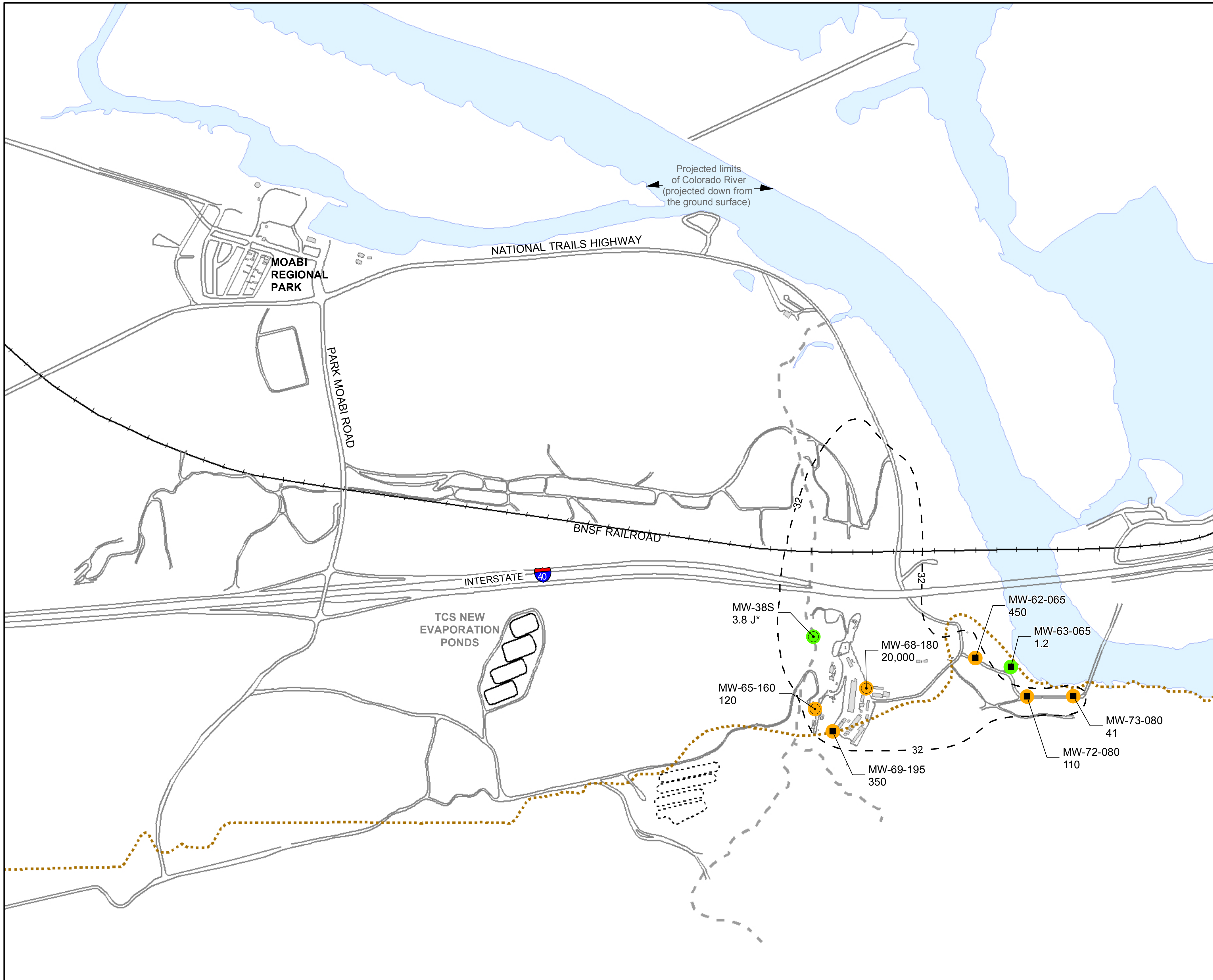


FIGURE 1-4
LOCATIONS OF WELLS AND CROSS SECTIONS USED FOR IM PERFORMANCE MONITORING

THIRD QUARTER 2017 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)

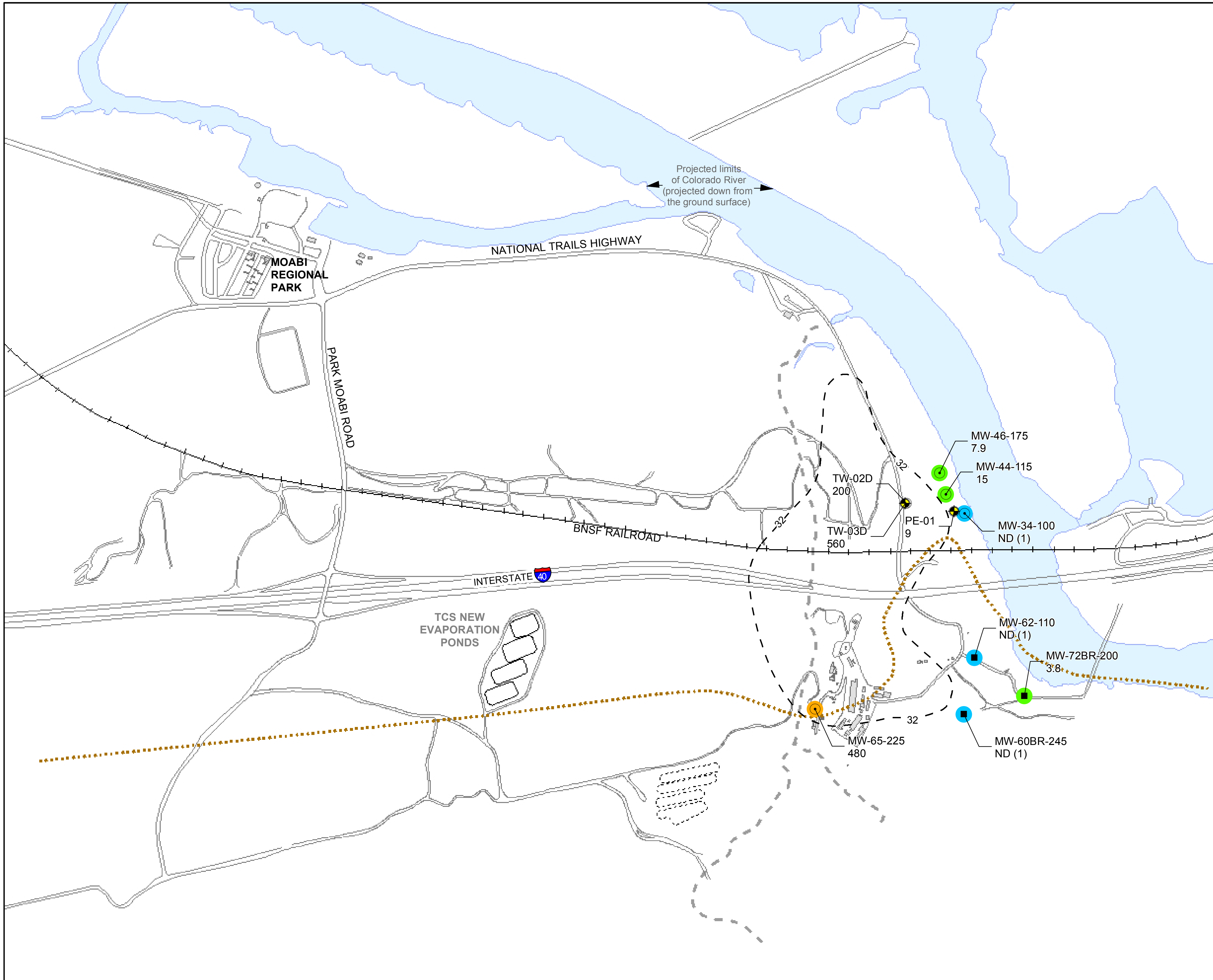
Notes:
1. "ND" = Cr(VI) not detected at listed reporting limit.
2. "J" = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
3. µg/L = micrograms per liter
4. Cr(VI) = Hexavalent Chromium
5. TCS = Topock Compressor Station
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, THIRD QUARTER 2017

THIRD QUARTER 2017 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\2017\GMP\2017Q3\FIGURE3-1A_CRVI_SHALLOW_2017Q3.MXD KDOLAN 11/27/2017 8:55:20 AM



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

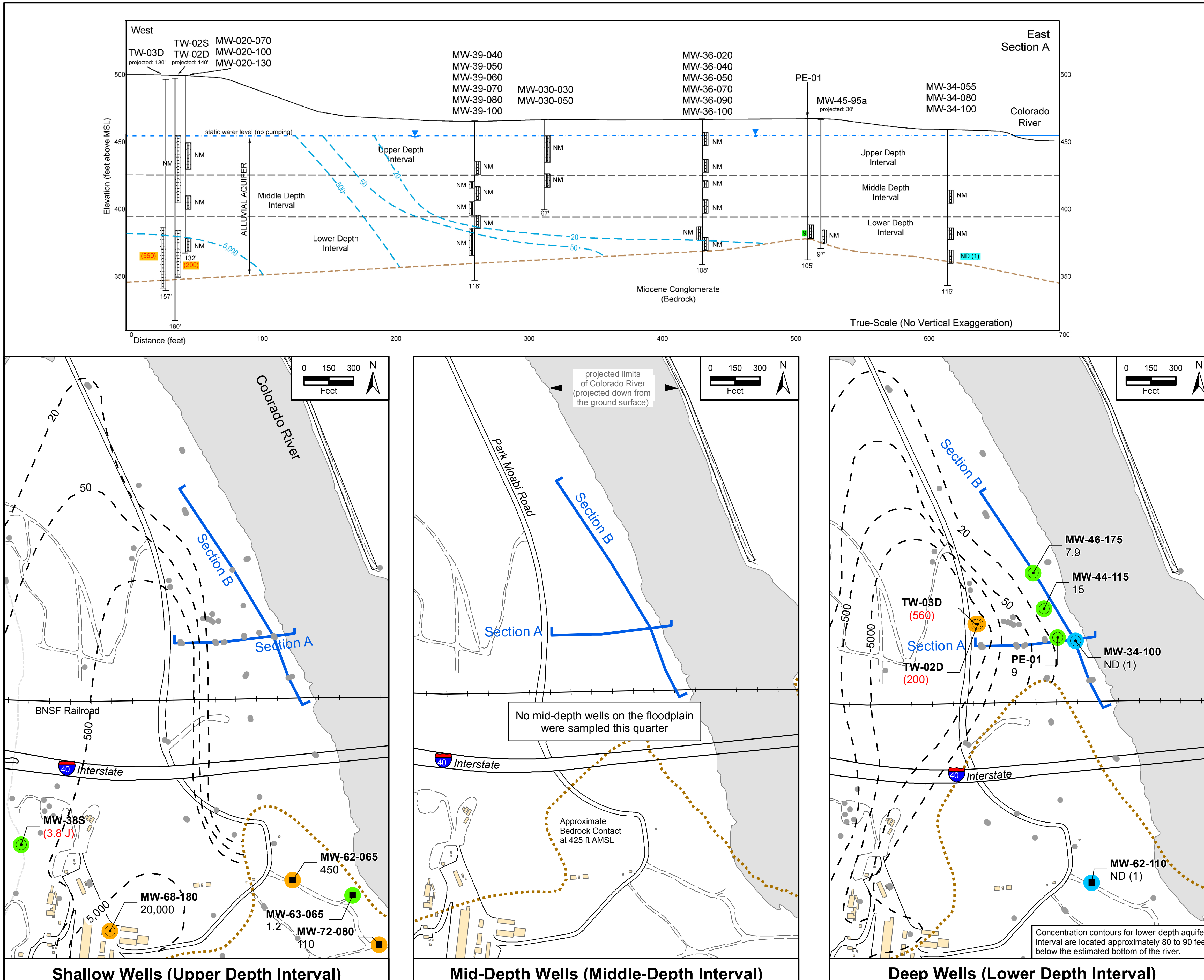
0 500 1,000
Feet

FIGURE 3-1b
Cr(VI) SAMPLING RESULTS, DEEP WELLS IN ALLUVIAL AQUIFER AND BEDROCK, THIRD QUARTER 2017

THIRD QUARTER 2017 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\2017\GMP\2017Q3\FIGURE3-1B_CRVI_DEEP_2017Q3.MXD KDOLAN 12/13/2017 8:15:21 PM



Shallow Wells (Upper Depth Interval)

Mid-Depth Wells (Middle-Depth Interval)

Deep Wells (Lower Depth Interval)

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 DTSC's 2005 IM performance monitoring directive. The IM performance standard was established for containment of Cr(VI) concentrations greater than 20 ug/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, THIRD QUARTER 2017

THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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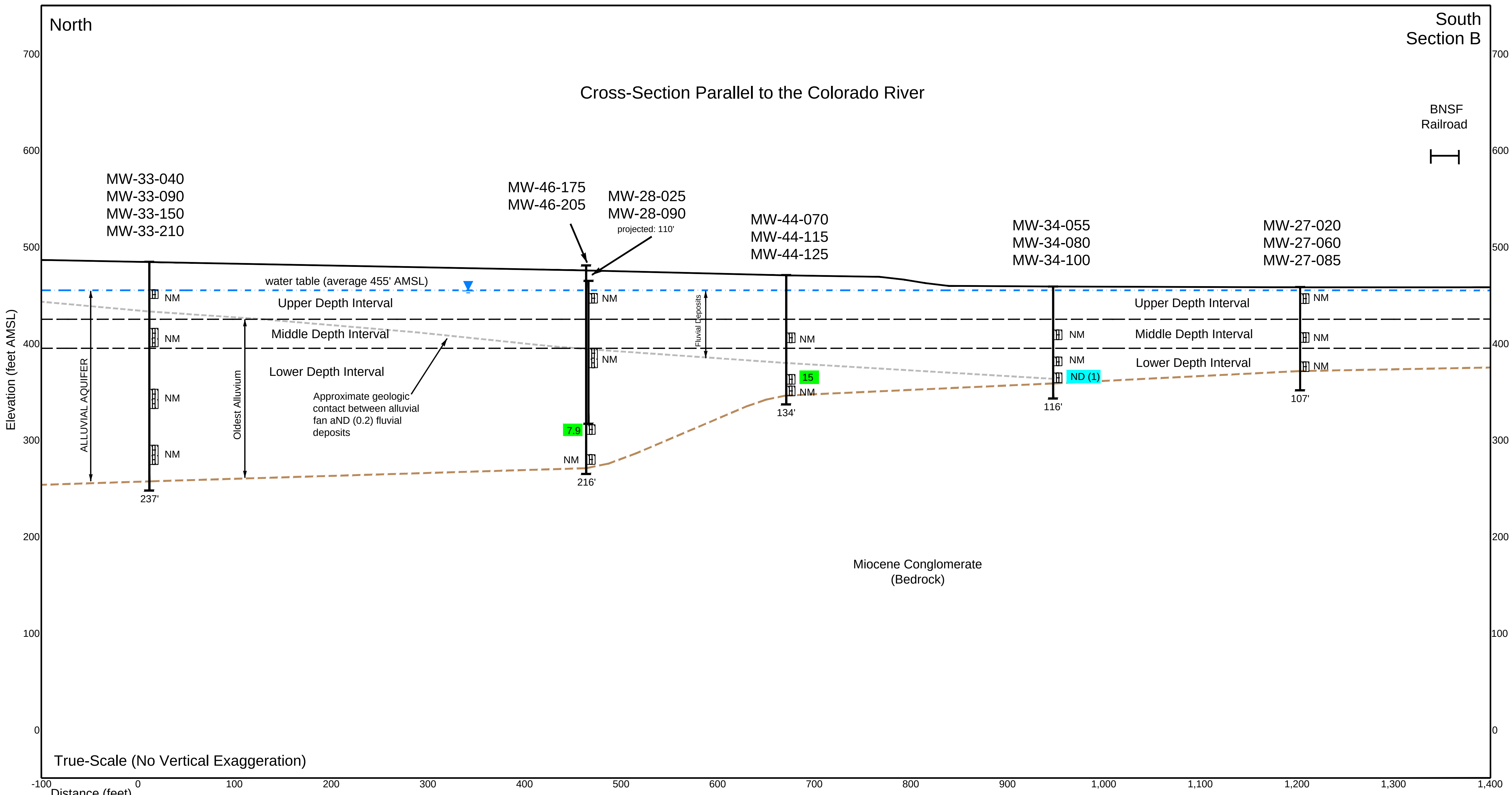
R:\GIS\TOPOCKGIS_2017\MAPFILES\2017\GMP\2017Q3\FIGURE4-1_GMP_CR6_2017Q3_MAX.MXD 12/13/2017 8:18:10 PM



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 21

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
THIRD QUARTER 2017
THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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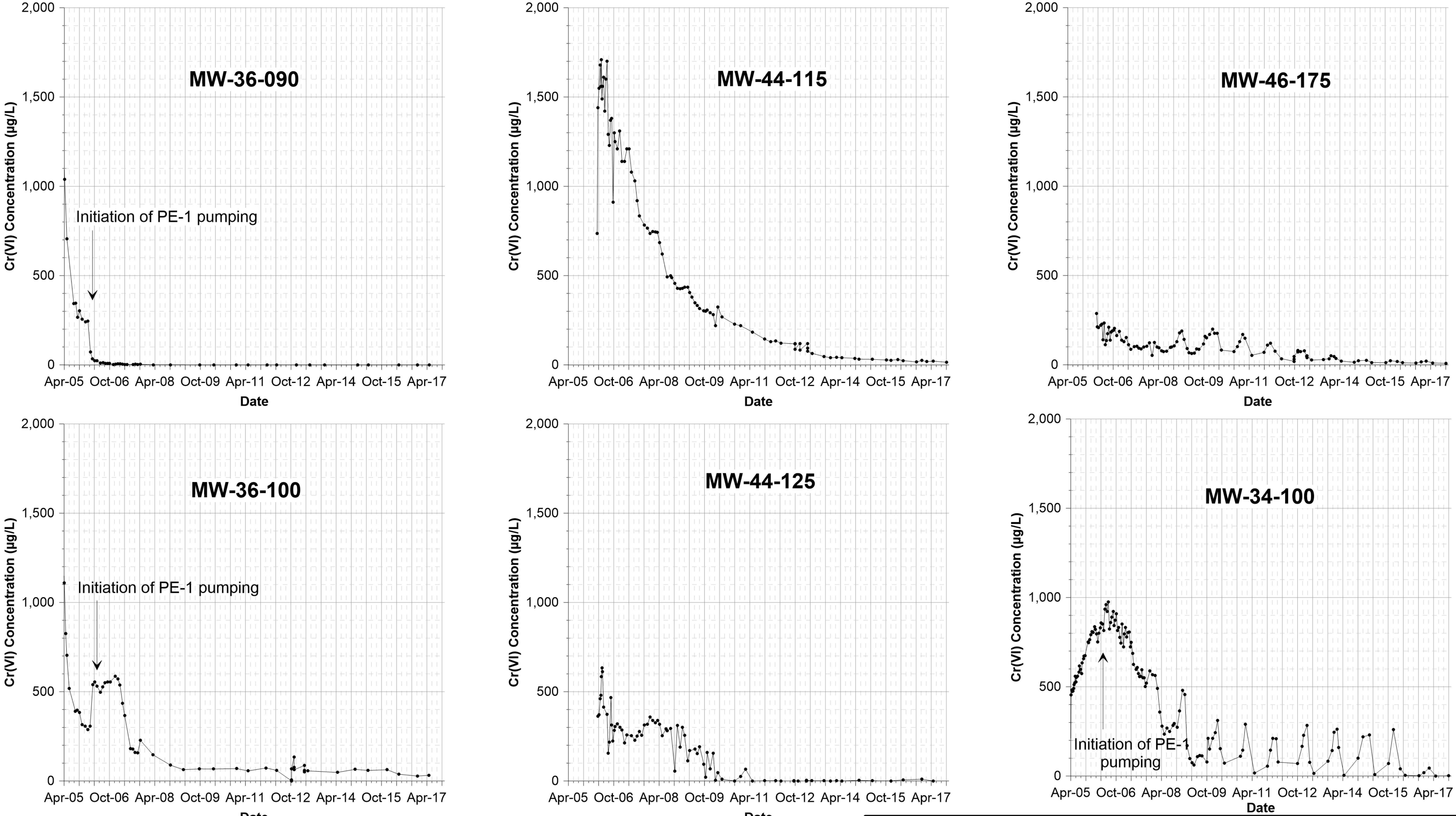

Notes:

1. 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 OCTOBER 2017

THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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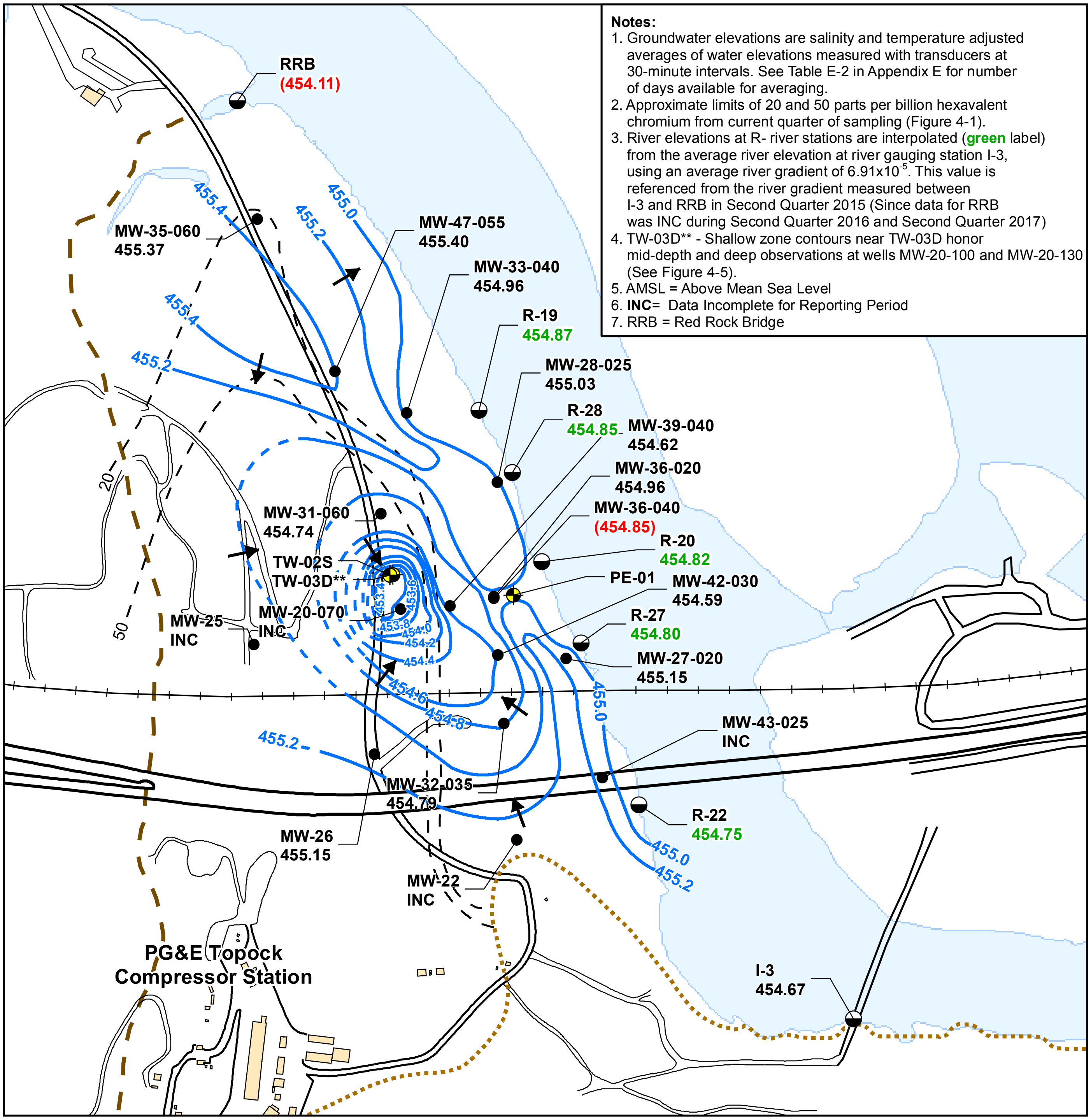


LEGEND

- 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)

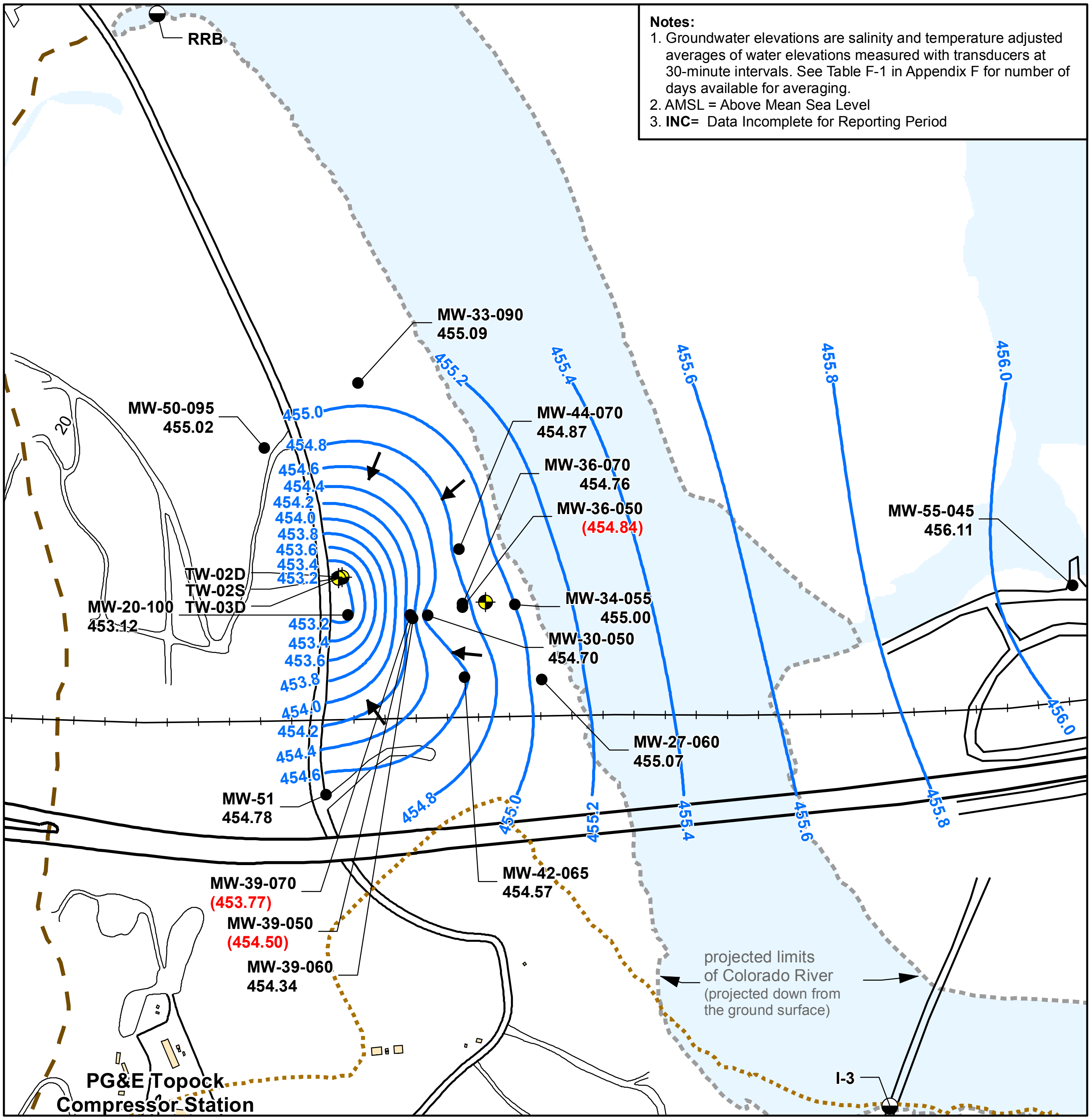
MW-43-025 — Gauging Location
456.13 — Average Groundwater Elevation (ft AMSL)
456.15 — Elevation in red parentheses not used for contouring
R-27 — River Station (see note 3)
456.80 — River Elevation (ft AMSL) Interpolated Average

0 300 600
Feet
N

FIGURE 4-4a
AVERAGE GROUNDWATER ELEVATIONS IN SHALLOW WELLS AND RIVER ELEVATIONS, THIRD QUARTER 2017

THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS Design & Consultancy for natural and built assets



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)

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, THIRD QUARTER 2017

THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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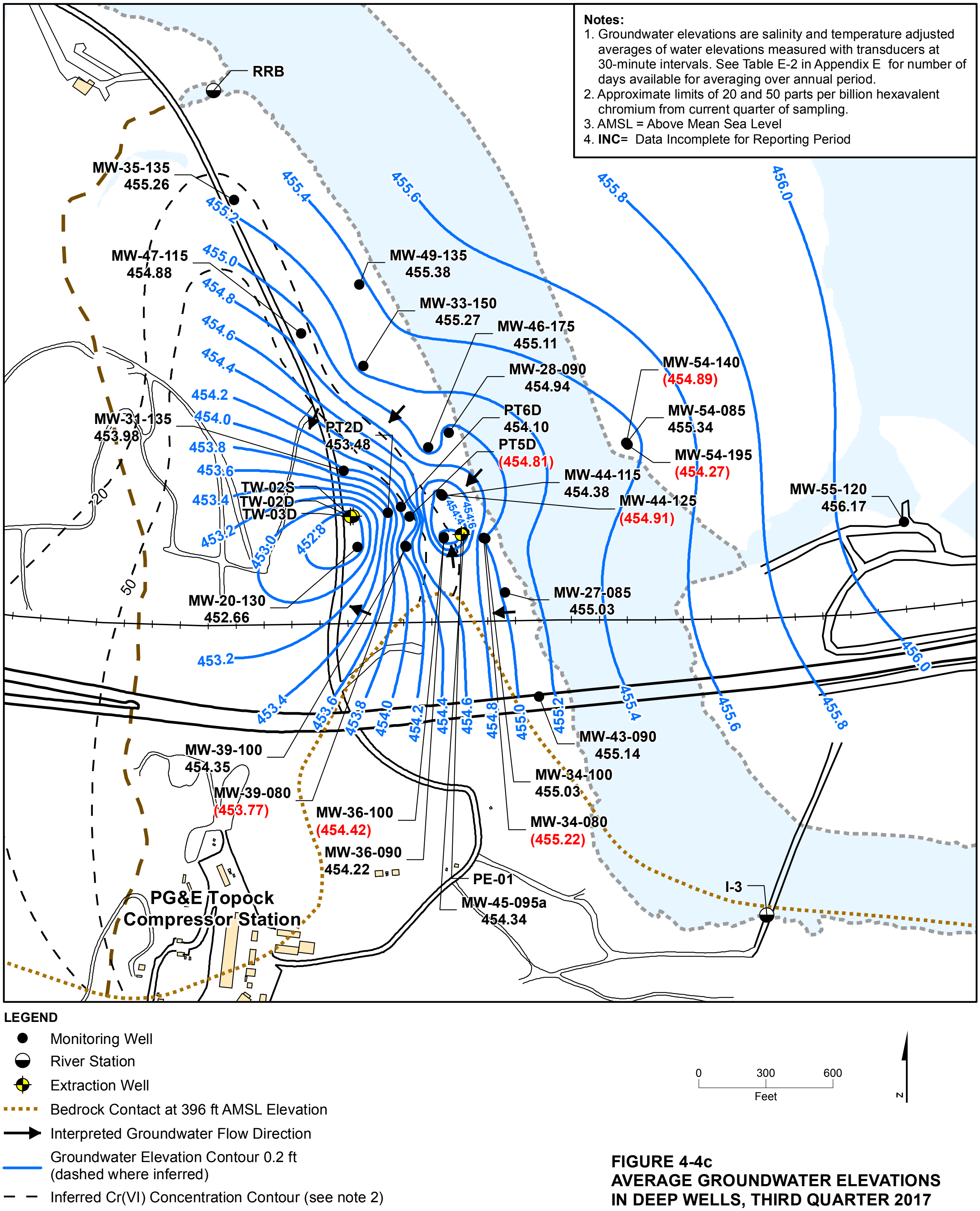
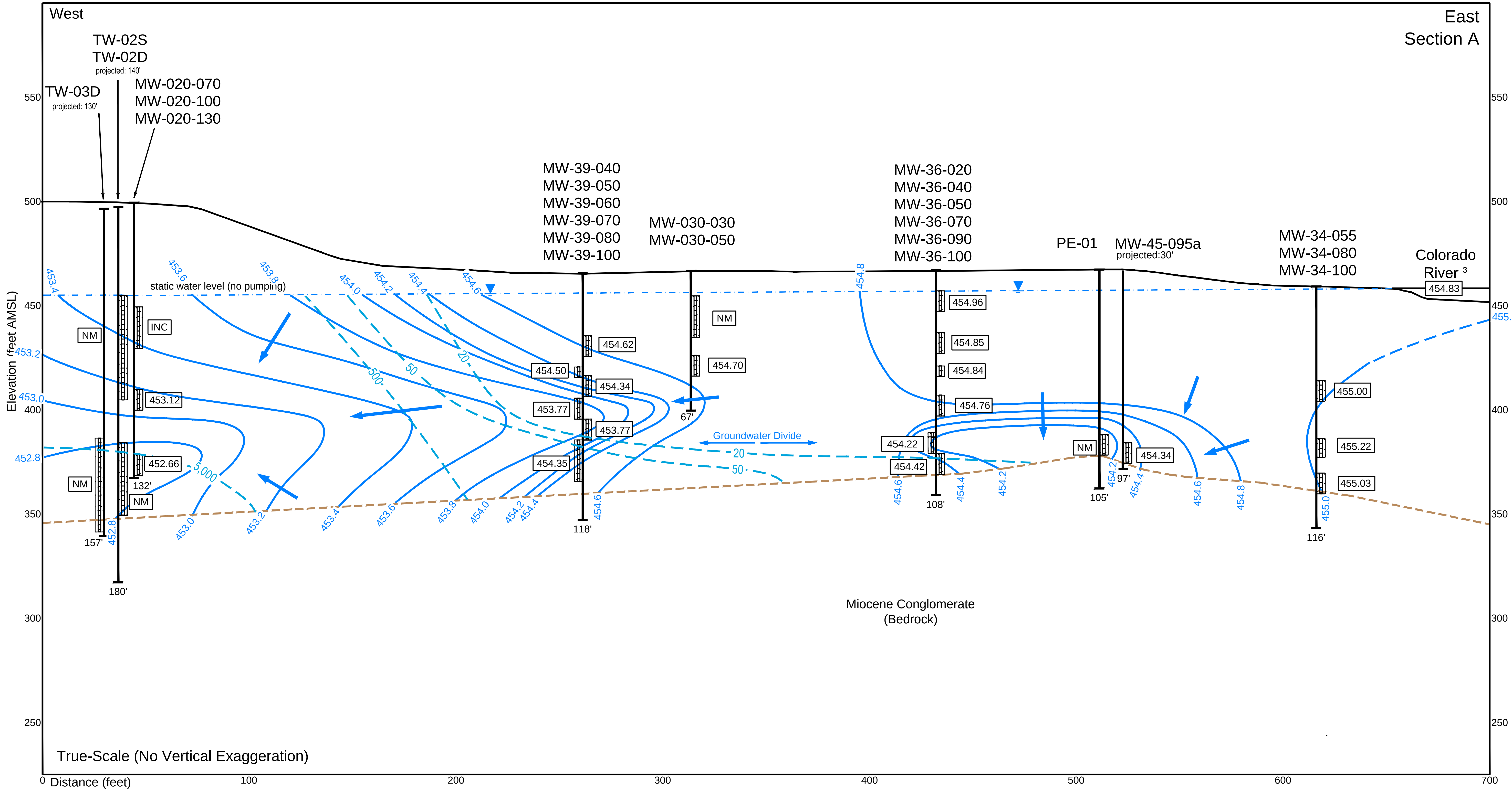


FIGURE 4-4c
AVERAGE GROUNDWATER ELEVATIONS IN DEEP WELLS, THIRD QUARTER 2017

THIRD QUARTER 2017 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 April 2017 through June 2017 measured with transducers at 30-minute intervals.
2. Groundwater elevations adjusted for salinity and temperature.
3. Colorado River elevation shown as interpolated annual average from I-3 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 imcomplete due to malfunction, inaccessibility, or low water level conditions

Legend

MW-030-050

Inferred water table

well screen

455.18

boring depth (feet)

67'

20

Inferred hexavalent chromium contour (ppb) in Alluvial Aquifer.

453.8

Groundwater head contour

453.8

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, THIRD QUARTER 2017
THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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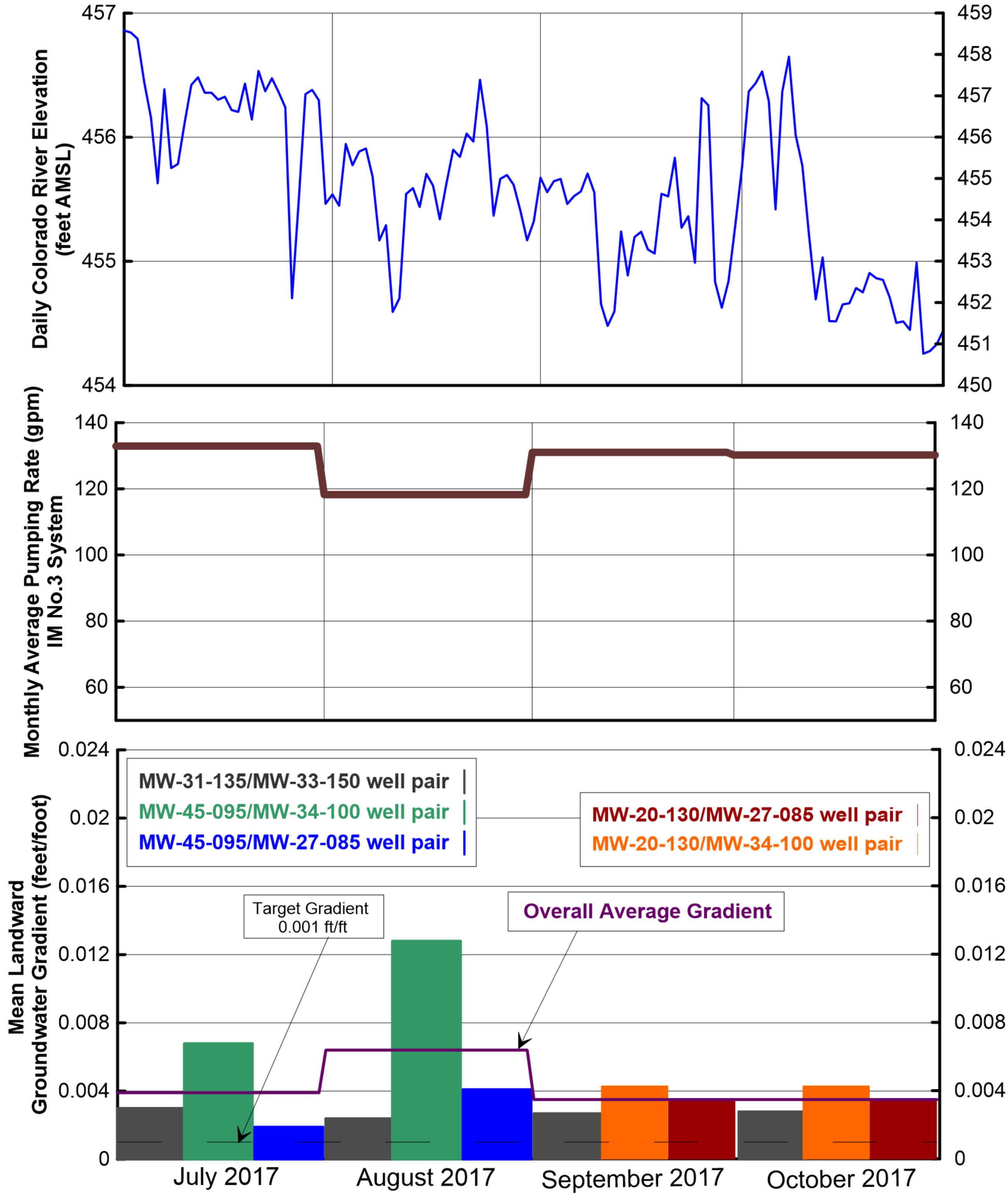

Notes:

1. For 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.

FIGURE 4-6
MEASURED HYDRAULIC GRADIENTS, RIVER ELEVATION, AND PUMPING RATE, THIRD QUARTER 2017

THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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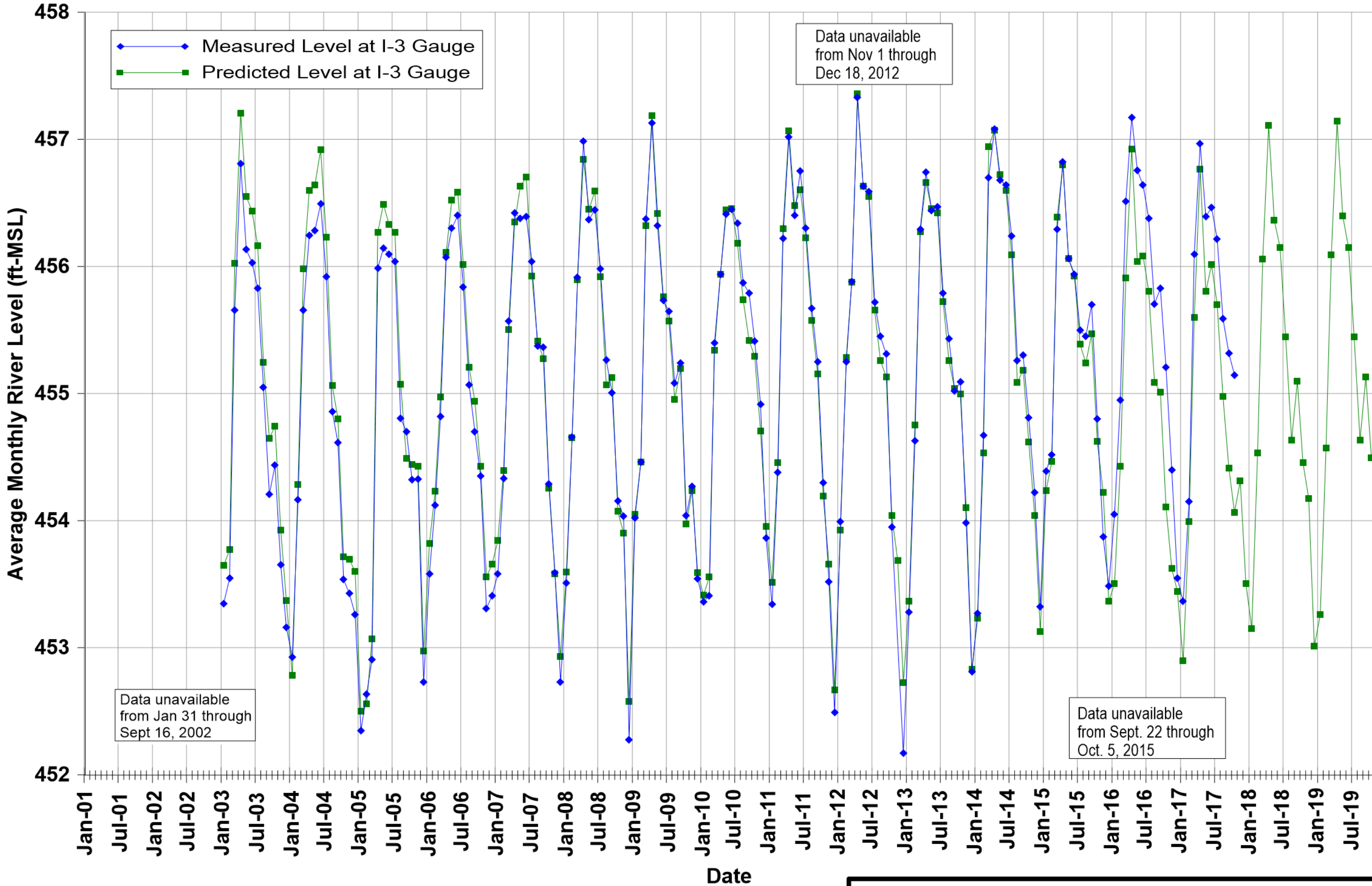

Note:
Projected river level for each month in the past is calculated based on the preceding months USBR projections of Davis Dam release and stage in Lake Havasu. Future projections of river level at I-3 are based upon USBR projections presented in the November 24-Month Study (Report dated November 14, 2017). These data are reported monthly by the US Department of Interior, at http://www.usbr.gov/lc/region/g4000/24mo.pdf

ft-MSL = feet mean sea level

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

THIRD QUARTER 2017 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, Third Quarter 2017

Table A-1
Well Inspection Log, Third Quarter 2017
Third Quarter 2017 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)
PE-1	9/7/2017	NA	NA	Yes	No	Yes	--	NA	NA	NA	NA	NA	Yes	No
TW-3D	9/7/2017	NA	NA	Yes	No	Yes	NA	NA	NA	NA	NA	NA	Yes	No
C-BNS	8/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-NR3-D	8/17/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-NR4-D	8/17/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-R22A-D	8/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-R27-D	8/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-TAZ-D	8/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-38S	9/26/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes
MW-57-050	9/27/2017	Yes	No	Yes	No	Yes	No	Yes	No	No	Yes	No	Yes	Yes
MW-58-065	9/27/2017	Yes	No	Yes	No	Yes	No	Yes	No	No	Yes	No	Yes	Yes
MW-58BR	9/27/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes
MW-60BR-245	9/25/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes
MW-62-065	9/25/2017	Yes	No	Yes	No	Yes	No	Yes	No	No	Yes	No	Yes	Yes
MW-62-110	9/25/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes
MW-63-065	9/28/2017	Yes	No	Yes	No	Yes	No	Yes	No	No	Yes	No	Yes	Yes
MW-64BR	9/25/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes
MW-65-160	9/26/2017	Yes	No	Yes	No	Yes	No	Yes	No	Yes	Yes	No	Yes	Yes
MW-65-225	9/26/2017	Yes	No	Yes	No	Yes	No	Yes	No	No	Yes	No	Yes	Yes
MW-68-180	9/26/2017	Yes	No	Yes	No	Yes	No	Yes	No	Yes	Yes	No	Yes	Yes
MW-69-195	9/26/2017	Yes	No	Yes	No	Yes	No	Yes	No	No	Yes	No	Yes	Yes
MW-72-080	9/28/2017	Yes	No	Yes	No	Yes	No	Yes	No	No	Yes	No	Yes	Yes
MW-72BR-200	9/27/2017	Yes	No	Yes	No	Yes	No	Yes	No	No	Yes	No	Yes	Yes
MW-73-080	9/27/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes
PE-01	8/2/2017	NA	No	NA	No	Yes	NA	NA	No	NA	NA	No	Yes	Yes
PE-01	7/18/2017	Yes	No	Yes	No	Yes	NA	Yes	No	No	Yes	No	Yes	No
R-19	8/17/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
R-28	8/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
R63	8/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RMP-AB1	8/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RMP-AB2	8/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RMP-AB3	8/17/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RRB	8/17/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW1	8/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW2	8/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TW-03D	8/2/2017	NA	No	NA	No	Yes	NA	NA	No	NA	NA	No	Yes	Yes
TW-03D	7/18/2017	Yes	No	Yes	No	Yes	NA	Yes	No	NA	Yes	No	Yes	No
C-CON-D	8/17/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-CON-S	8/17/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-I-3-D	8/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-I-3-S	8/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-MAR-D	8/17/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-MAR-S	8/17/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-NR1-D	8/17/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-NR1-S	8/17/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-NR3-S	8/17/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-NR4-S	8/17/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-R22A-S	8/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-R27-S	8/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-TAZ-S	8/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-38S-SMT	9/26/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes

APPENDIX B

Lab Reports, Third Quarter 2017 (Provided on CD Only with Hard Copy Submittal)

APPENDIX C

Other Monitoring Results

Table C-1

Arsenic Results in Monitoring Wells, December 2015 through October 2017

Third Quarter 2017 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-10	SA	12/1/2015		LF	2.9
MW-10	SA	12/7/2016		LF	3
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-12	SA	12/2/2015		LF	36
MW-12	SA	12/7/2016		3V	41
MW-13	SA	12/7/2015		LF	1.9
MW-13	SA	12/8/2016		LF	1.4
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-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
MW-20-130	DA	4/27/2017	FD	LF	4.5
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-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

Table C-1

Arsenic Results in Monitoring Wells, December 2015 through October 2017

Third Quarter 2017 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-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-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-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-24BR	BR	12/2/2015		3V	0.37
MW-24BR	BR	12/7/2016		3V	ND (0.5)
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-26	SA	12/8/2015		LF	1.9
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-27-020	SA	12/3/2015		LF	1.5
MW-27-020	SA	12/6/2016		LF	1.3
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-27-085	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-28-025	SA	12/2/2015		LF	0.81

Table C-1

Arsenic Results in Monitoring Wells, December 2015 through October 2017

Third Quarter 2017 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-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-28-090	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-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-30-030	SA	12/3/2015		LF	2.5
MW-30-030	SA	12/6/2016		LF	2.7
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-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-31-135	DA	12/7/2015		LF	3.4
MW-31-135	DA	12/9/2016		LF	3.9
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-32-035	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-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-33-090	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

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Third Quarter 2017 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	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
MW-33-150	DA	4/26/2017	FD	LF	1.5
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-34-055	MA	12/3/2015		LF	2.4
MW-34-055	MA	12/6/2016		LF	2.4
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-34-100	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-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-35-135	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-36-020	SA	12/8/2015		LF	1.8
MW-36-020	SA	12/7/2016		LF	1.9
MW-36-040	SA	12/8/2015		LF	4.6
MW-36-040	SA	12/7/2016		LF	5.6
MW-36-050	MA	12/8/2015		LF	3.8

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Arsenic Results in Monitoring Wells, December 2015 through October 2017

Third Quarter 2017 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-36-050	MA	12/7/2016		LF	4.4
MW-36-070	MA	12/8/2015		LF	2.9
MW-36-070	MA	12/7/2016		LF	3.2
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-36-100	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-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-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-38S	SA	12/1/2015		3V	13
MW-38S	SA	12/1/2015		LF	14
MW-38S	SA	2/24/2016		3V	14
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

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Arsenic Results in Monitoring Wells, December 2015 through October 2017

Third Quarter 2017 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	9/26/2017	FD	LF	7.5
MW-39-040	SA	12/4/2015		LF	18
MW-39-040	SA	12/7/2016		LF	19
MW-39-050	MA	12/4/2015		LF	2.4
MW-39-050	MA	12/7/2016		LF	2.3
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-39-100	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-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
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-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-41S	SA	12/7/2015		LF	1.6
MW-41S	SA	12/8/2016		LF	1.7
MW-42-030	SA	12/3/2015		LF	3.4
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-42-065	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-43-025	SA	12/8/2015		LF	17

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Third Quarter 2017 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-43-025	SA	12/7/2016		LF	25
MW-43-075	DA	12/2/2015		LF	13
MW-43-075	DA	12/9/2016		LF	13
MW-43-090	DA	12/2/2015		LF	1.2
MW-43-090	DA	12/9/2016		LF	2.2
MW-44-070	MA	12/4/2015		LF	6.6
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-44-115	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-44-125	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-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-47-115	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-49-275	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
MW-51	MA	4/27/2016		LF	3.4
MW-51	MA	12/9/2016		LF	4

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Arsenic Results in Monitoring Wells, December 2015 through October 2017

Third Quarter 2017 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	4/26/2017		LF	3.5
MW-51	MA	4/26/2017	FD	LF	3.5
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-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-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-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-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-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-54-140	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-54-195	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

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Third Quarter 2017 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-54-195	DA	5/4/2017		3V	0.94
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-57-185	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-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-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
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-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-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-61-110	BR	12/4/2015		3V	3.3
MW-61-110	BR	4/29/2016		LF	3.3

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Arsenic Results in Monitoring Wells, December 2015 through October 2017

Third Quarter 2017 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-61-110	BR	12/13/2016		3V	3.4
MW-61-110	BR	5/2/2017		3V	3.1
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-62-110	BR	12/4/2015		3V	7.7
MW-62-110	BR	2/24/2016		3V	4.9
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-62-190	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-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-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

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Arsenic Results in Monitoring Wells, December 2015 through October 2017

Third Quarter 2017 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-64BR	BR	5/2/2017		LF	3.8
MW-64BR	BR	9/25/2017		LF	4.2
MW-65-160	SA	12/2/2015		LF	0.73
MW-65-160	SA	2/24/2016		LF	0.54
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-65-225	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-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-66-230	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-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-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-67-225	MA	12/2/2015		LF	3.5
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

Table C-1

Arsenic Results in Monitoring Wells, December 2015 through October 2017

Third Quarter 2017 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-67-260	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-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-68-240	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-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-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
MW-69-195	BR	9/26/2017		LF	2.2
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-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

Table C-1

Arsenic Results in Monitoring Wells, December 2015 through October 2017

Third Quarter 2017 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-70BR-225	BR	5/2/2017		3V	1.8
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-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	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
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-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
PM-03	---	4/5/2016		Tap	1.2
PM-04	---	4/5/2016		Tap	0.43
TW-02D	DA	12/9/2015	FD	Tap	2.4

Table C-1

Arsenic Results in Monitoring Wells, December 2015 through October 2017

Third Quarter 2017 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)

Notes:

(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.

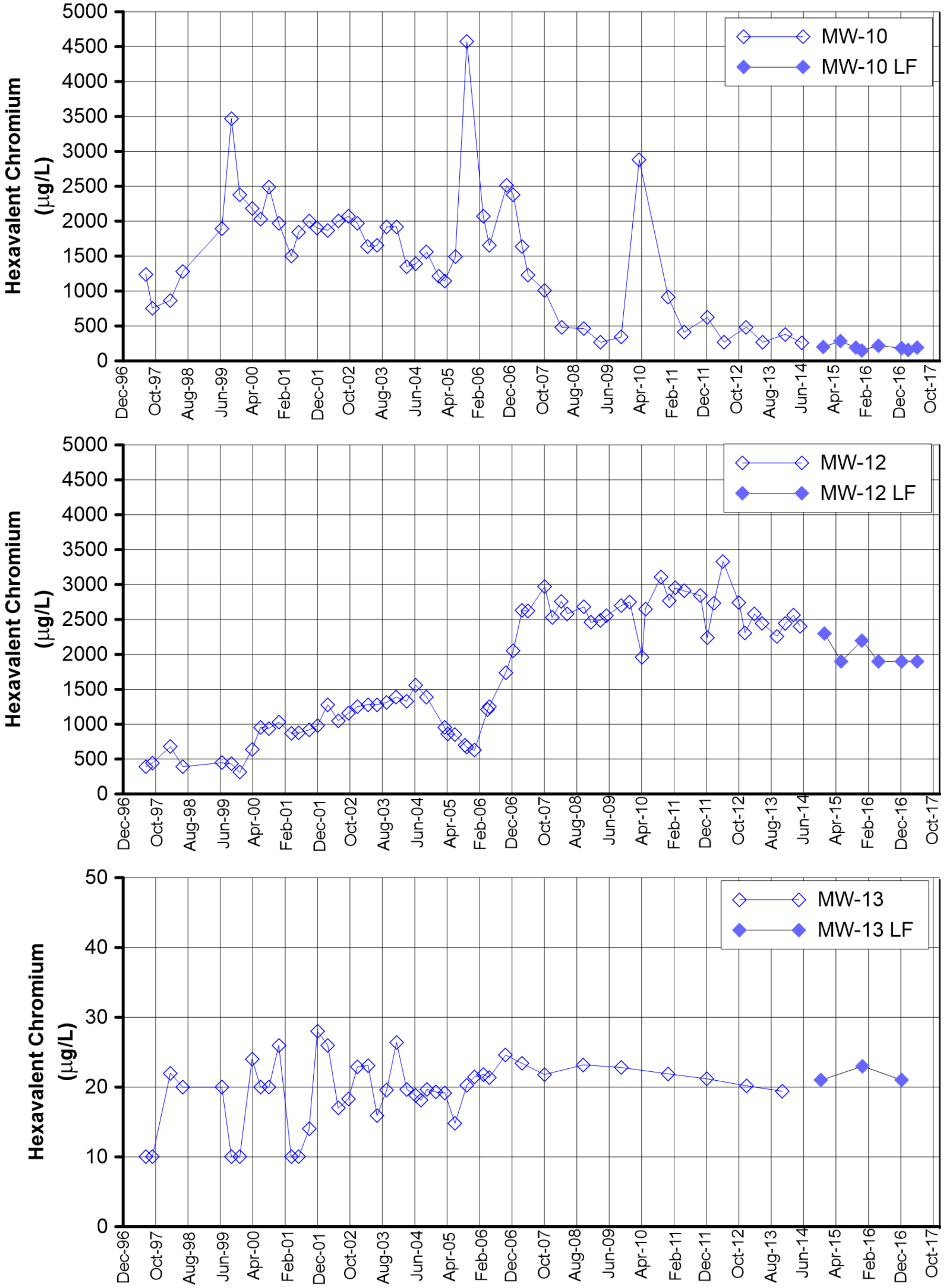
Wells are assigned to separate aquifer zones for results reporting:
SA = shallow interval of Alluvial Aquifer.
MA = mid-depth interval of Alluvial Aquifer.
DA = deep interval of Alluvial Aquifer.
PA = perched aquifer (unsaturated zone).
BR = well completed in bedrock (Miocene Conglomerate or pre-Tertiary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

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

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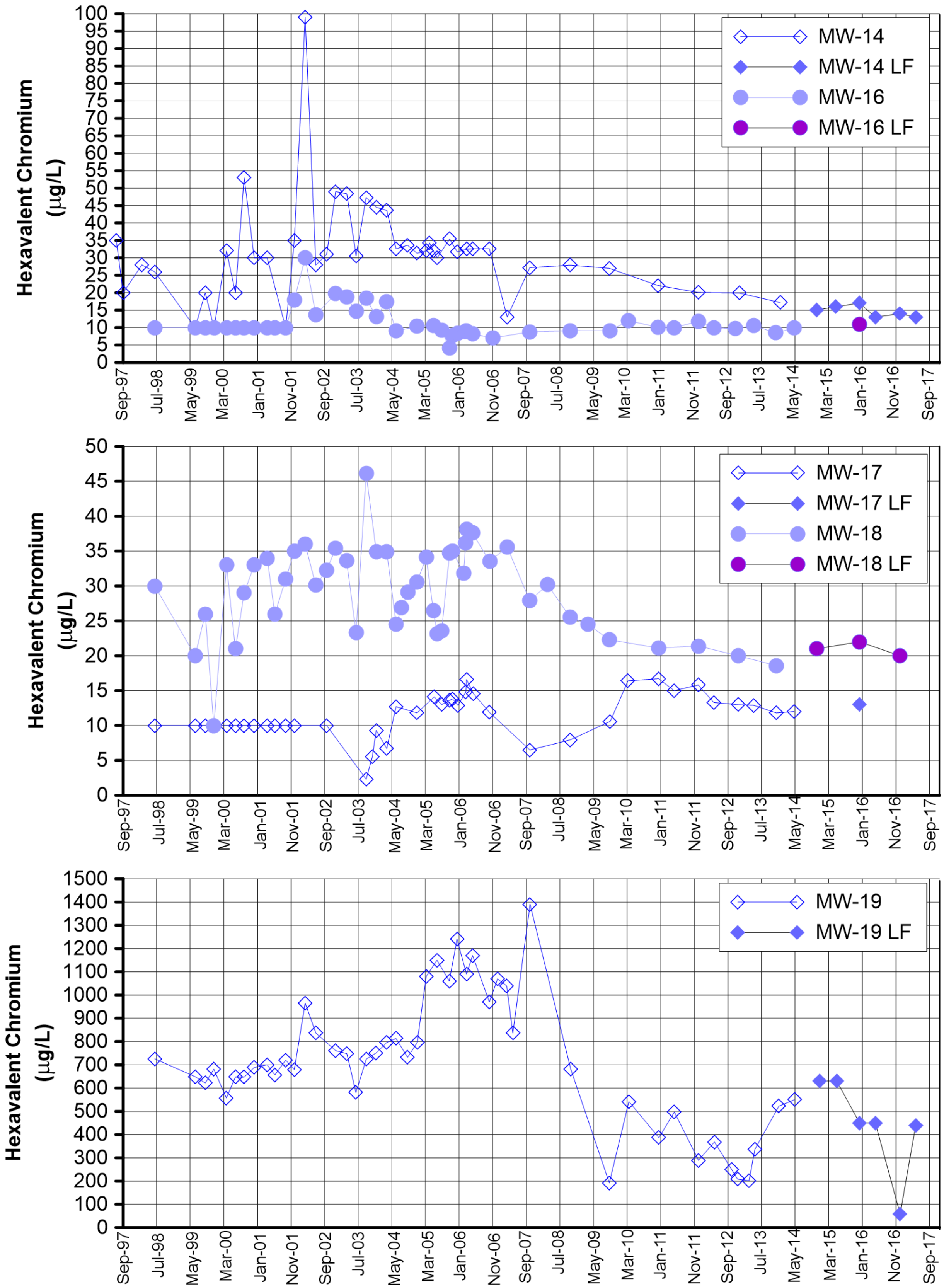
THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA



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

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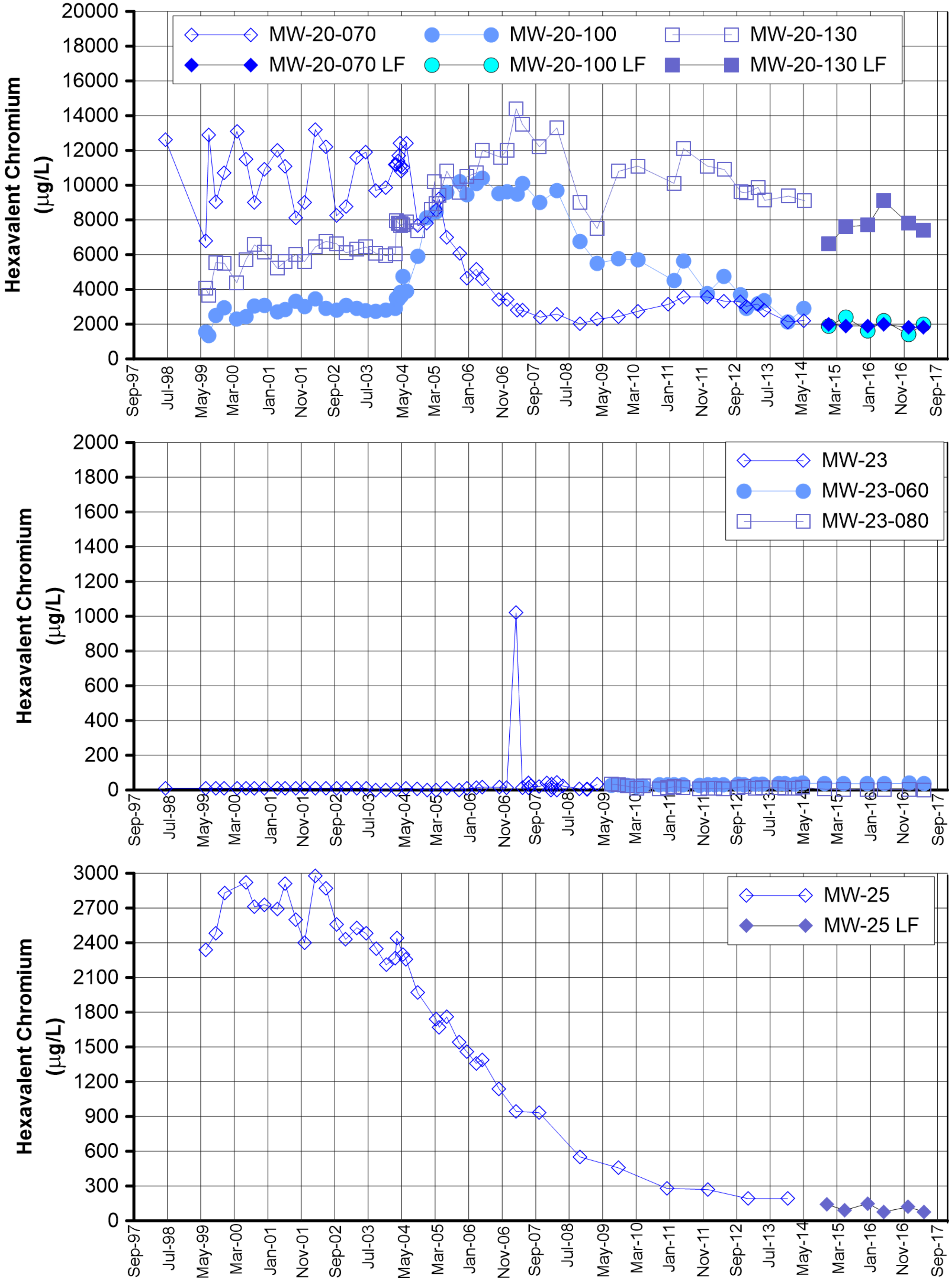
THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA



Notes:

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

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

THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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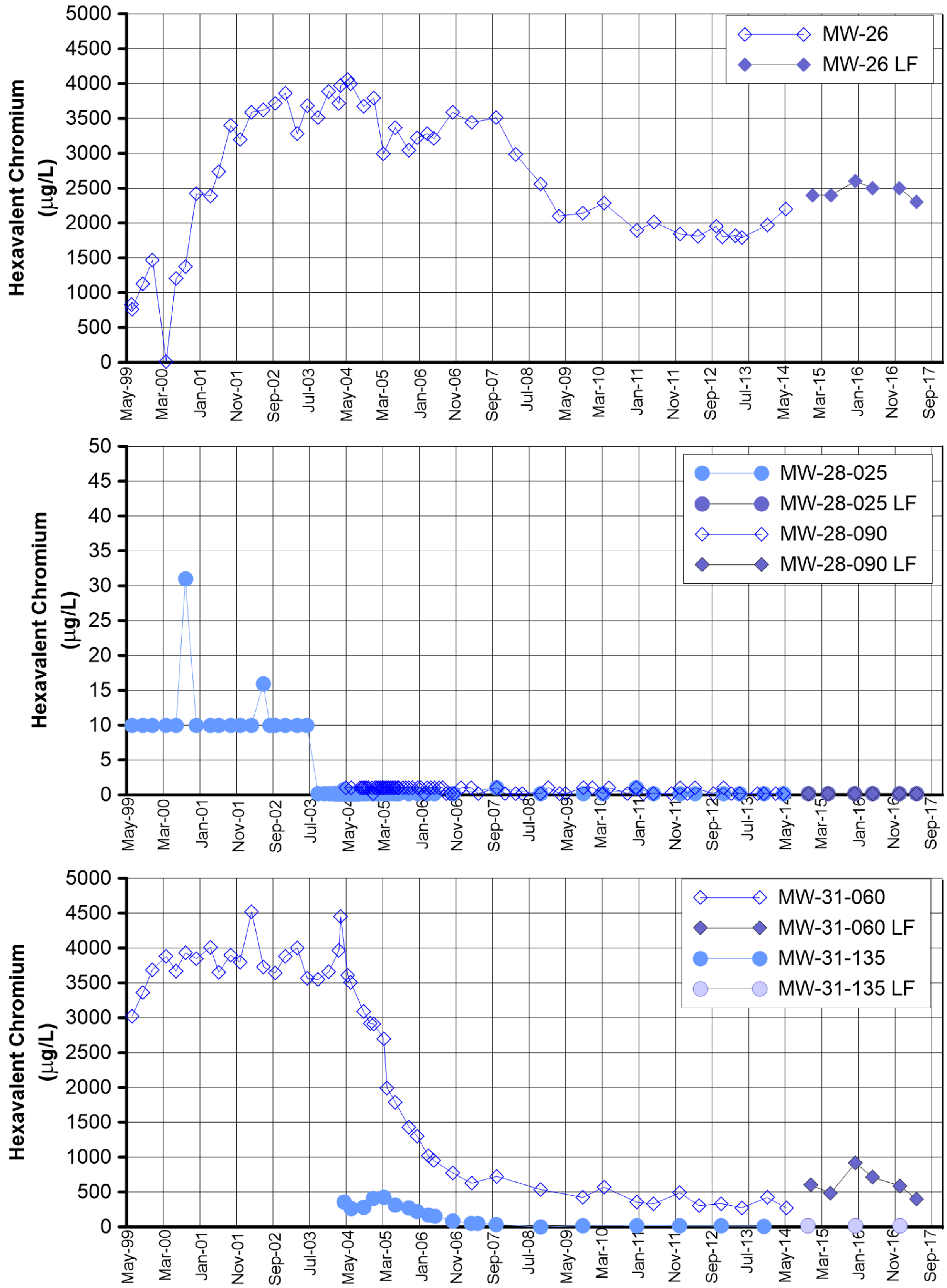

Notes:

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

THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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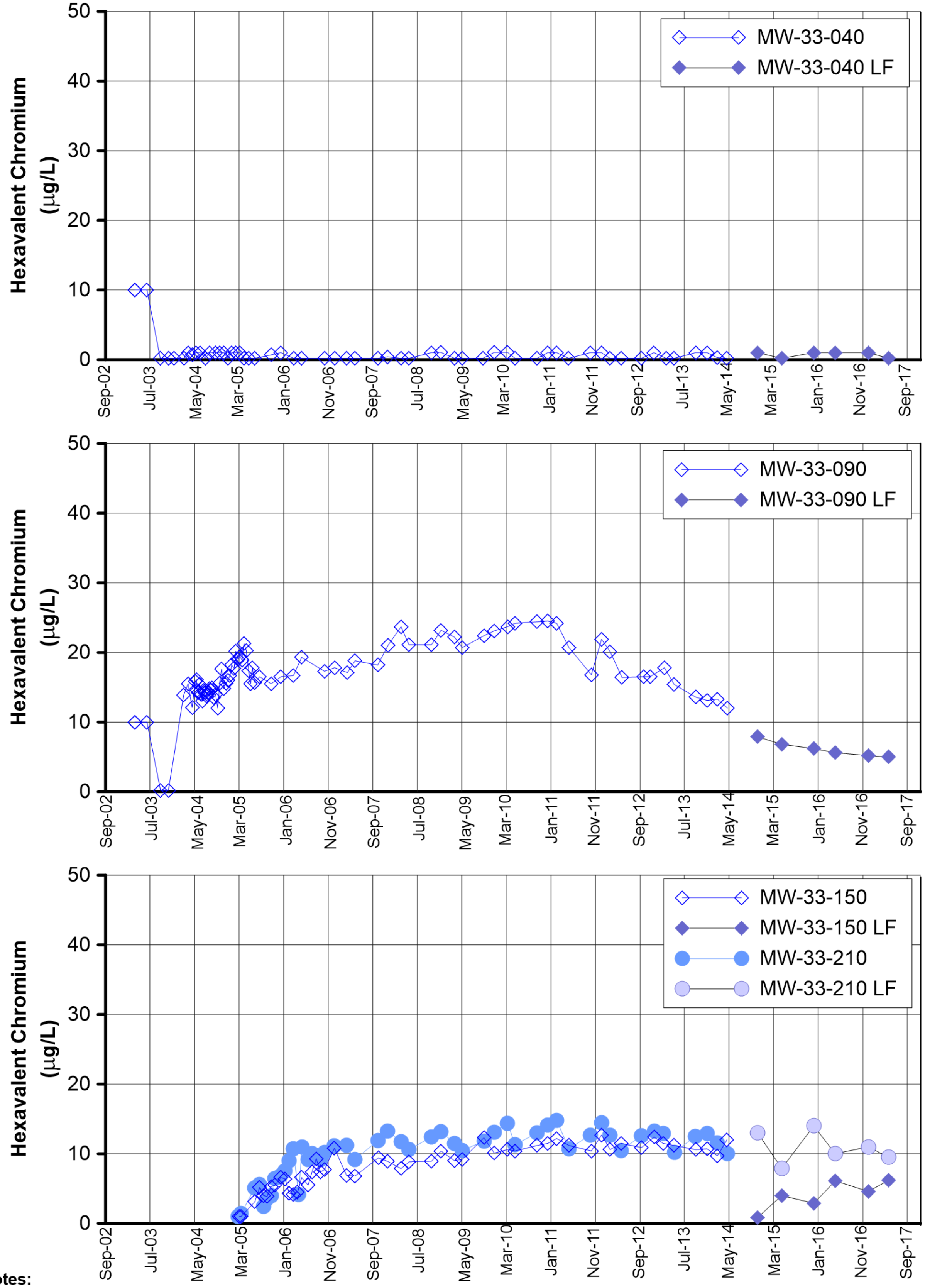

Notes:

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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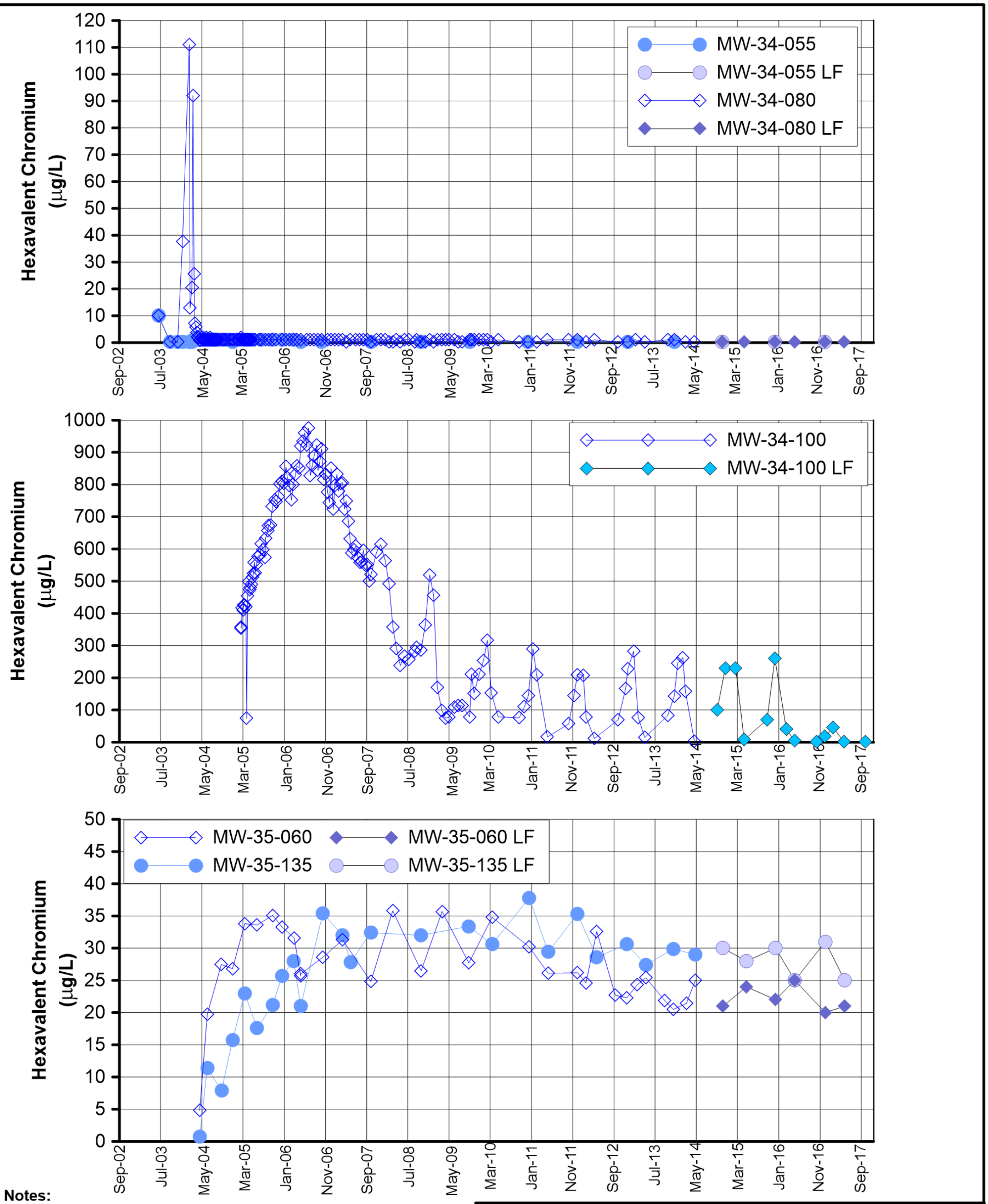
THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA



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

THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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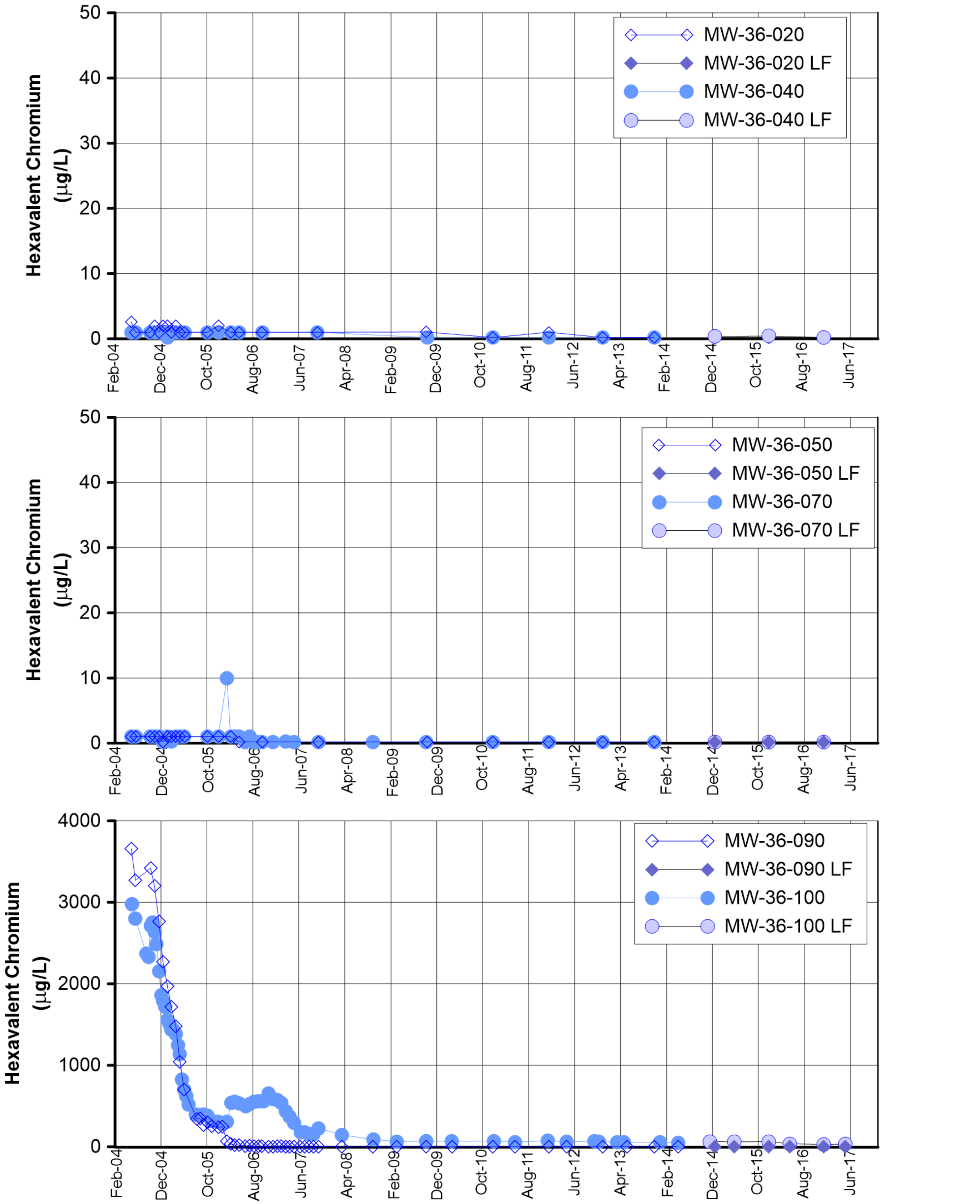

Notes:

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-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

THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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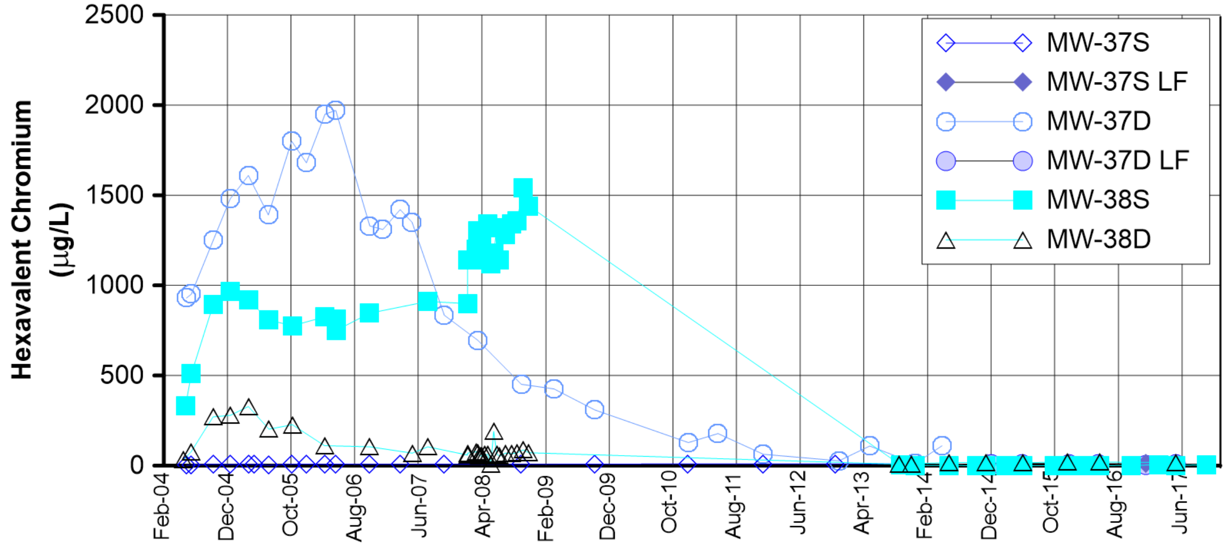

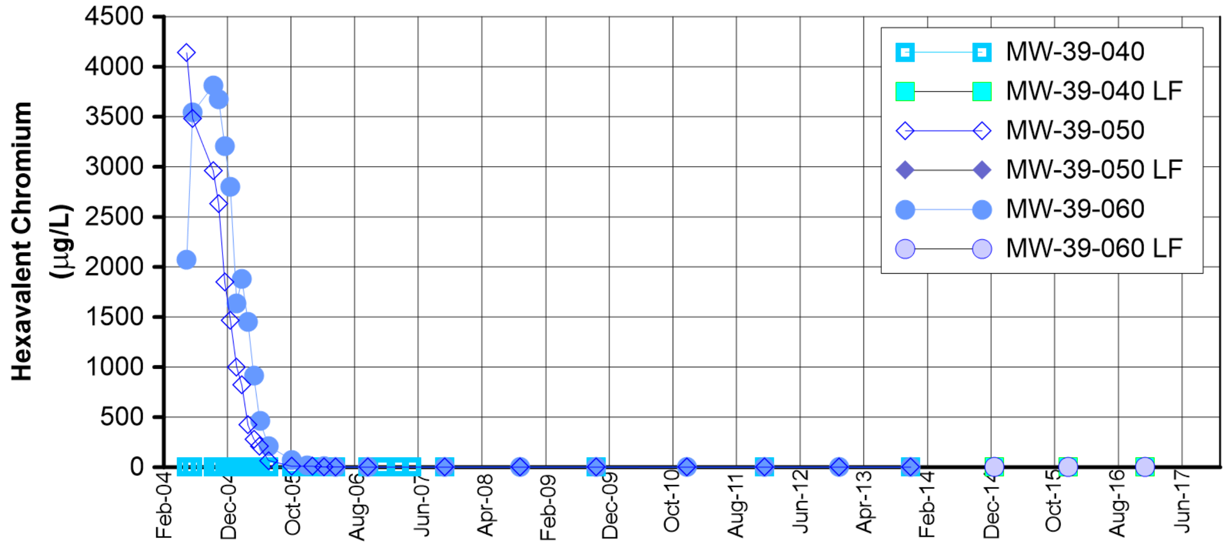

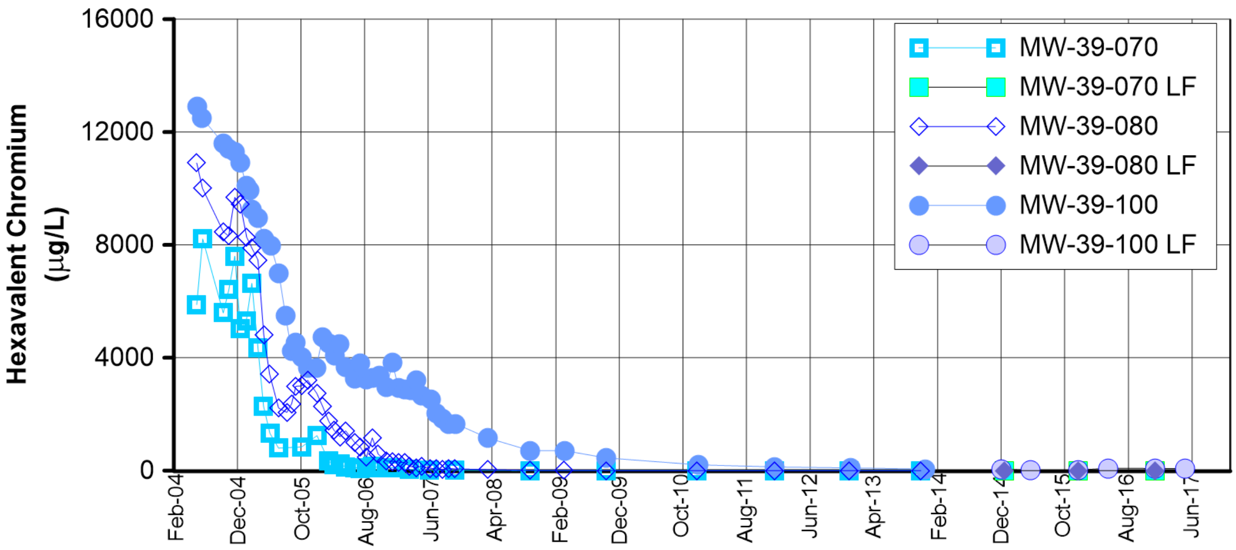

Notes:

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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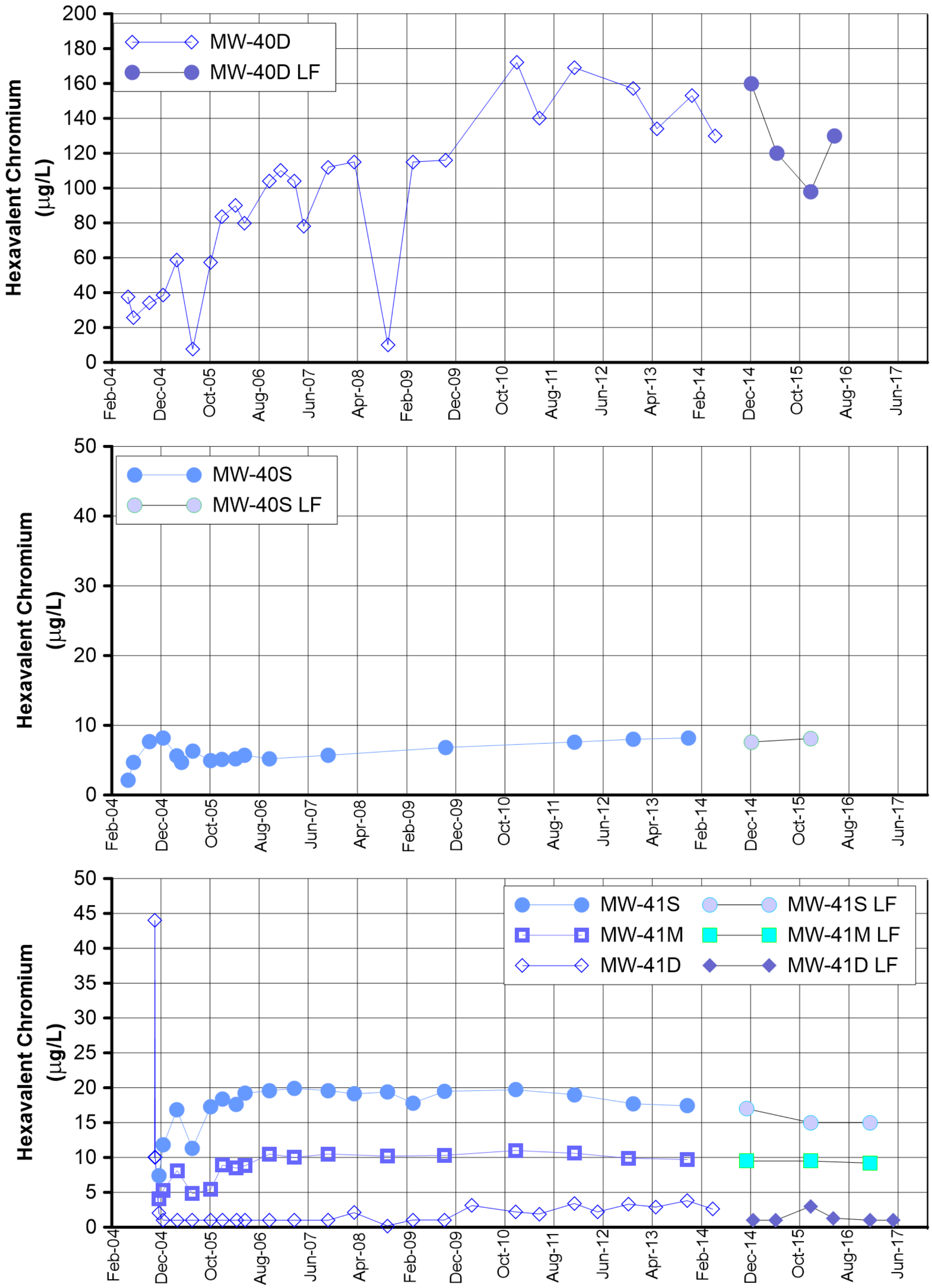
THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA



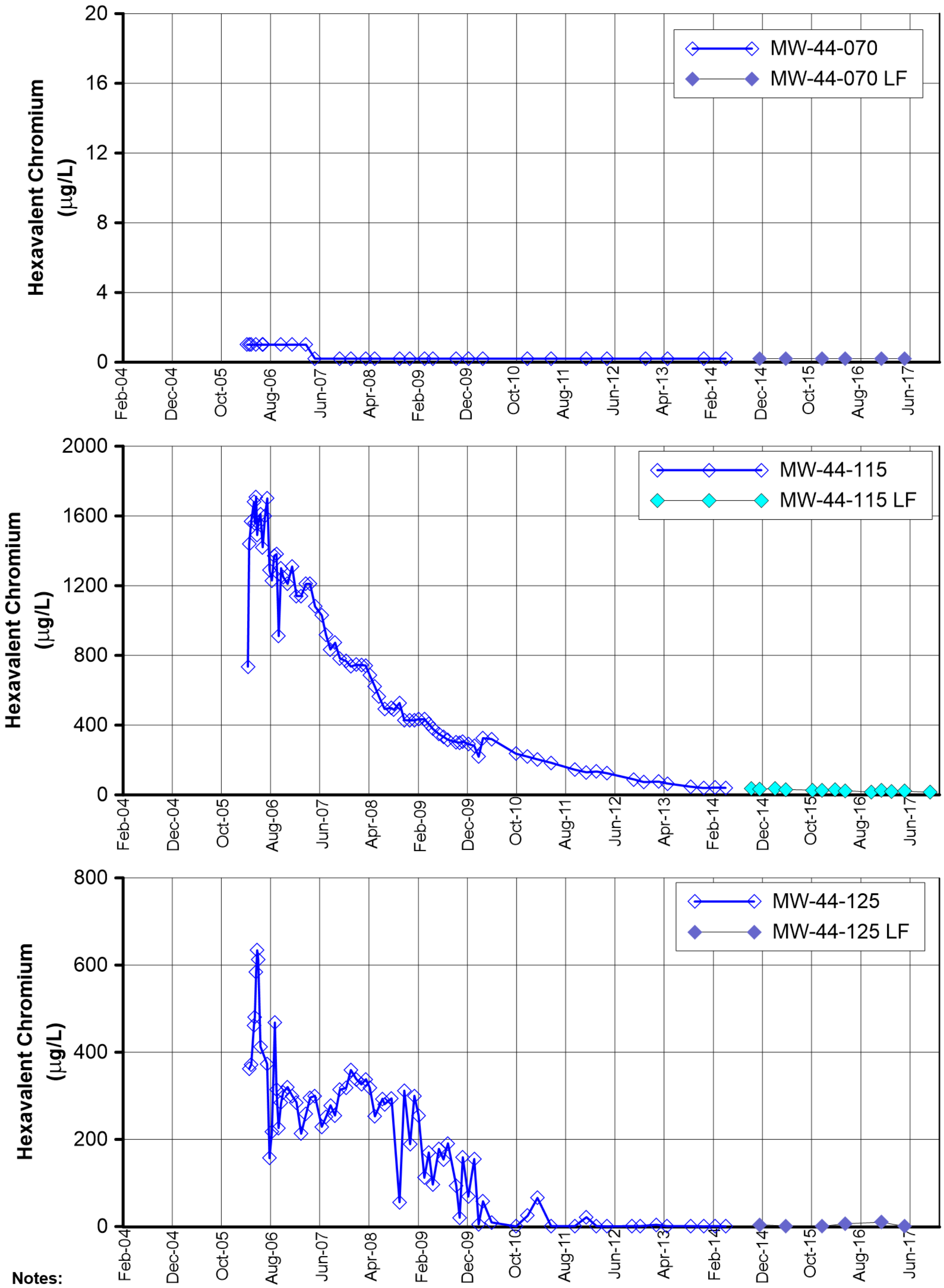
Notes:

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

THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS



Notes:

1) The IM Contingency Plan and hexavalent chromium [Cr(VI)] trigger levels were updated July 17, 2008 (DTSC, 2008b).
2) The trigger level for MW-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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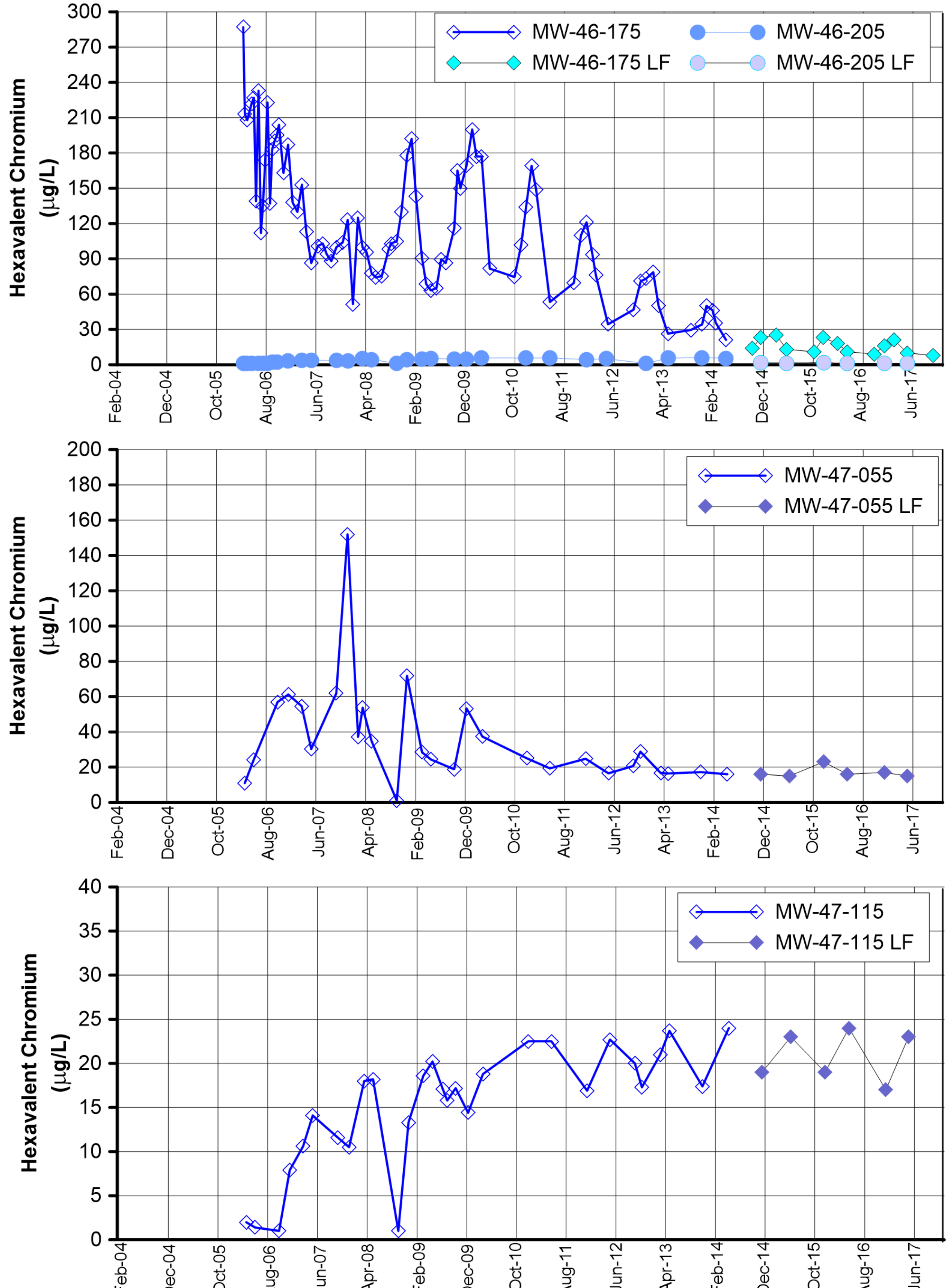
THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA



Notes:

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

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

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

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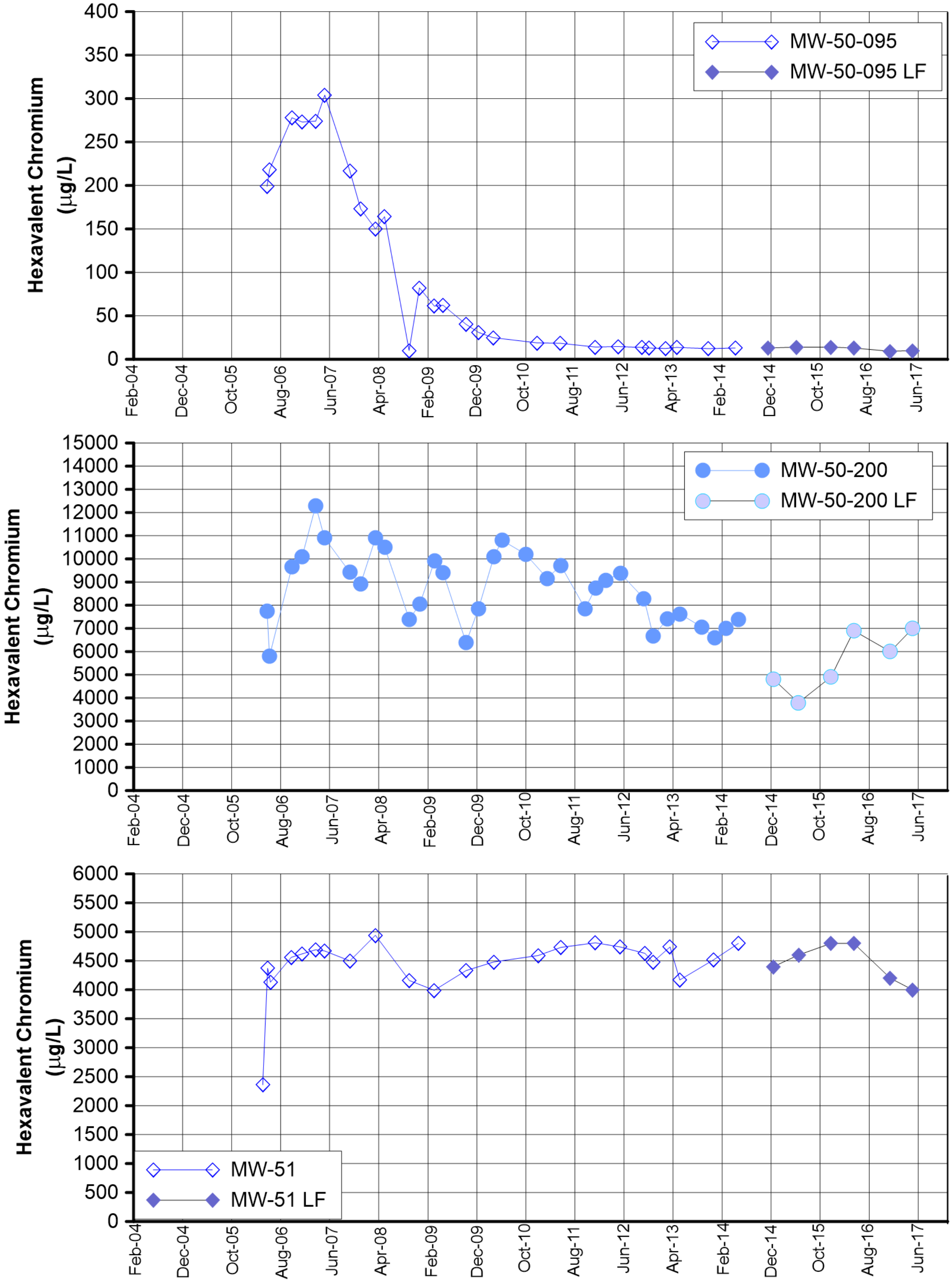
THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA



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

THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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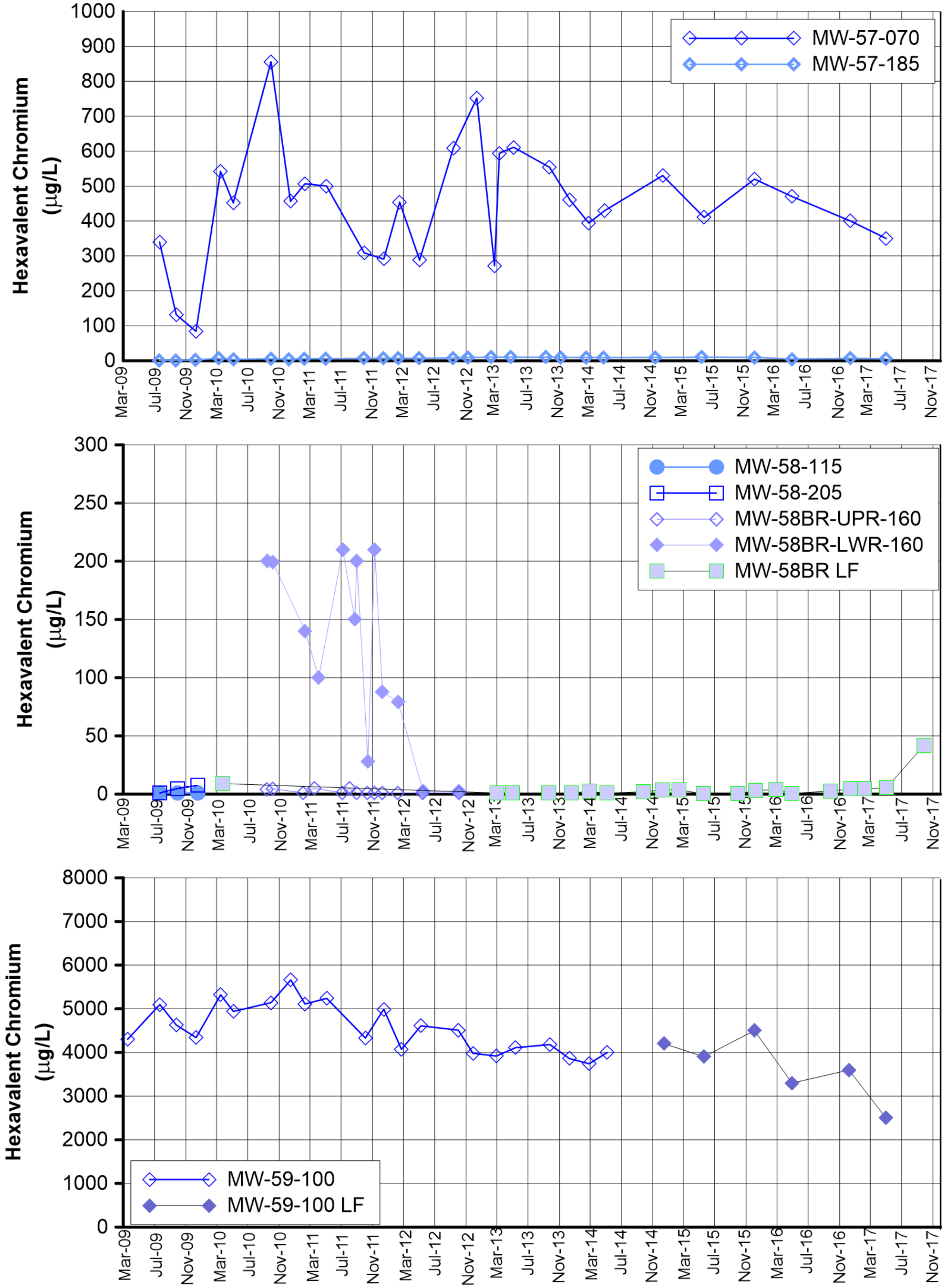

Note:

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

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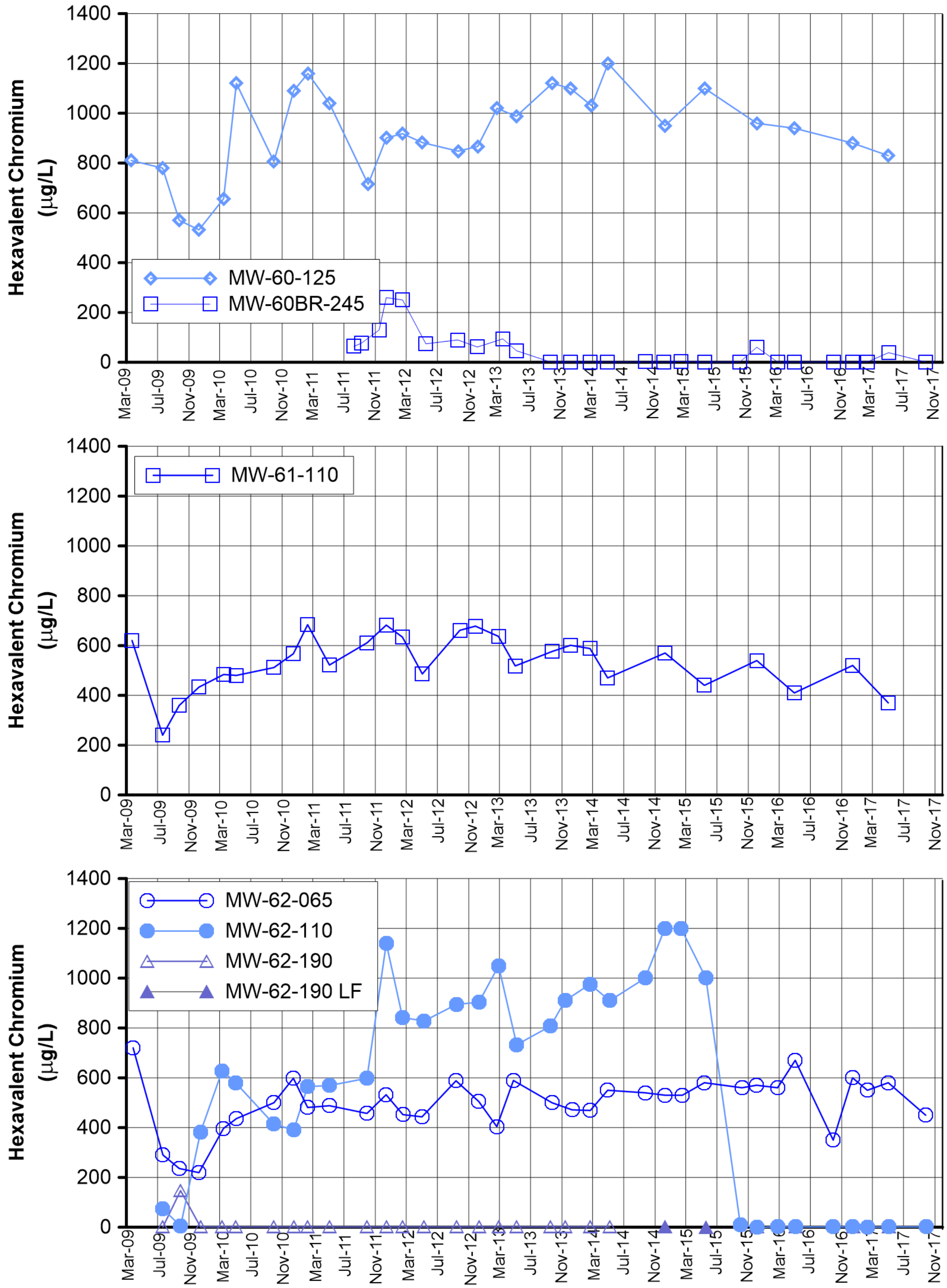
THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA



Notes:

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

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

THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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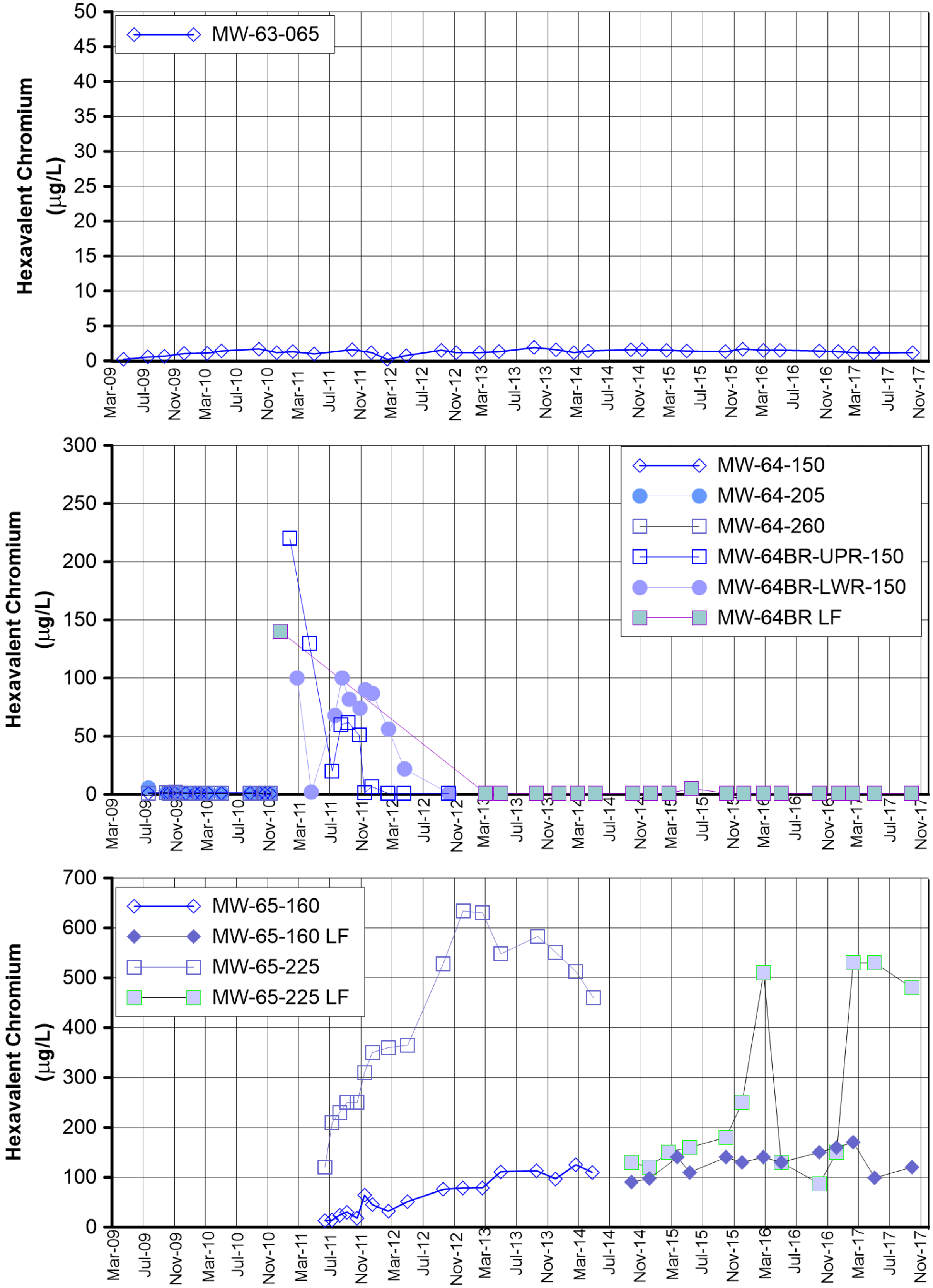

Notes:

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

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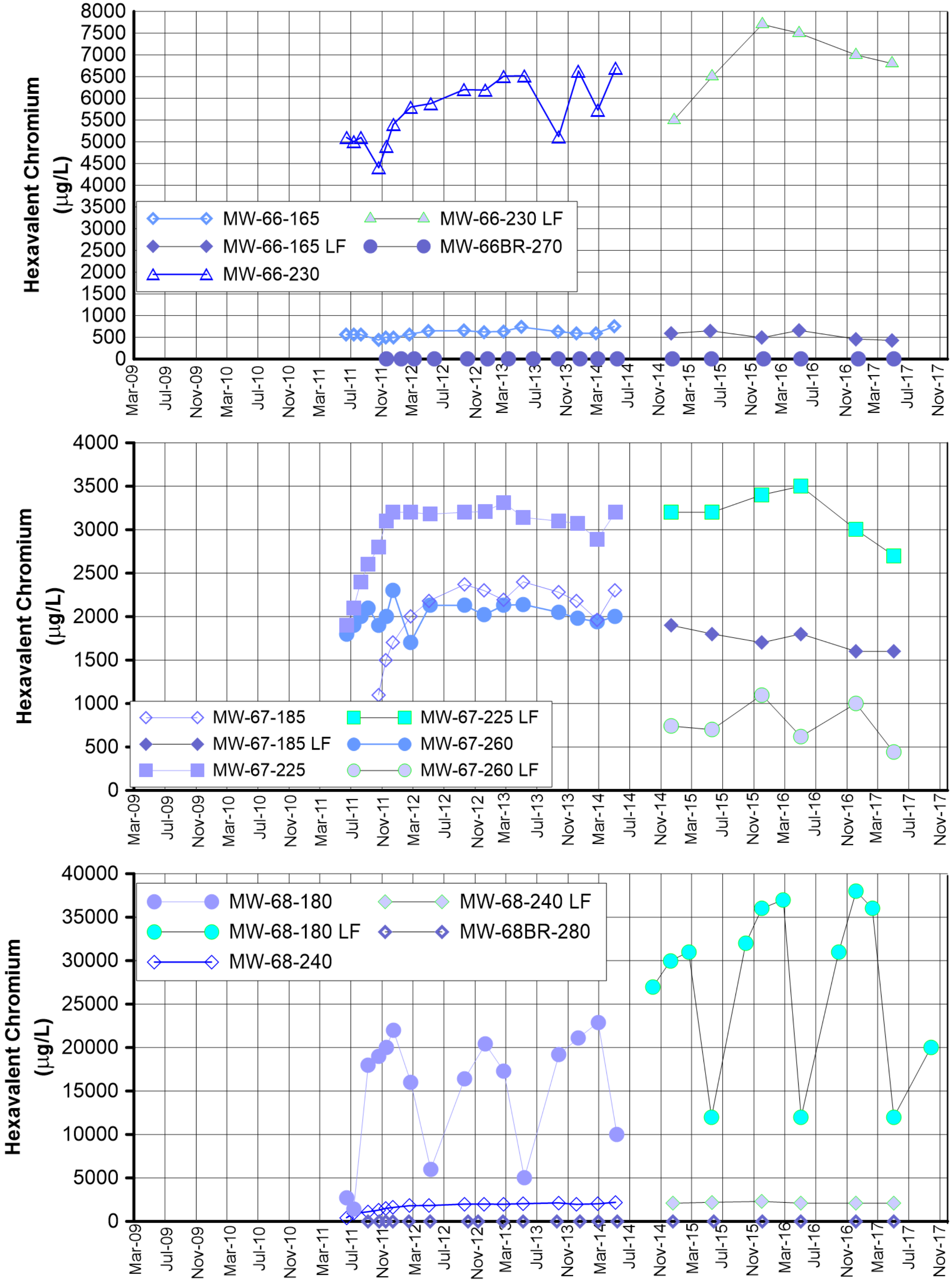
THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

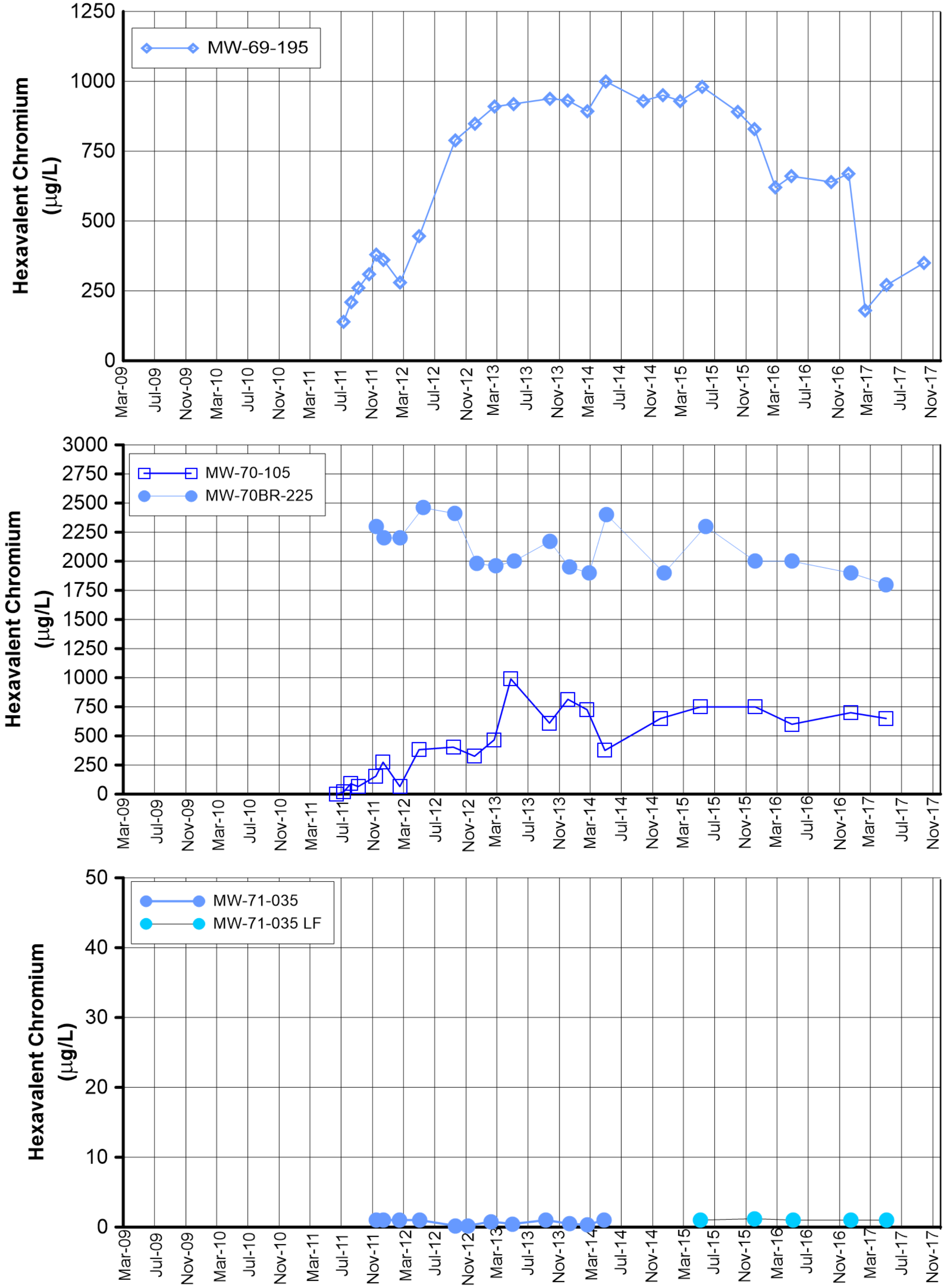


Notes:

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

FIGURE D-16
HEXAVALENT CHROMIUM IN MW-66, MW-67, AND MW-68 CLUSTERS
THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

ARCADIS

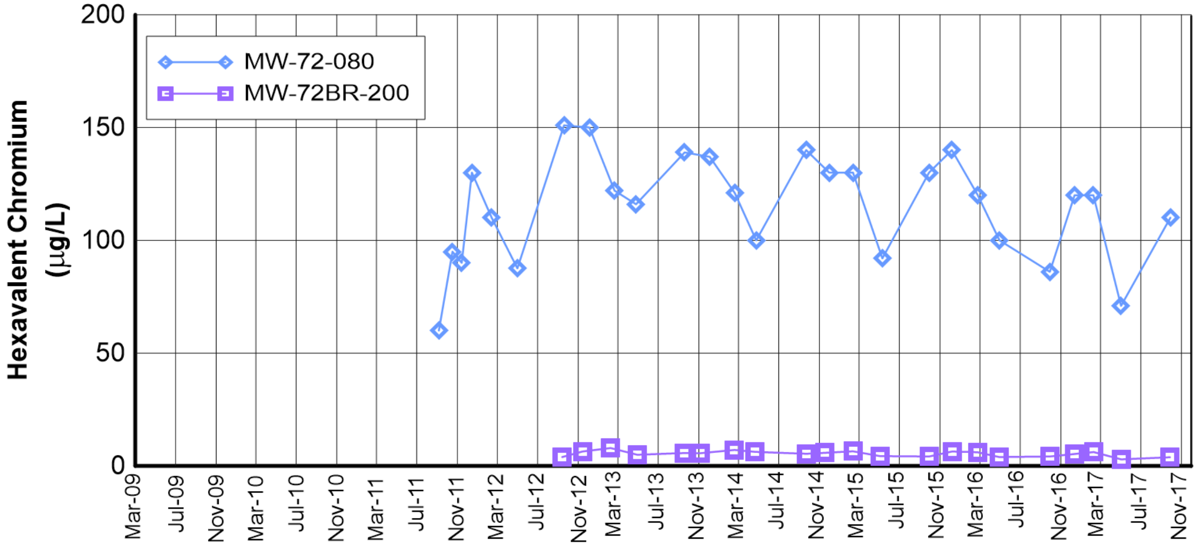


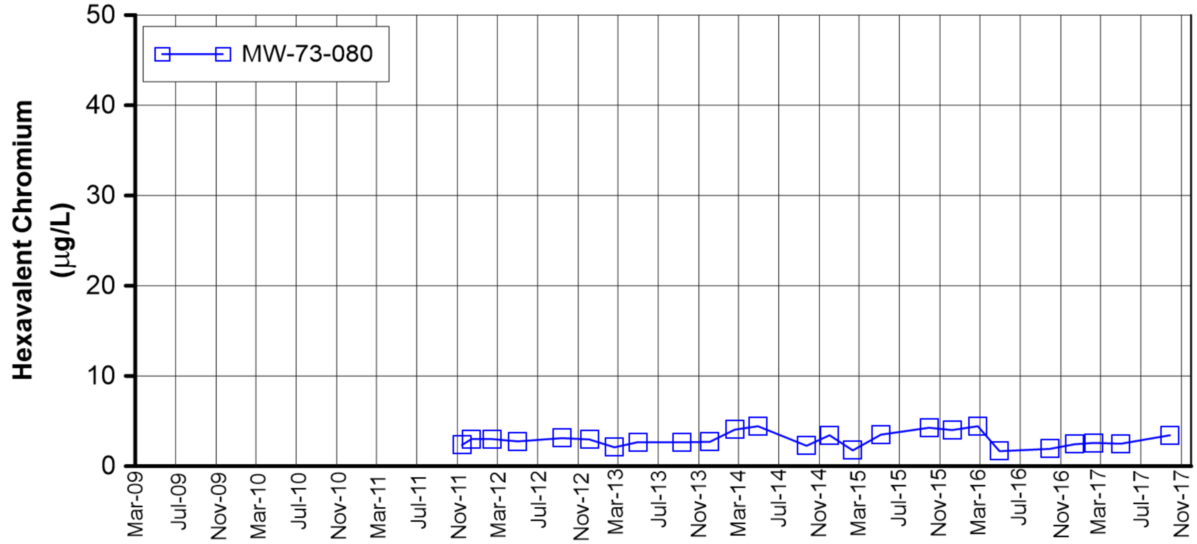
Notes:

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

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

THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA





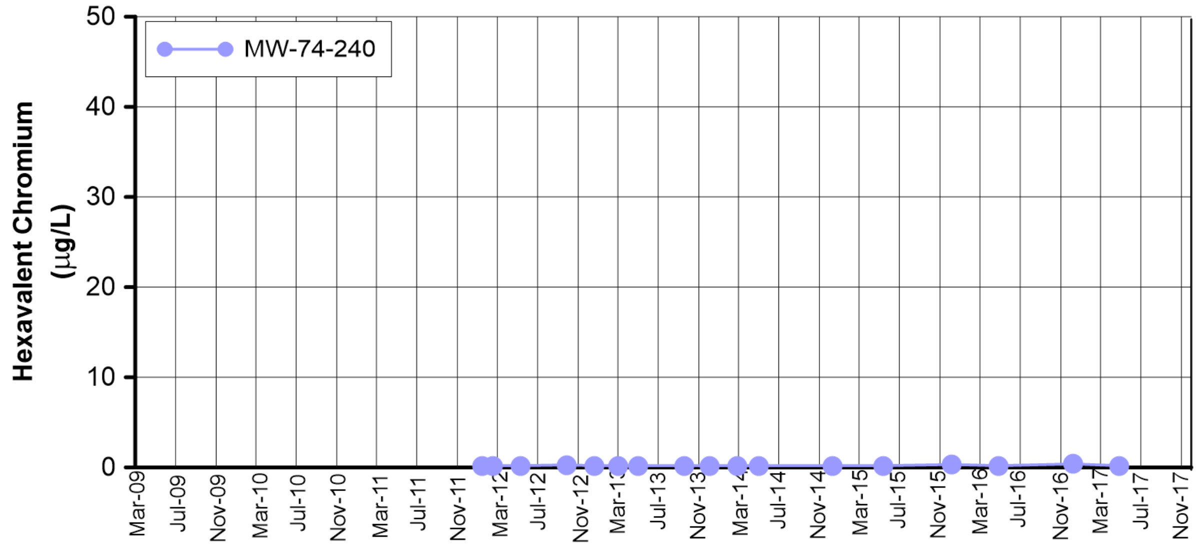


FIGURE D-18
HEXAVALENT CHROMIUM
IN MW-72 CLUSTER, MW-73-080, AND MW-74-240

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THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

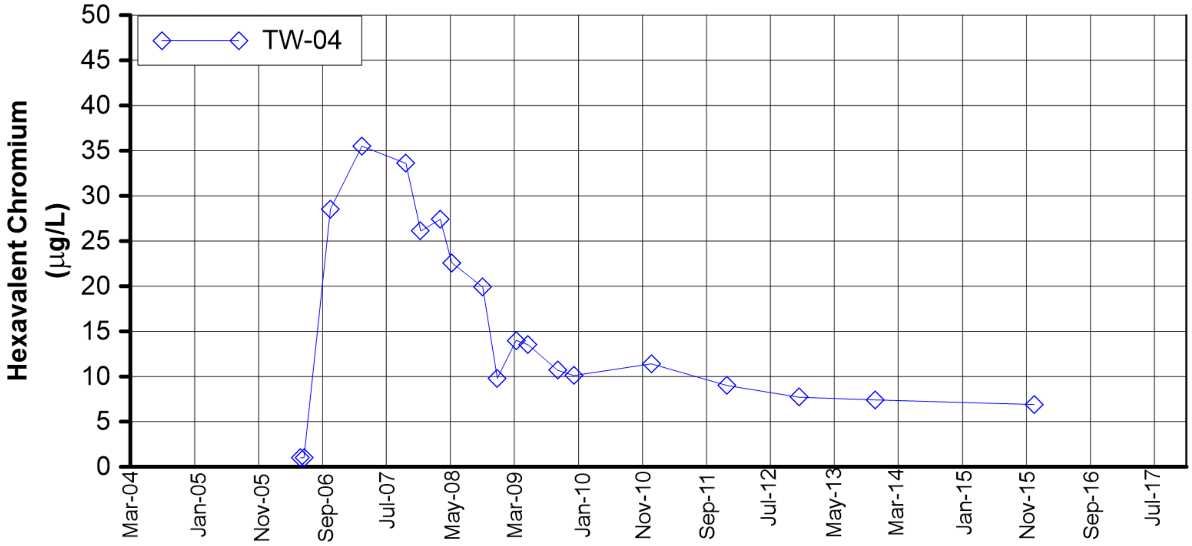

FIGURE D-19
HEXAVALENT CHROMIUM
IN TW-04

THIRD QUARTER 2017 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

Third Quarter 2017 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)	2017 Third Quarter Hexavalent Chromium Result (µg/L)	Maximum 2014 Total Dissolved Chromium Concentration and New Trigger Levels (µg/L)	2017 Third 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	ND (1)	
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
Third Quarter 2017 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)**	**2017 Third Quarter Hexavalent Chromium Result (µg/L)**	**Maximum 2014 Total Dissolved Chromium Concentration and New Trigger Levels (µg/L)**	**2017 Third 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	15	42.9	13	
MW-44-125	4.0 J	---	5.9	---	
MW-45-095a	13.7 (a)	---	14.2 (a)	---	
MW-46-175	46.3	7.9	46.1	7.2	
MW-46-205	5.5	---	4.8	---	
MW-47-115	24	---	20	---	
PE-01	5.6	9	6	4.5	Y
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, Third Quarter 2017

APPENDIX E

Interim Measures Extraction System Operations Log, Third Quarter 2017, PG&E Topock Performance Monitoring Program

During Third Quarter 2017 (July through October), extraction wells PE-1 and TW-3D operated at a target pump rate of at 135 gallons per minute, excluding periods of planned and unplanned downtime. Extraction wells TW-2S and TW-2D were not operated during Third Quarter 2017. The operational run time for the Interim Measure groundwater extraction system (combined or individual pumping) was approximately 95.4 percent during Third Quarter 2017.

The Interim Measure Number 3 (IM-3) facility treated approximately 22,678,524 gallons of extracted groundwater during Third Quarter 2017. The IM-3 facility also treated 26,650 gallons of injection well development water and 1,170 gallons of purge water from site sampling activities. Six containers of solids from the IM-3 facility were transported offsite during the reporting period.

Periods of planned and unplanned extraction system downtime (that together resulted in approximately 4.6 percent of downtime during Third Quarter 2017) 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 July 2017

- **July 6, 2017 (planned):** The extraction well system was offline from 6:52 a.m. to 8:14 a.m. due to testing of the pipeline critical alarms and leak detection system and to change out the microfilter modules due to high transmembrane pressure. The plant was shut down to replace the plugged modules with clean ones. Extraction system downtime was 1 hour 22 minutes.
- **July 7, 2017 (unplanned):** The extraction well system was offline from 12:54 p.m. to 1:00 p.m. due to the voltage coming into the plant being too low. The plant power was switched from City of Needles Power to the generator. Extraction system downtime was 6 minutes.
- **July 7, 2017 (unplanned):** The extraction well system was offline from 2:26 p.m. to 2:30 p.m. to switch the plant power back to Needles Power. Extraction system downtime was 4 minutes.
- **July 8, 2017 (unplanned):** The extraction well system was offline from 7:06 p.m. to 7:12 p.m. due to bad weather. There were high winds and lightning. The plant power was switched to the generator. Extraction system downtime was 6 minutes.
- **July 22, 2017 (unplanned):** The extraction well system was offline from 12:26 a.m. to 12:36 a.m. due to loss of power from the City of Needles Power. Extraction system downtime was 10 minutes.
- **July 21, 2017 (unplanned):** The extraction well system was offline from 12:28 p.m. to 12:42 p.m. due to a high voltage reading on the incoming power from “line C”. The plant was shut down to switch to generator power. The City of Needles Power was called and the plant remained on the generator until the power issue was resolved. Extraction system downtime was 14 minutes.
- **July 24, 2017 (unplanned):** The extraction well system was offline from 8:22 p.m. to 9:38 p.m. due to extraction well TW-3D failing to run or start. The plant was shut down while the issue was investigated and the electric panel reset. Extraction system downtime was 1 hour 16 minutes.
- **July 25, 2017 (unplanned):** The extraction well system was offline from 11:56 a.m. to 11:58 a.m. due to loss of power from the City of Needles. Extraction system downtime was 2 minutes.

- **July 25, 2017 (unplanned):** The extraction well system was offline from 1:26 p.m. to 2:46 p.m. due to a "low flow ferrous" alarm. The plant was shut down while the ferrous chemical pump was cleaned and re-primed. Extraction system downtime was 1 hour 20 minutes.
- **July 26, 2017 (unplanned):** The extraction well system was offline from 5:38 a.m. to 8:10 a.m. to change out the microfilter modules due to high transmembrane pressure. The plant was shut down to replace the plugged modules with clean ones. Extraction system downtime was 2 hours 32 minutes.
- **July 28, 2017 (unplanned):** The extraction well system was offline from 9:56 a.m. to 9:58 a.m. and from 10:10 a.m. to 10:40 a.m. and from 12:50 p.m. to 12:52 p.m. due to loss of power from the City of Needles. Extraction system downtime was 34 minutes.

E.2 August 2017

- **August 3, 2017 (unplanned):** The extraction well system was offline from 12:18 a.m. to 12:22 a.m. due to a programmable logic controller (PLC) and human machine interface (HMI) connectivity issue. Extraction system downtime was 4 minutes.
- **August 3, 2017 (unplanned):** The extraction well system was offline from 10:28 a.m. to 11:56 a.m. to change out the microfilter modules due to high transmembrane pressure. The plant was shut down to replace the fouled modules in the east bank with clean ones. Extraction system downtime was 1 hour 28 minutes.
- **August 7, 2017 (planned):** The extraction well system was offline from 8:40 a.m. to 9:08 a.m. due to testing of the pipeline critical alarms and leak detection system. Extraction system downtime was 28 minutes.
- **August 14, 2017 (unplanned):** The extraction well system was offline from 10:50 a.m. to 12:54 p.m. to change out the microfilter modules due to high transmembrane pressure. The plant was shut down to replace the fouled modules in the west bank with clean ones. Extraction system downtime was 2 hours 4 minutes.
- **August 21 - 24, 2017 (planned):** The extraction well system was offline from 6:14 a.m. on August 21, 2017 to 9:50 a.m. on August 24, 2017, for semiannual scheduled maintenance. Extraction system downtime was 3 days, 1 hour 22 minutes.
- **August 24, 2017 (unplanned):** The extraction well system was offline from 6:54 p.m. to 7:34 p.m. to change out the microfilter modules due to high transmembrane pressure. The plant was shut down to replace the fouled modules in the west bank with clean ones. Extraction system downtime was 40 minutes.
- **August 24, 2017 (unplanned):** The extraction well system was offline from 7:38 p.m. to 7:46 a.m. due to a PLC and HMI connectivity issue. Extraction system downtime was 8 minutes.
- **August 25, 2017 (unplanned):** The extraction well system was offline from 8:00 a.m. to 8:04 a.m. due to a PLC and HMI connectivity issue. Extraction system downtime was 4 minutes.
- **August 25, 2017 (unplanned):** The extraction well system was offline from 1:32 p.m. to 1:52 p.m. due to loss of power from the City of Needles. Extraction system downtime was 20 minutes.
- **August 25, 2017 (unplanned):** The extraction well system was offline from 3:16 p.m. to 3:28 p.m. due to loss of power from the City of Needles. Extraction system downtime was 12 minutes.
- **August 26, 2017 (unplanned):** The extraction well system was offline from 8:06 a.m. to 8:10 a.m. due to a PLC and HMI connectivity issue. Extraction system downtime was 4 minutes.
- **August 26, 2017 (planned):** The extraction well system was offline from 9:18 a.m. to 10:38 a.m. to maintain appropriate levels in the Raw Water Storage Tank (T-100) due to the large amount of injection well

backwashing water produced during the Aquagard cleaning process performed by Groundwater Partners. Extraction system downtime was 1 hour 20 minutes.

- **August 27, 2017 (unplanned):** The extraction well system was offline from 6:50 a.m. to 8:46 a.m. to change out the microfilter modules due to high transmembrane pressure. The plant was shut down to replace the fouled modules in the east bank with clean ones. Extraction system downtime was 1 hour 56 minutes.
- **August 27, 2017 (planned):** The extraction well system was offline from 12:20 p.m. to 12:34 p.m. to maintain appropriate levels in the Raw Water Storage Tank (T-100) due to the large amount of injection well backwashing water produced during the Aquagard cleaning process performed by Groundwater Partners. Extraction system downtime was 14 minutes.
- **August 29, 2017 (unplanned):** The extraction well system was offline from 2:42 p.m. to 2:56 p.m. due to loss of power from the City of Needles. The plant power was switched to the generator. Extraction system downtime was 14 minutes.
- **August 29, 2017 (unplanned):** The extraction well system was offline from 4:02 p.m. to 4:04 p.m. due to a PLC and HMI connectivity issue. Extraction system downtime was 2 minutes.
- **August 29, 2017 (unplanned):** The extraction well system was offline from 4:58 p.m. to 6:58 p.m. due to loss of power from the City of Needles and a failure of the Clarifier Feed Pump VFD (P-400). Extraction system downtime was 2 hours.
- **August 31, 2017 (unplanned):** The extraction well system was offline from 6:54 a.m. to 9:32 a.m. to change out the microfilter modules due to high transmembrane pressure. The plant was shut down to replace the fouled modules with clean ones. The plant was also offline due to a PLC and HMI connectivity issue. Extraction system downtime was 2 hours 38 minutes.

E.3 September 2017

- **September 1, 2017 (unplanned):** The extraction well system was offline from 7:32 a.m. to 8:04 a.m. due a leaking seal at the Chemical Mixing Pump (P-201). Extraction system downtime was 32 minutes.
- **September 2, 2017 (unplanned):** The extraction well system was offline from 4:06 p.m. to 5:54 p.m. due to a high temperature condition at the air compressor (CMP-1001). Extraction system downtime was 1 hour 48 minutes.
- **September 5, 2017 (unplanned):** The extraction well system was offline from 6:52 p.m. to 9:00 p.m. to change out the microfilter modules due to high transmembrane pressure. The plant was shut down to replace the fouled membranes with clean membranes. Extraction system downtime was 2 hours 8 minutes.
- **September 7, 2017 (unplanned):** The extraction well system was offline from 4:26 a.m. to 4:36 a.m. due to loss of power from the City of Needles. Extraction system downtime was 10 minutes.
- **September 8, 2017 (planned):** The extraction well system was offline from 12:14 p.m. to 12:32 p.m. due to testing of the pipeline critical alarms and leak detection system. Extraction system downtime was 18 minutes.
- **September 13, 2017 (unplanned):** The extraction well system was offline from 8:54 a.m. to 9:32 a.m. to change out the microfilter modules due to high transmembrane pressure. The plant was shut down to replace the fouled membranes with clean ones. Extraction system downtime was 38 minutes.
- **September 13, 2017 (unplanned):** The extraction well system was offline from 10:30 a.m. to 11:02 a.m. to change out the microfilter modules due to high transmembrane pressure. The plant was shut down to replace the fouled membranes with clean ones. Extraction system downtime was 32 minutes.

- **September 13-14, 2017 (unplanned): T**he extraction well system was offline during 5 separate periods – On September 13 from 1:48 pm to 3:04 pm, 6:52 pm to 7:48 pm, 9:14 pm to 10:08 pm, 11:26 pm to 12:32 am on September 14, and from 1:12 am to 1:26 am on September 14. A current monitoring sensor in the Motor Control Center shutdown the TW-3D well pump due to high heat caused by failure of the control building air conditioner. After troubleshooting, the set point of the sensor was adjusted so this will not happen in the future. Extraction system downtime was 4 hours 26 minutes.
- **September 19, 2017 (unplanned):** The extraction well system was offline from 11:00 a.m. to 1:02 p.m. to change out the microfilter modules due to high transmembrane pressure. The plant was shut down to replace the fouled membranes with clean ones. Extraction system downtime was 2 hours 2 minutes.
- **September 26, 2017 (planned):** The extraction well system was offline from 4:50 a.m. to 5:50 a.m. because the Raw Water Storage Tank (T-100) was full and needed to have the water level lowered. Extraction system downtime was 1 hour.
- **September 27, 2017 (unplanned):** The extraction well system was offline from 9:36 a.m. to 11:14 a.m. to change out the microfilter modules due to high transmembrane pressure. The plant was shut down to replace the fouled membranes with clean ones. Extraction system downtime was 1 hour 38 minutes.

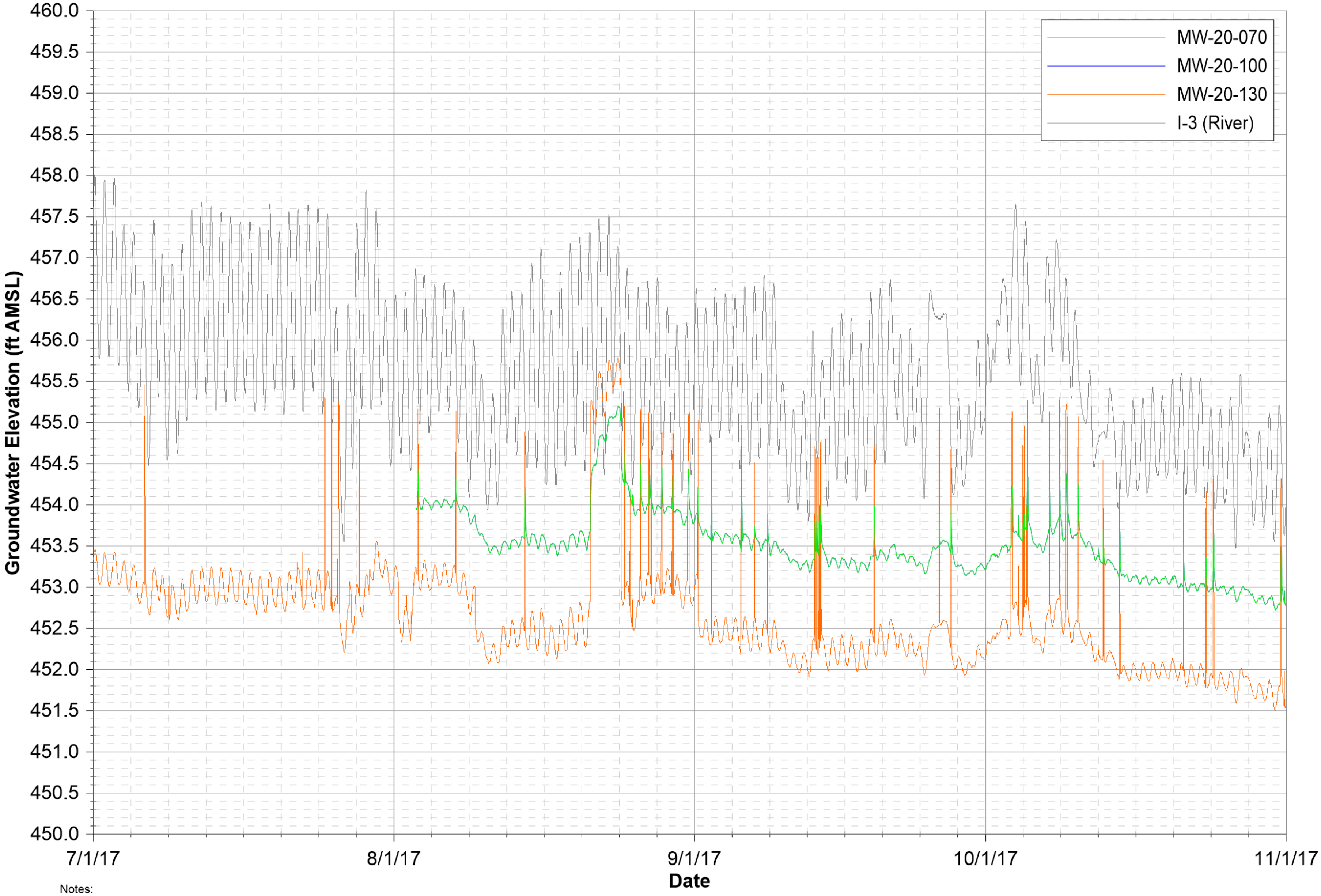
E.4 October 2017

- **October 3, 2017 (unplanned):** The extraction well system was offline from 3:10 p.m. to 6:22 p.m. due to a failure of an air release valve and replacing it with a new one. The plant was also offline from 6: 24 p.m. to 6:36 p.m. and from 6:44 p.m. to 6:58 p.m. to test the new air release valve. Extraction system downtime was 3 hours 38 minutes.
- **October 4, 2017 (unplanned):** The extraction system was offline from 9:04 a.m. to 9:28 a.m. and from 8:24 p.m. to 8:34 p.m. and from 11:20 p.m. 11:34 p.m. due to a programmable logic controller (PLC) and human machine interface (HMI) connectivity issue. Extraction system downtime was 48 minutes.
- **October 5, 2017 (planned):** The extraction well system was offline from 6:06 a.m. to 8:30 a.m. due to testing of the pipeline critical alarms and leak detection system. Extraction system downtime was 2 hours 24 minutes.
- **October 7, 2017 (unplanned):** The extraction well system was offline from 1:54 p.m. to 2:34 p.m. for tank level management. The water level in Raw Water Storage Tank (T-100) caused a high water-level shutdown. Extraction system downtime was 40 minutes.
- **October 8, 2017 (unplanned):** The extraction well system was offline from 2:06 p.m. to 3:24 p.m. due to scale build-up at the Clarifier Feed Pump (P-400) and associated static mixer, which were restricting flow resulting in high water levels in T-100. The extraction wells were shutdown to lower the water level in the T-100. Extraction system downtime was 1 hour 18 minutes.
- **October 9, 2017 (unplanned):** The extraction well system was offline from 6:18 a.m. to 10:28 a.m. to change out the microfilter modules due to high transmembrane pressure. The plant was shut down to replace the fouled membranes with clean membranes. Extraction system downtime was 4 hours 10 minutes.
- **October 9, 2017 (unplanned):** The extraction system was offline from 10:30 a.m. to 10:38 a.m. due to a programmable logic controller (PLC) and human machine interface (HMI) connectivity issue. Extraction system downtime was 8 minutes.
- **October 10, 2017 (unplanned):** The extraction well system was offline from 12:26 p.m. to 1:38 p.m. due to the scale build-up at the Clarifier Feed Pump (P-400) and associated static mixer, which were restricting flow resulting in high water levels in T-100. The extraction wells were shutdown to lower the level at T-100. Extraction system downtime was 1 hour 12 minutes.

- **October 12, 2017 (unplanned):** The extraction well system was offline from 4:04 p.m. to 4:16 p.m. due to loss of power from the City of Needles. Extraction system downtime was 12 minutes.
- **October 13, 2017 (unplanned):** The extraction well system was offline from 2:30 a.m. to 3:04 a.m. and from 4:28 a.m. to 4:40 a.m. due to loss of power from the City of Needles. Extraction system downtime was 46 minutes.
- **October 14, 2017 (unplanned):** The extraction well system was offline from 7:04 p.m. to 8:30 p.m. because the T-100 was full and needed to have the water level lowered. Extraction system downtime was 1 hour 26 minutes.
- **October 18, 2017 (unplanned):** The extraction system was offline from 9:46 a.m. to 9:48 a.m. due to a programmable logic controller (PLC) and human machine interface (HMI) connectivity issue. Extraction system downtime was 2 minutes.
- **October 21, 2017 (unplanned):** The extraction well system was offline from 9:04 a.m. to 10:16 a.m. due to the scale build-up at Clarifier Feed Pump (P-400) and associated static mixer, which was restricting flow resulting in high water levels in T-100. The extraction wells were shutdown to lower the level at T-100. Extraction system downtime was 1 hour 12 minutes.
- **October 23, 2017 (unplanned):** The extraction well system was offline from 5:26 p.m. to 6:26 p.m. because T-100 was full and needed to have the water level lowered. Extraction system downtime was 1 hour.
- **October 24, 2017 (unplanned):** The extraction well system was offline from 10:32 a.m. to 12:58 p.m. to change out the microfilter modules due to high transmembrane pressure. The plant was shut down to replace the fouled membranes with clean membranes. Extraction system downtime was 2 hours 26 minutes.
- **October 31, 2017 (unplanned):** The extraction well system was offline from 10:06 a.m. to 12:30 p.m. to service the Clarifier Feed Pump (P-400) and the Pre-treated Water Transfer Pump (P-500). Extraction system downtime was 2 hours 24 minutes.
- **October 31, 2017 (unplanned):** The extraction well system was offline from 7:32 p.m. to 7:52 p.m. due to loss of power from the City of Needles. Extraction system downtime was 20 minutes.

APPENDIX F

Hydraulic Data for Interim Measures Reporting Period

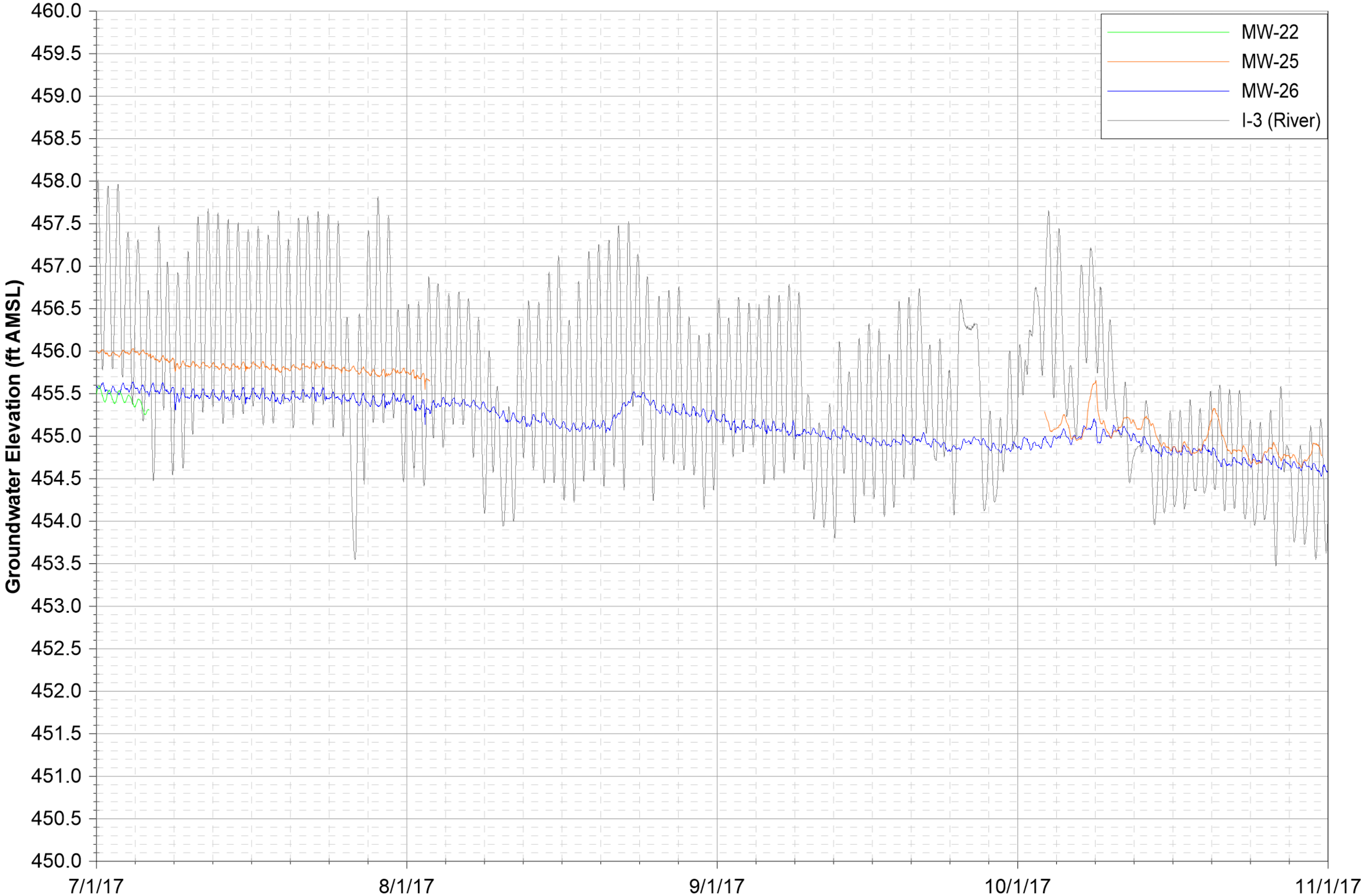


Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.
3. MW-20-070 data unavailable from July 1, 2017 through August 2, 2017 due to transducer malfunction.

FIGURE F-1A
MW-20 CLUSTER HYDROGRAPHS

THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS



Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.
3. MW-22 data unavailable from July 6, 2017 through October 31, 2017 due to transducer malfunction.
4. MW-25 data unavailable from August 3, 2017 through October 2, 2017 due to transducer malfunction.

FIGURE F-1B

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

THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

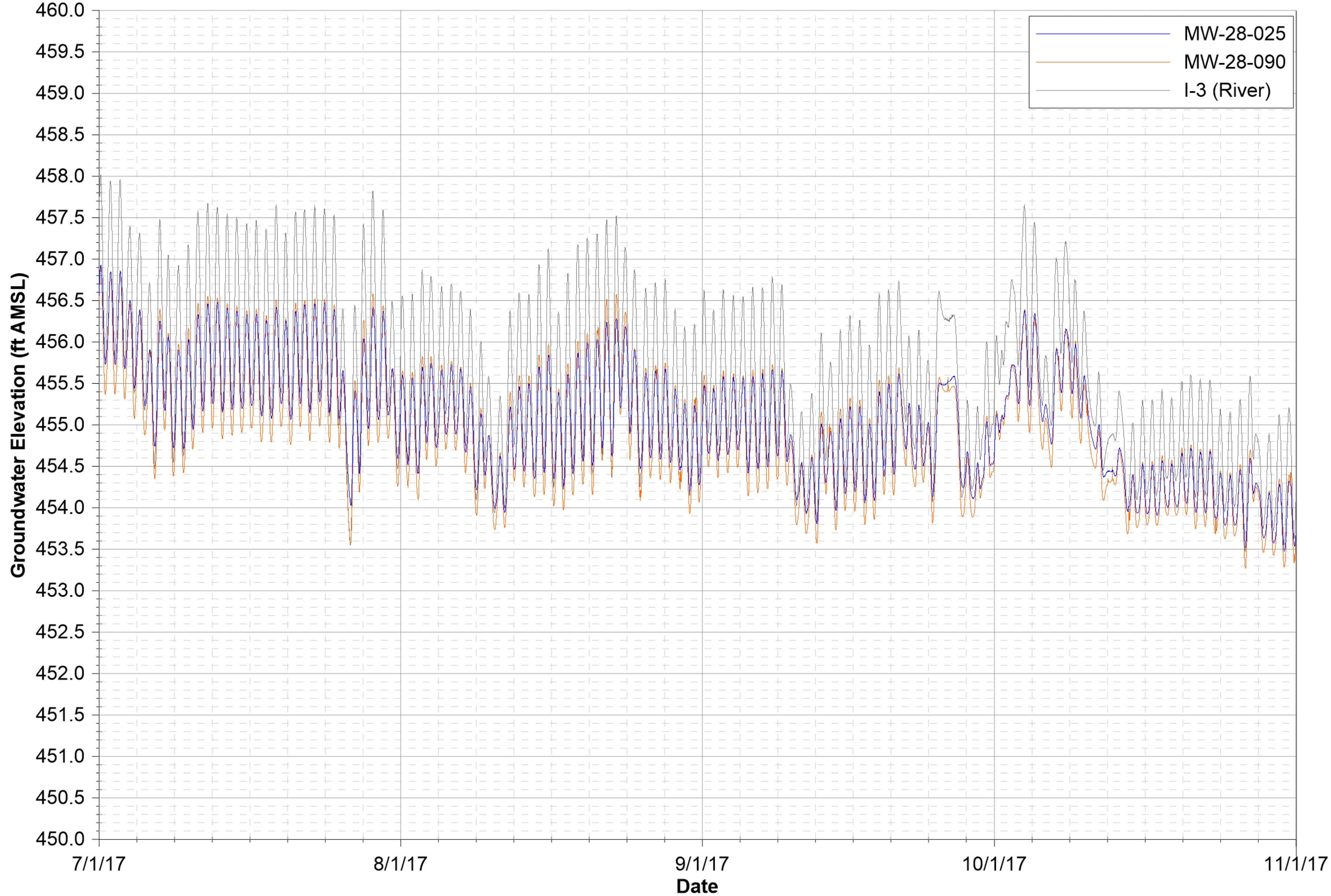
ARCADIS

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

FIGURE F-1C
MW-27 CLUSTER HYDROGRAPHS

THIRD QUARTER 2017 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
THIRD QUARTER 2017 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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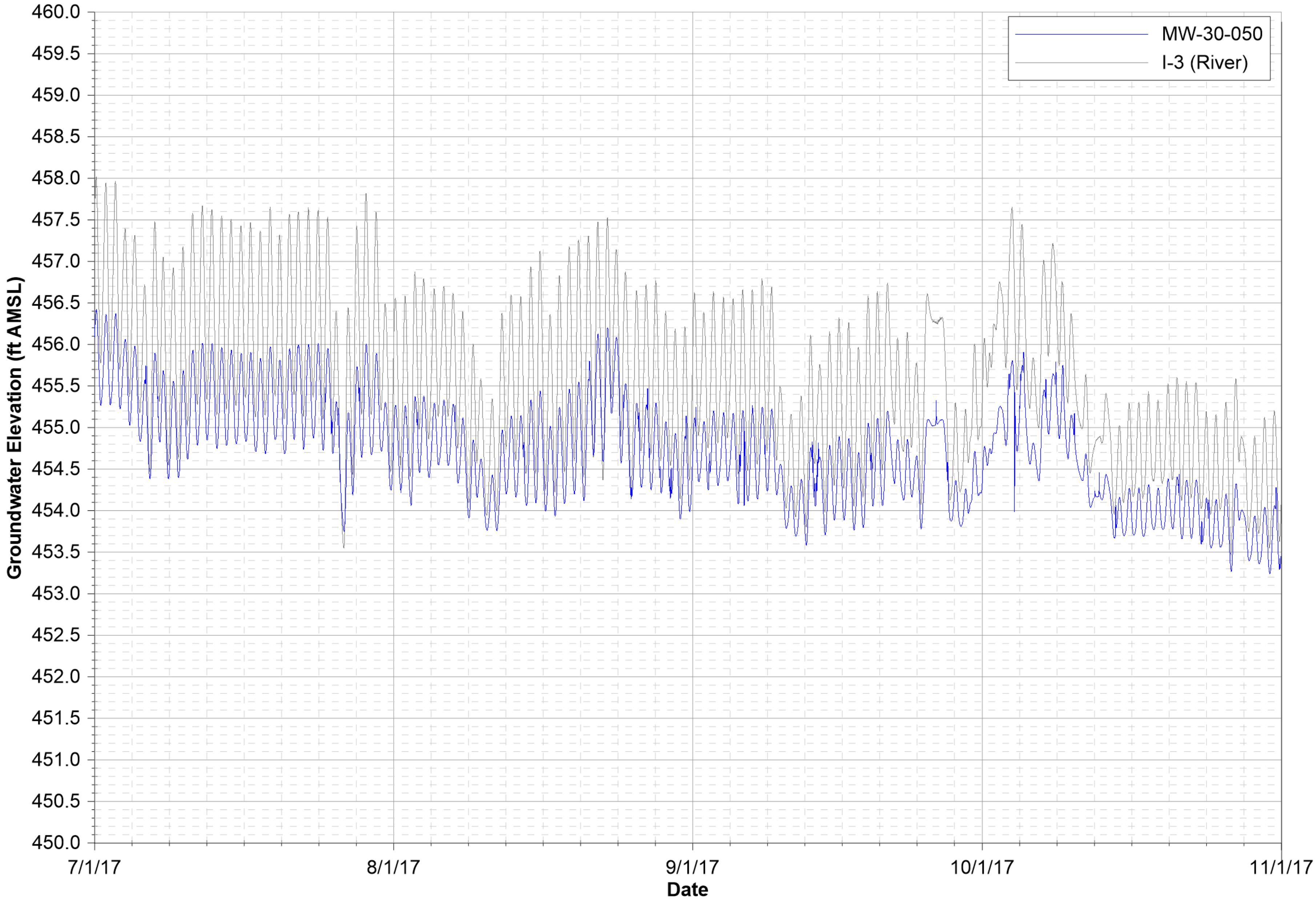
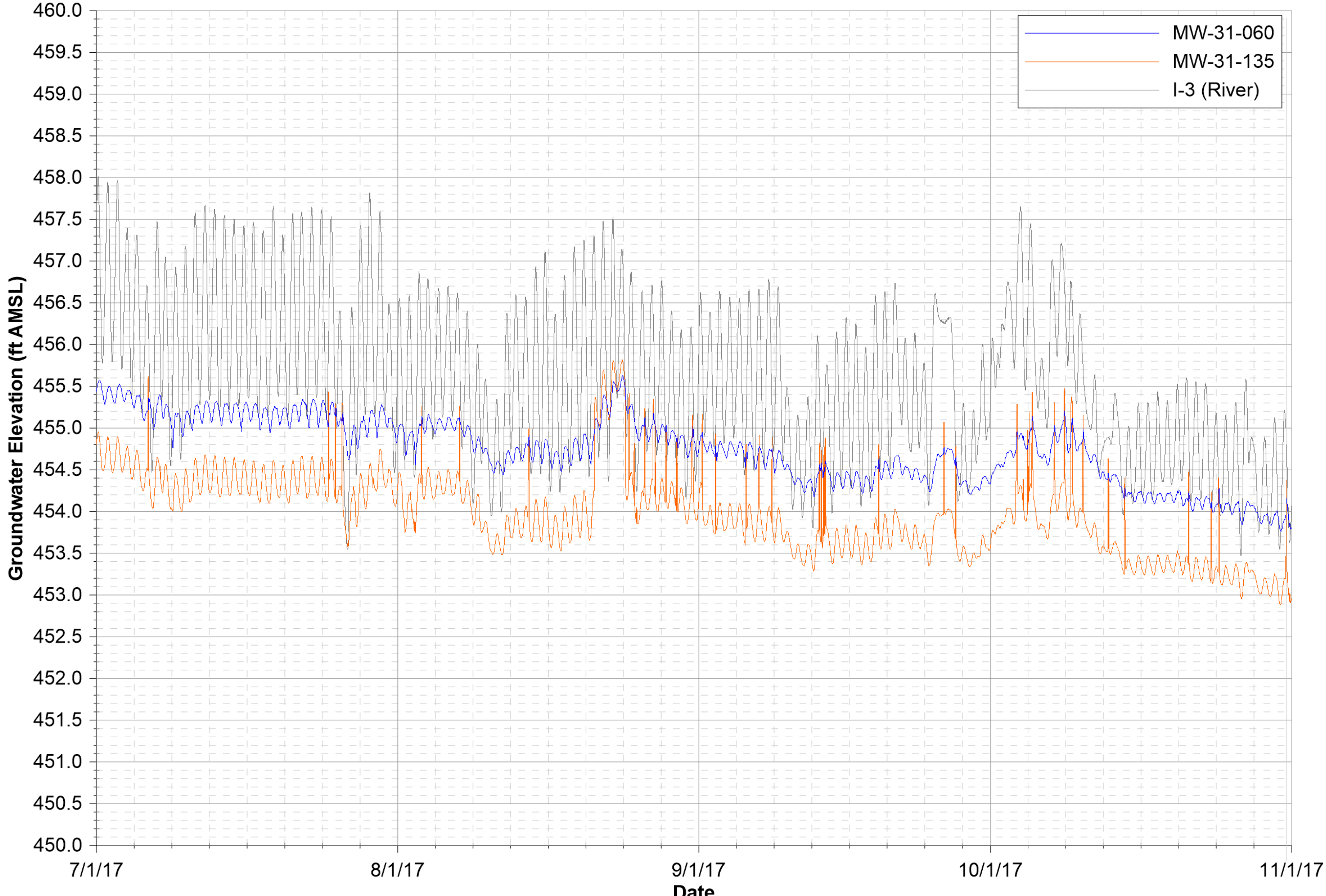


Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1E
MW-30-050 HYDROGRAPH
THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS



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

FIGURE F-1F

MW-31 CLUSTER HYDROGRAPHS

THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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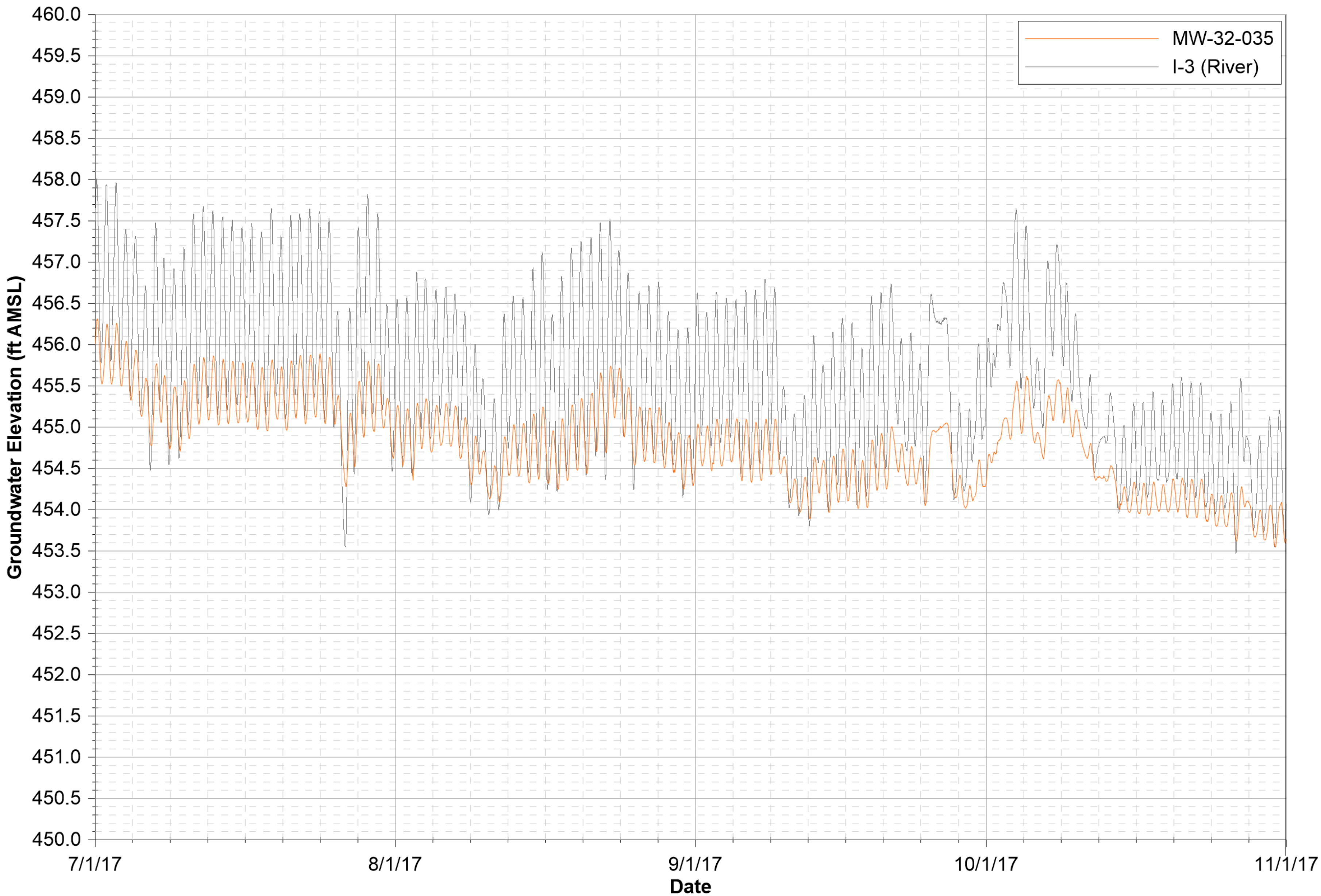

Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1G
MW-32 HYDROGRAPH

THIRD QUARTER 2017 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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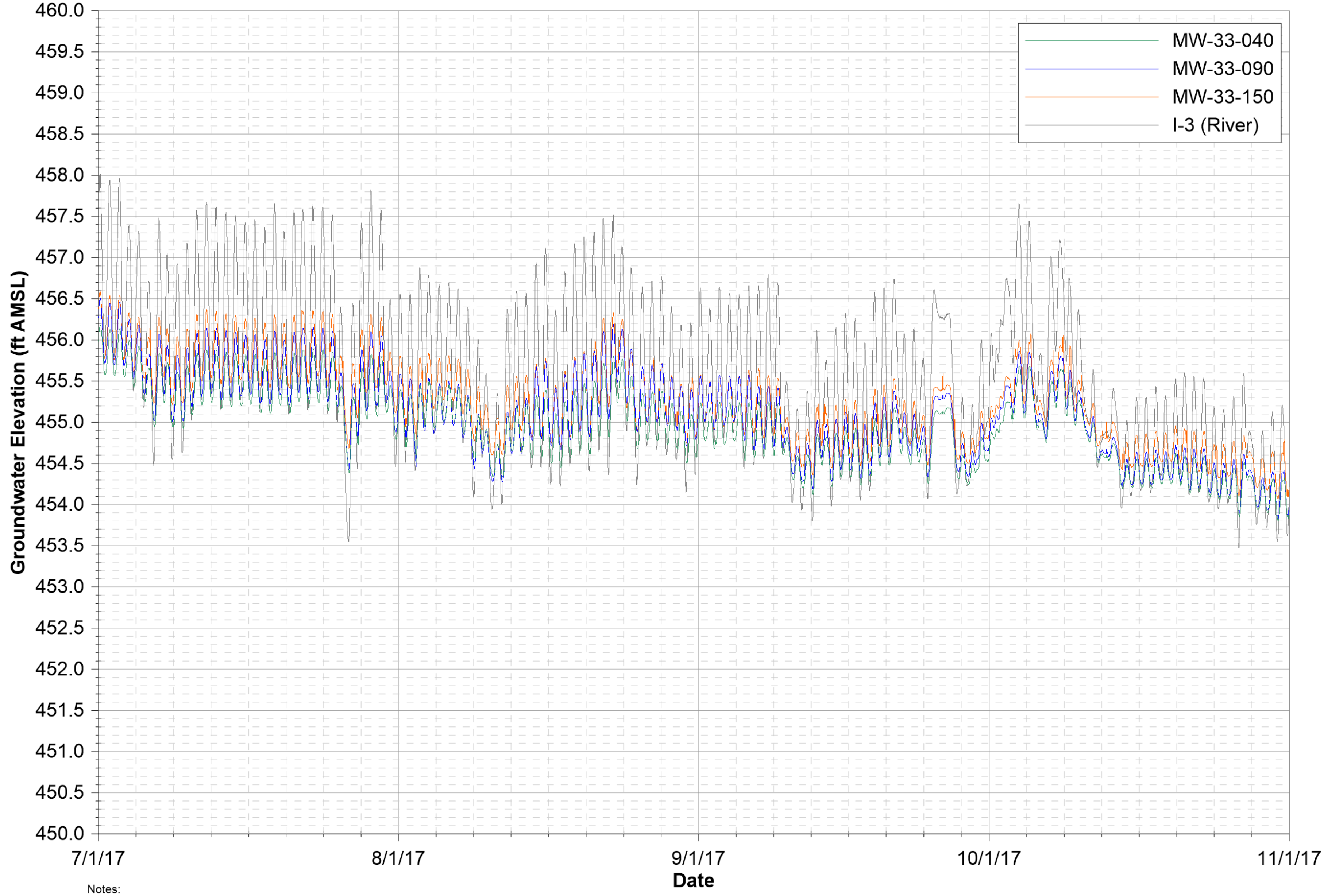


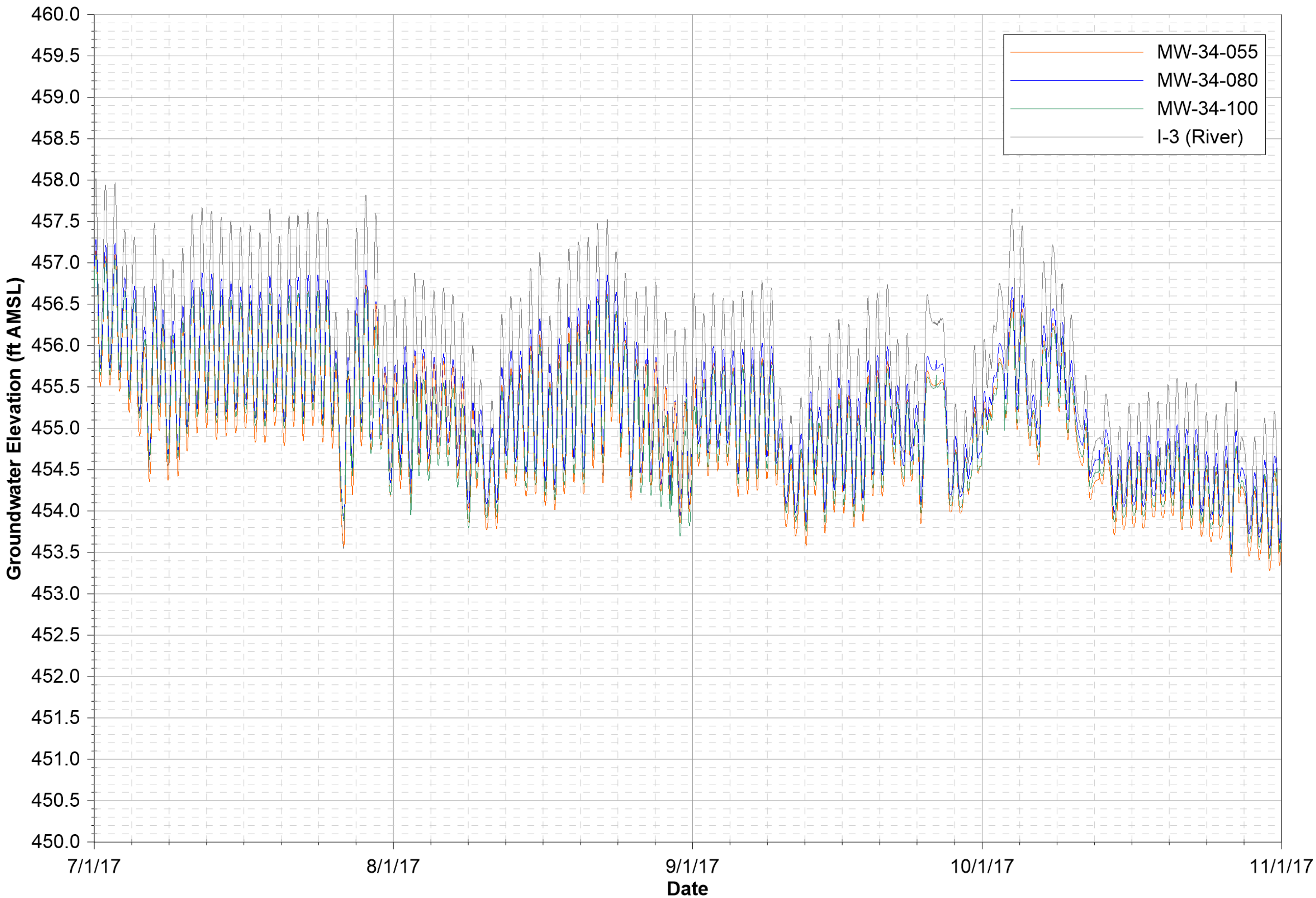
Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1H

MW-33 CLUSTER HYDROGRAPHS

THIRD QUARTER 2017 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

THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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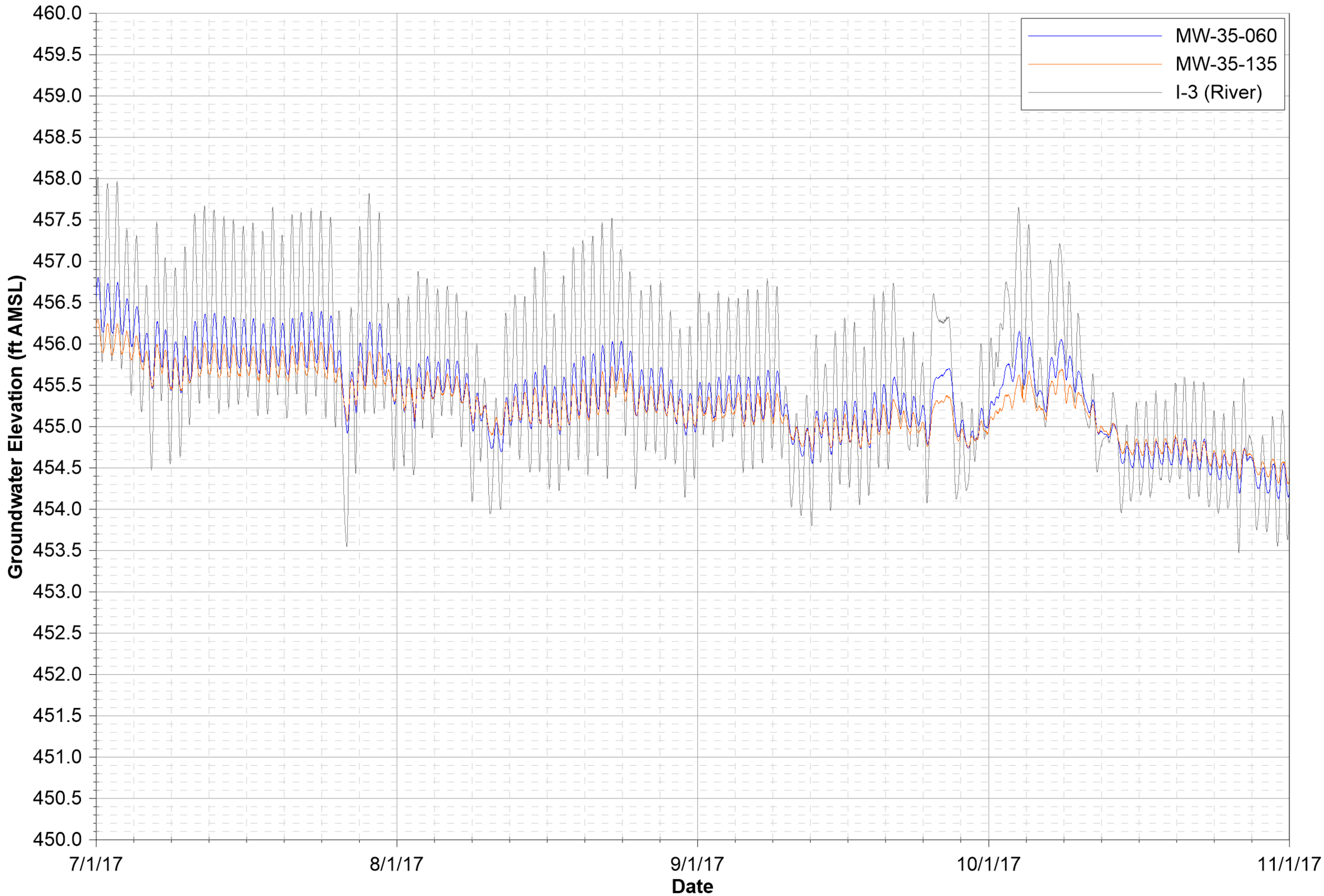

Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1J
MW-35 CLUSTER HYDROGRAPHS
THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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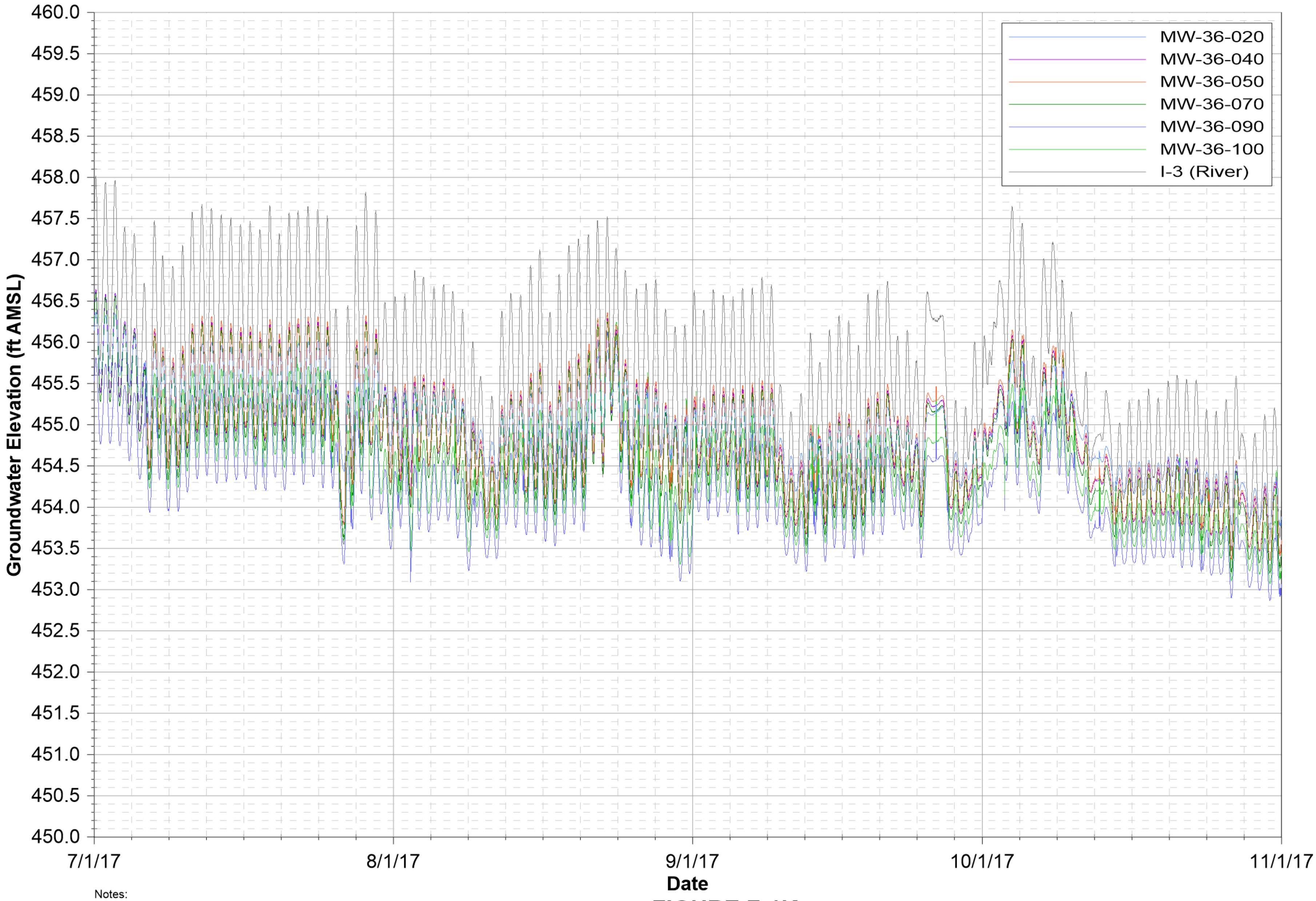

Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1K
MW-36 CLUSTER HYDROGRAPHS
THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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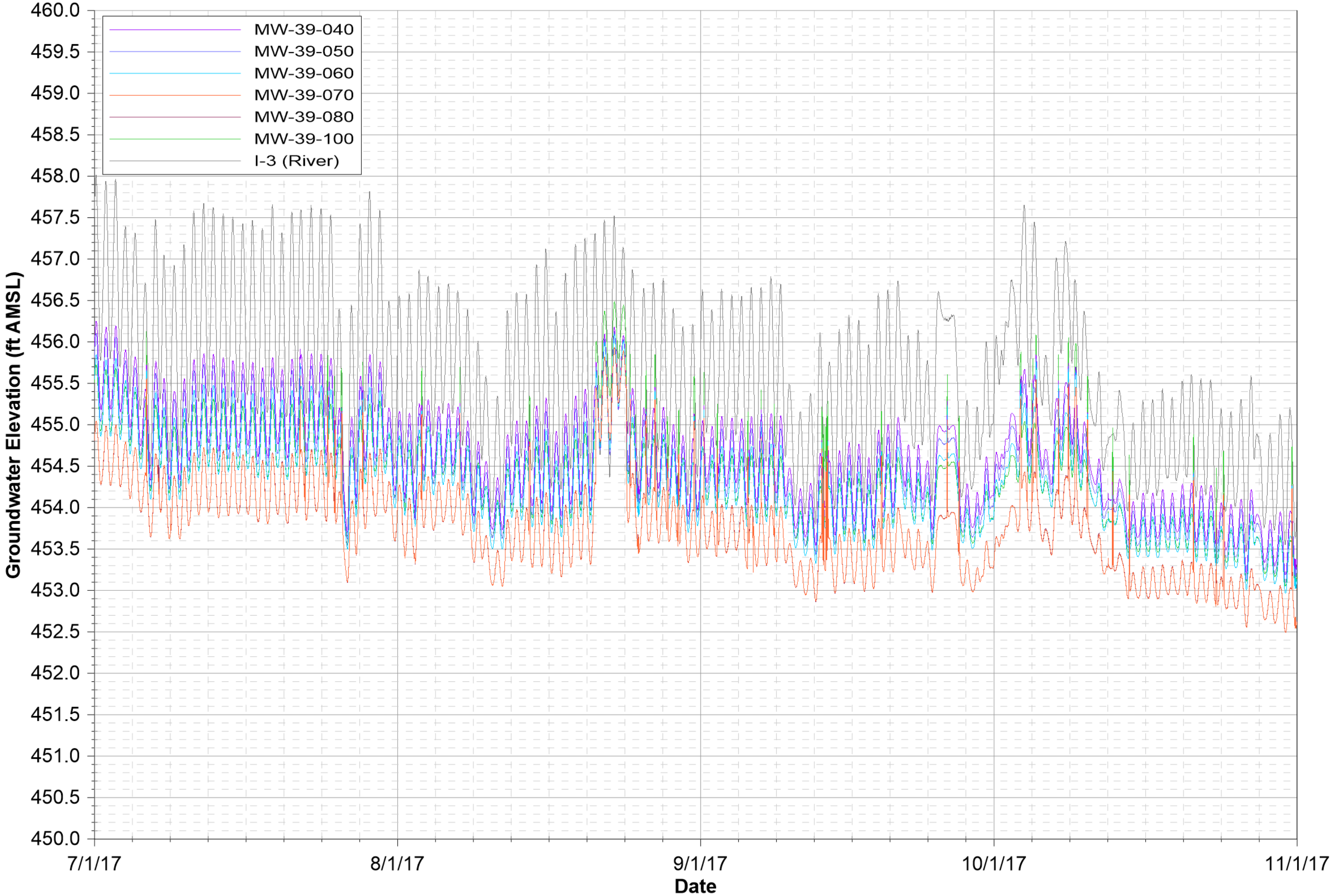

Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1L
MW-39 CLUSTER HYDROGRAPHS

THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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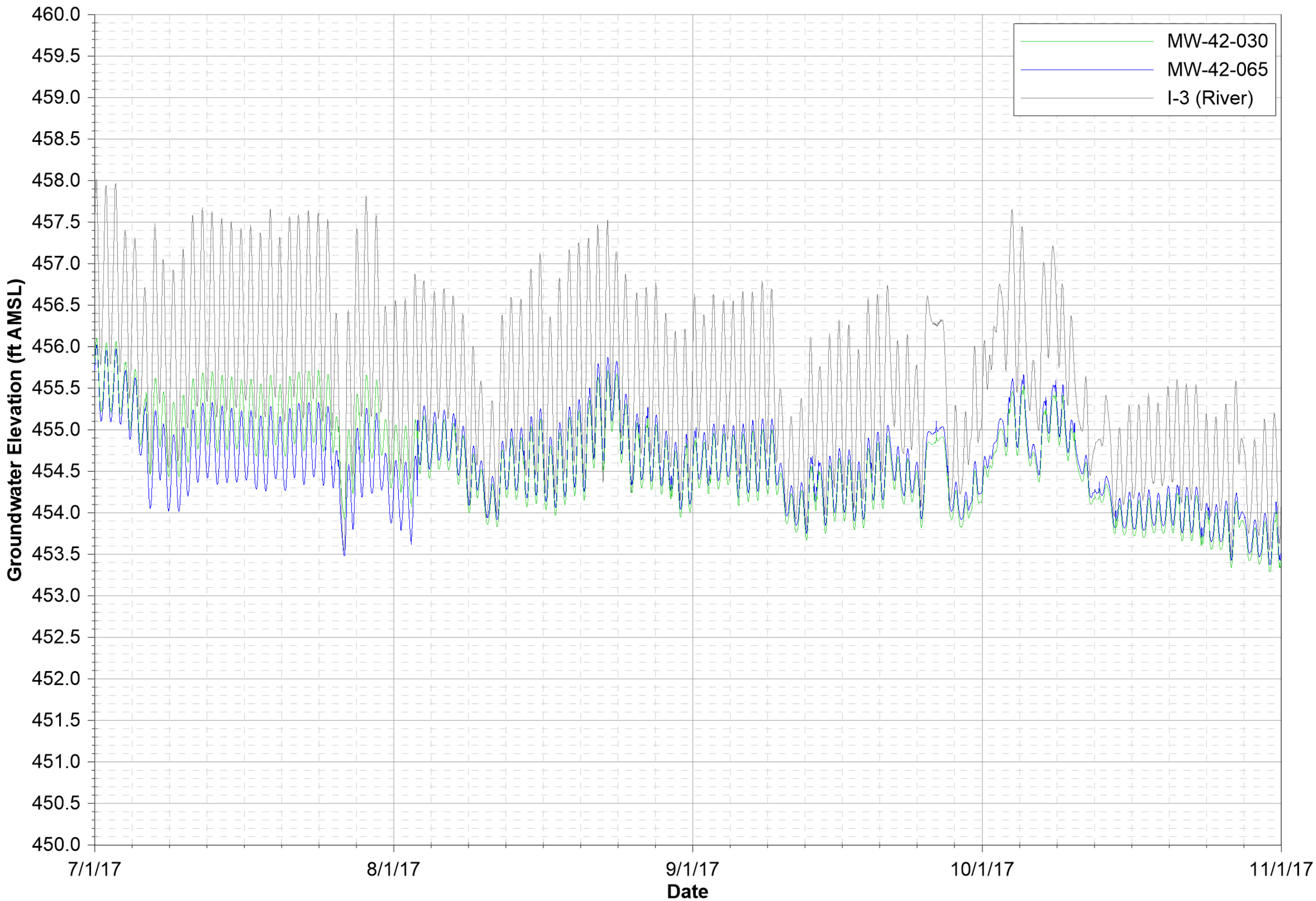

FIGURE F-1M
MW-42 CLUSTER HYDROGRAPHS

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

THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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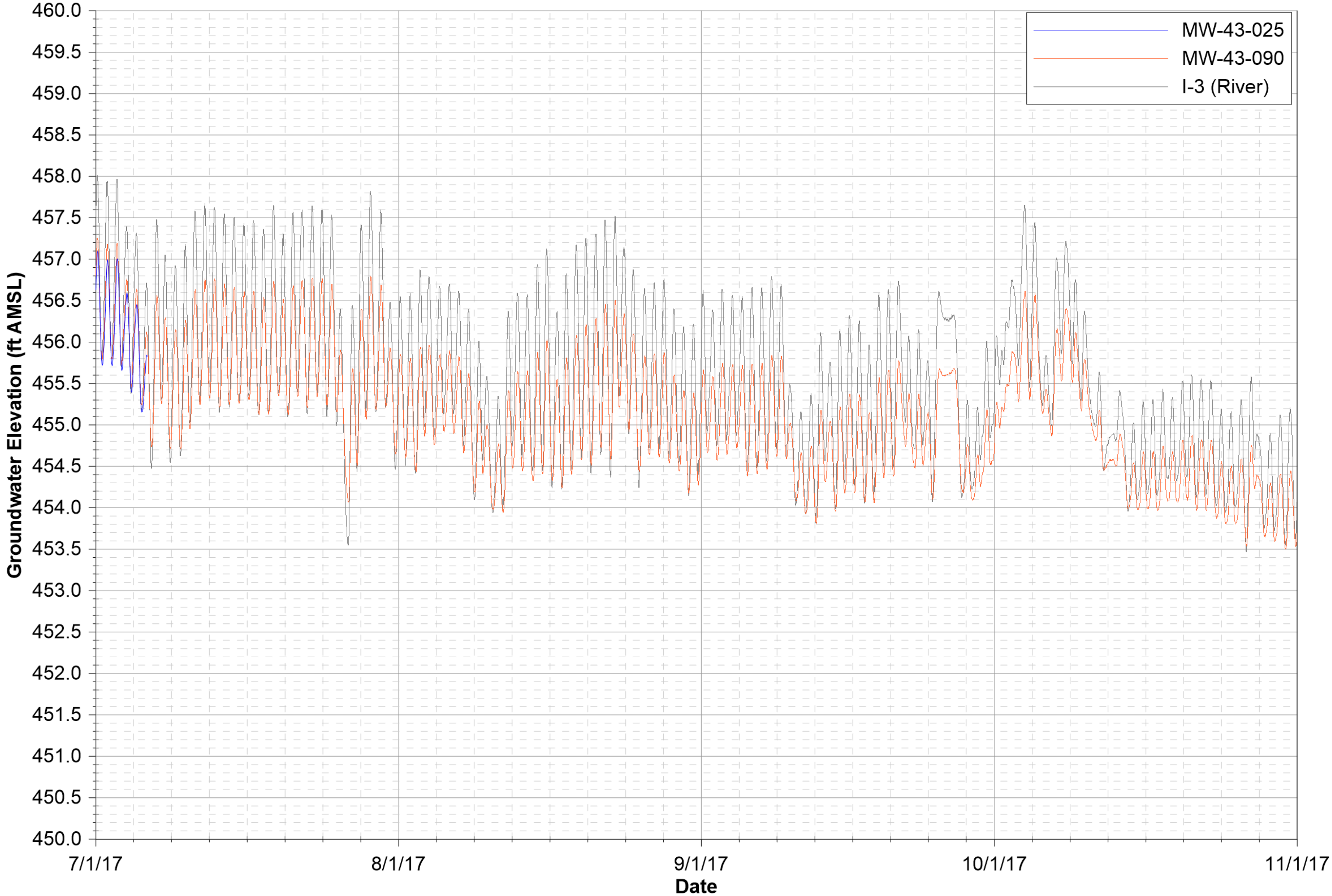


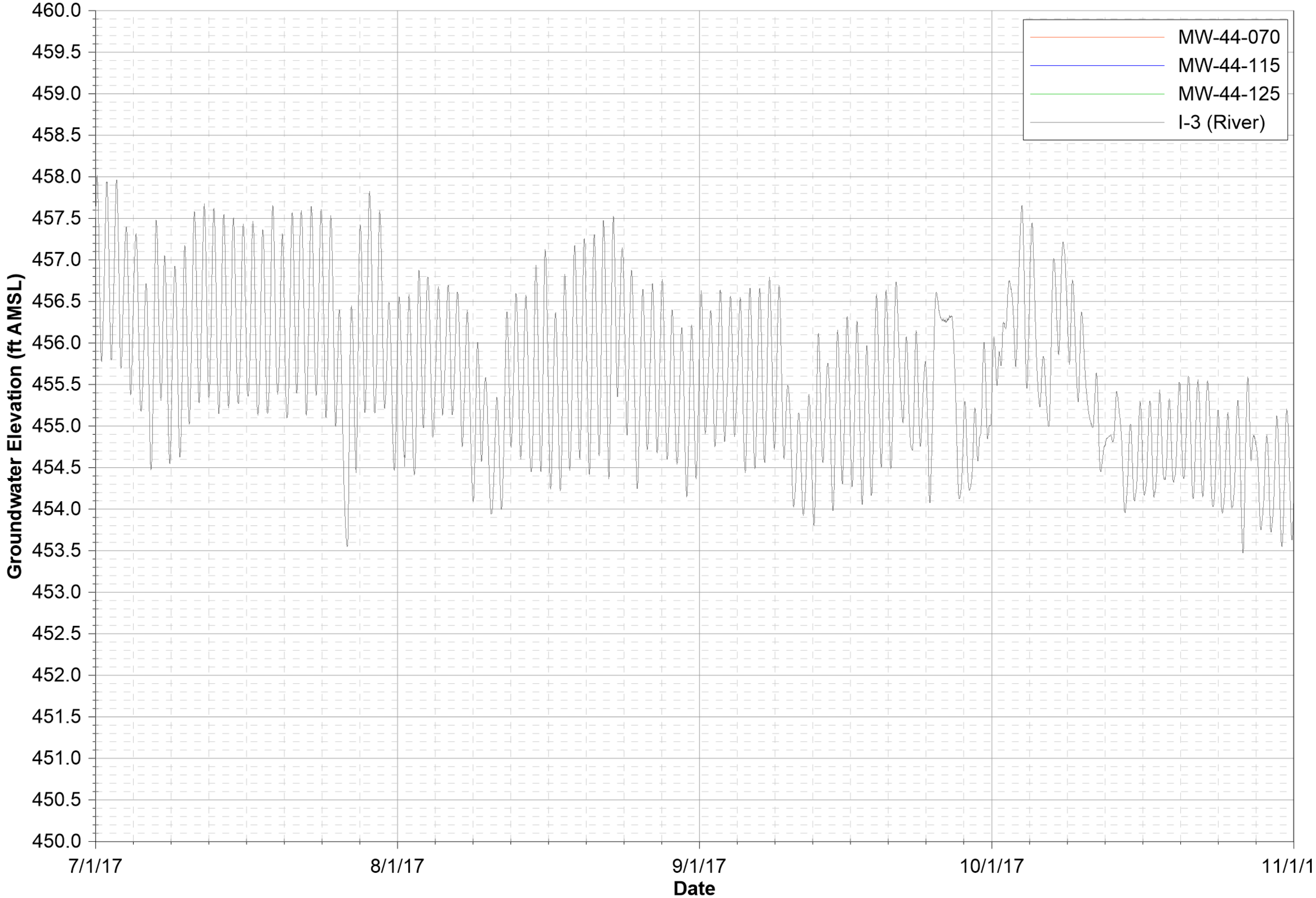
Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.
3. MW-43-025 data unavailable from July 6, 2017 through October 31, 2017 due to transducer malfunction.

FIGURE F-1N

MW-43 CLUSTER HYDROGRAPHS

THIRD QUARTER 2017 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-44-070, MW-44-115, and MW-44-125 data unavailable from July 1, 2017 through October 31, 2017 due to transducer malfunction.

FIGURE F-1O

MW-44 CLUSTER HYDROGRAPHS

THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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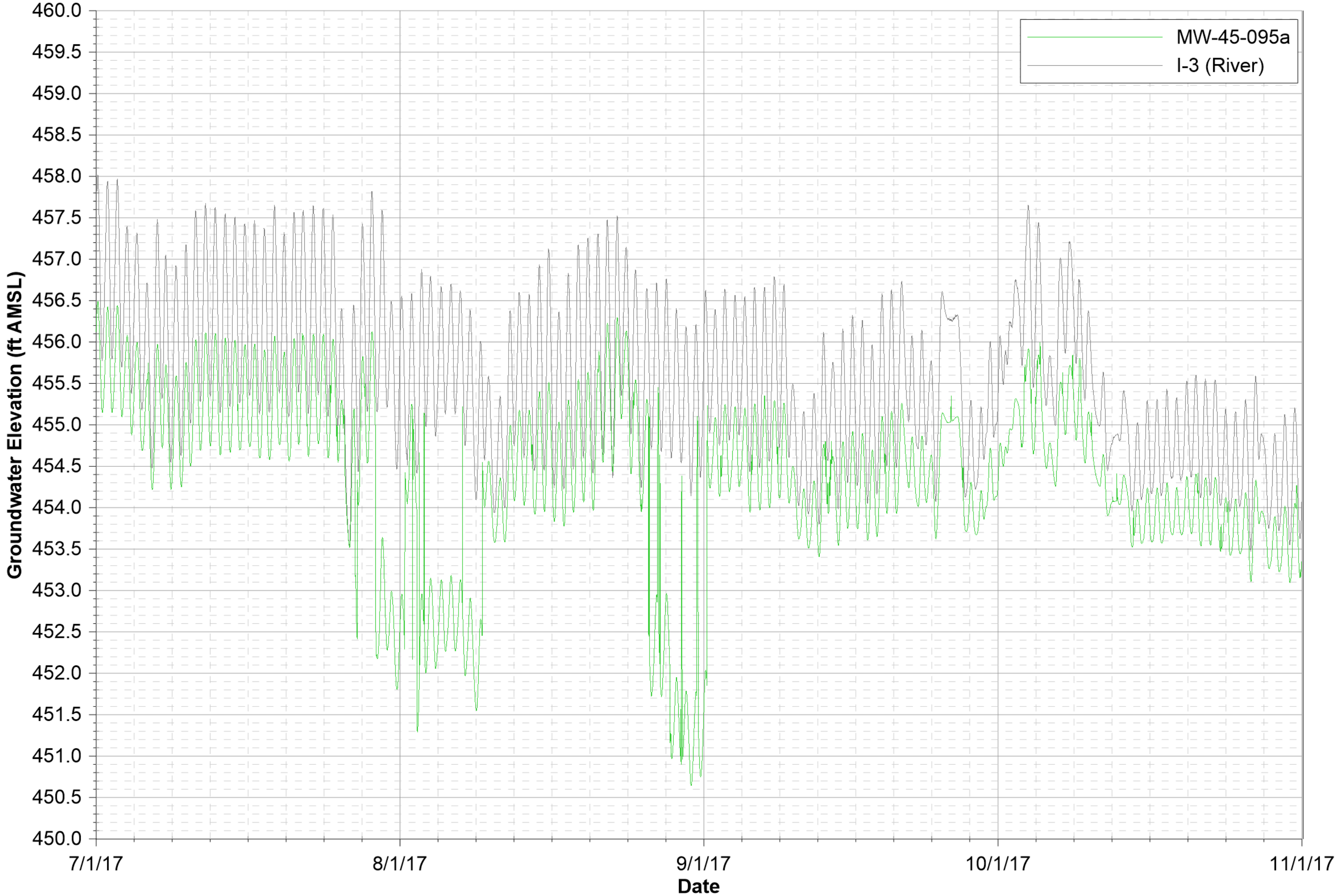

Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1P
MW-45-095a HYDROGRAPH
THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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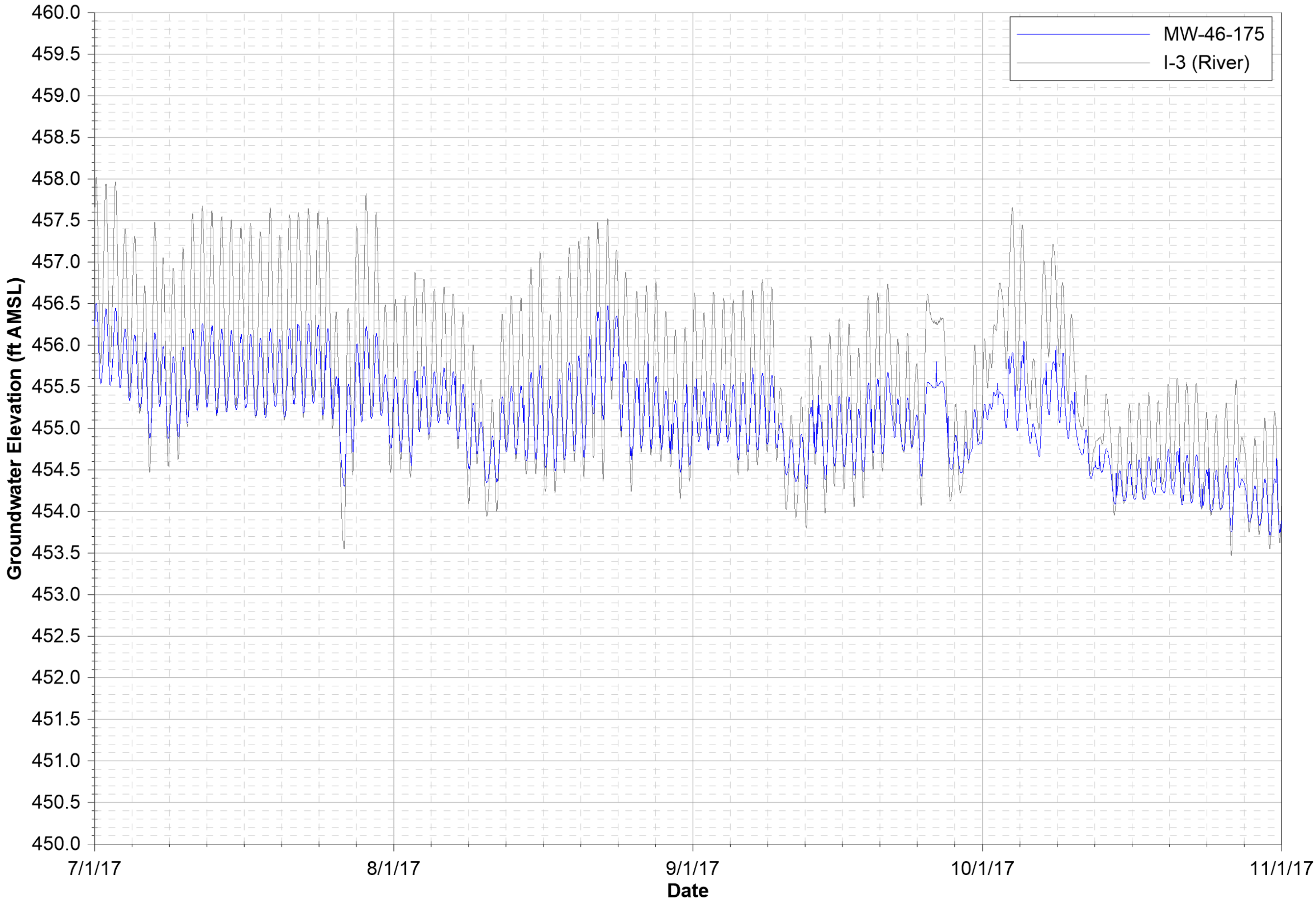

Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1Q
MW-46 HYDROGRAPH

THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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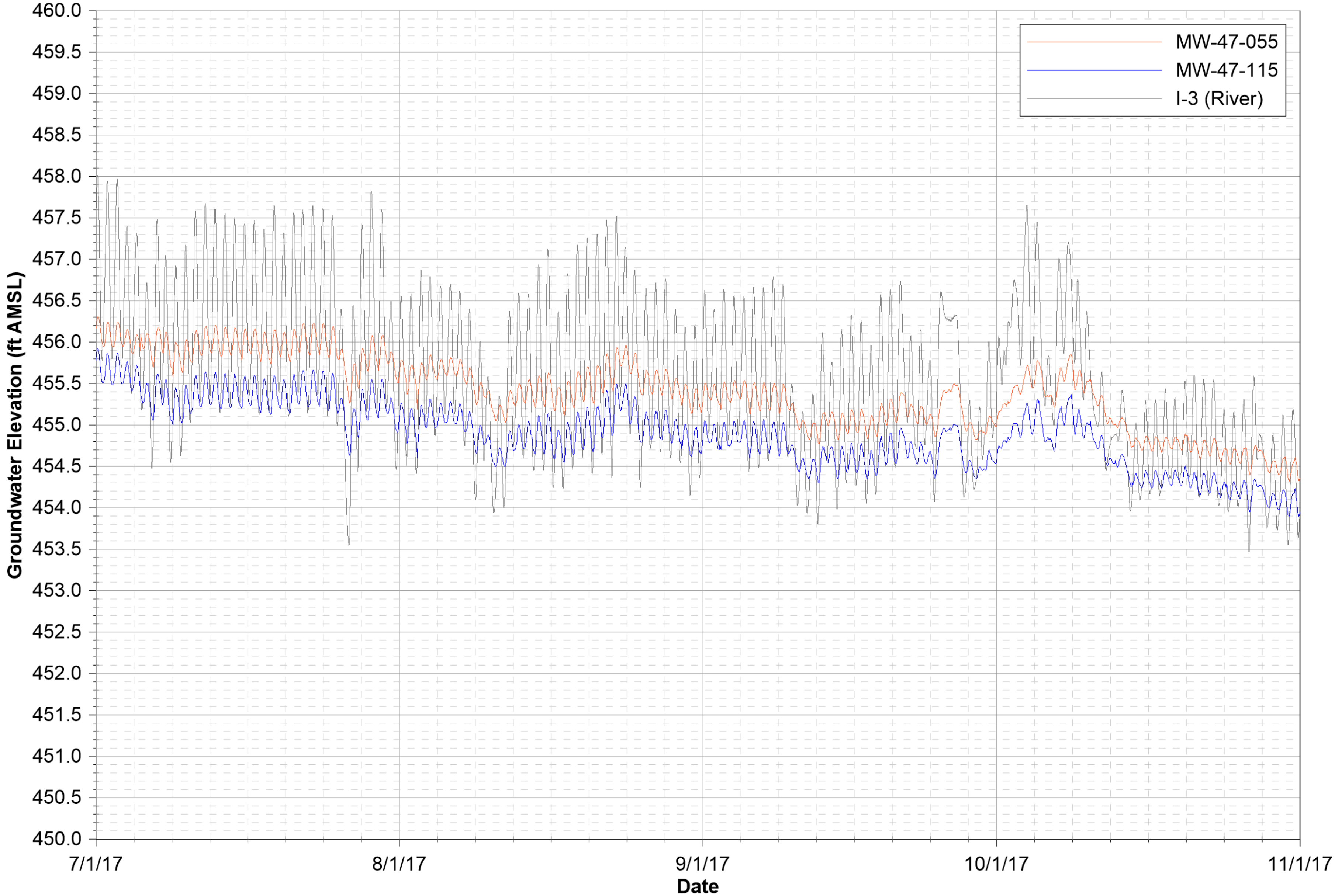

Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1R
MW-47 CLUSTER HYDROGRAPHS
THIRD QUARTER 2017 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-1S
MW-49 HYDROGRAPH
THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS

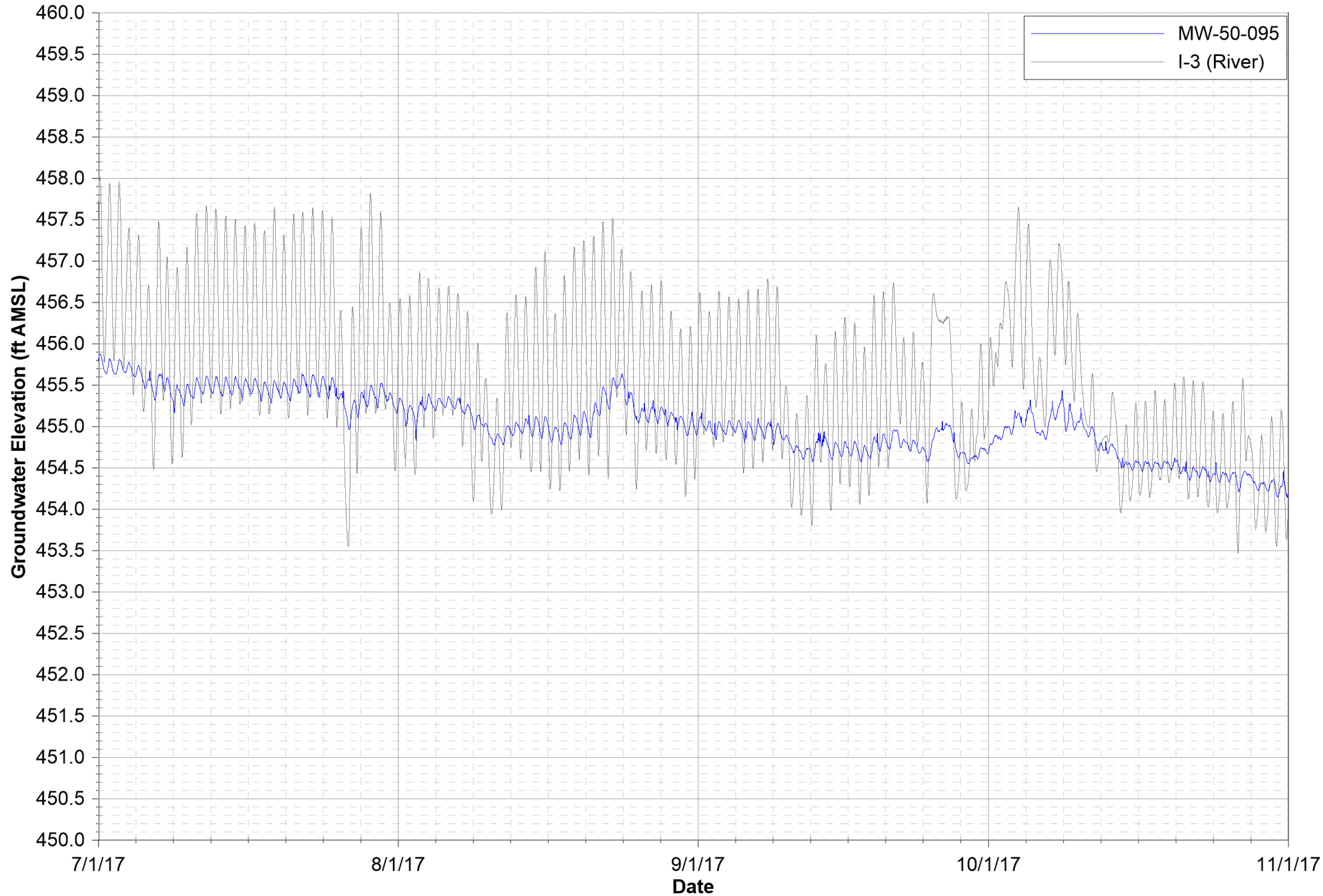

FIGURE F-1T

MW-50 HYDROGRAPH

THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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

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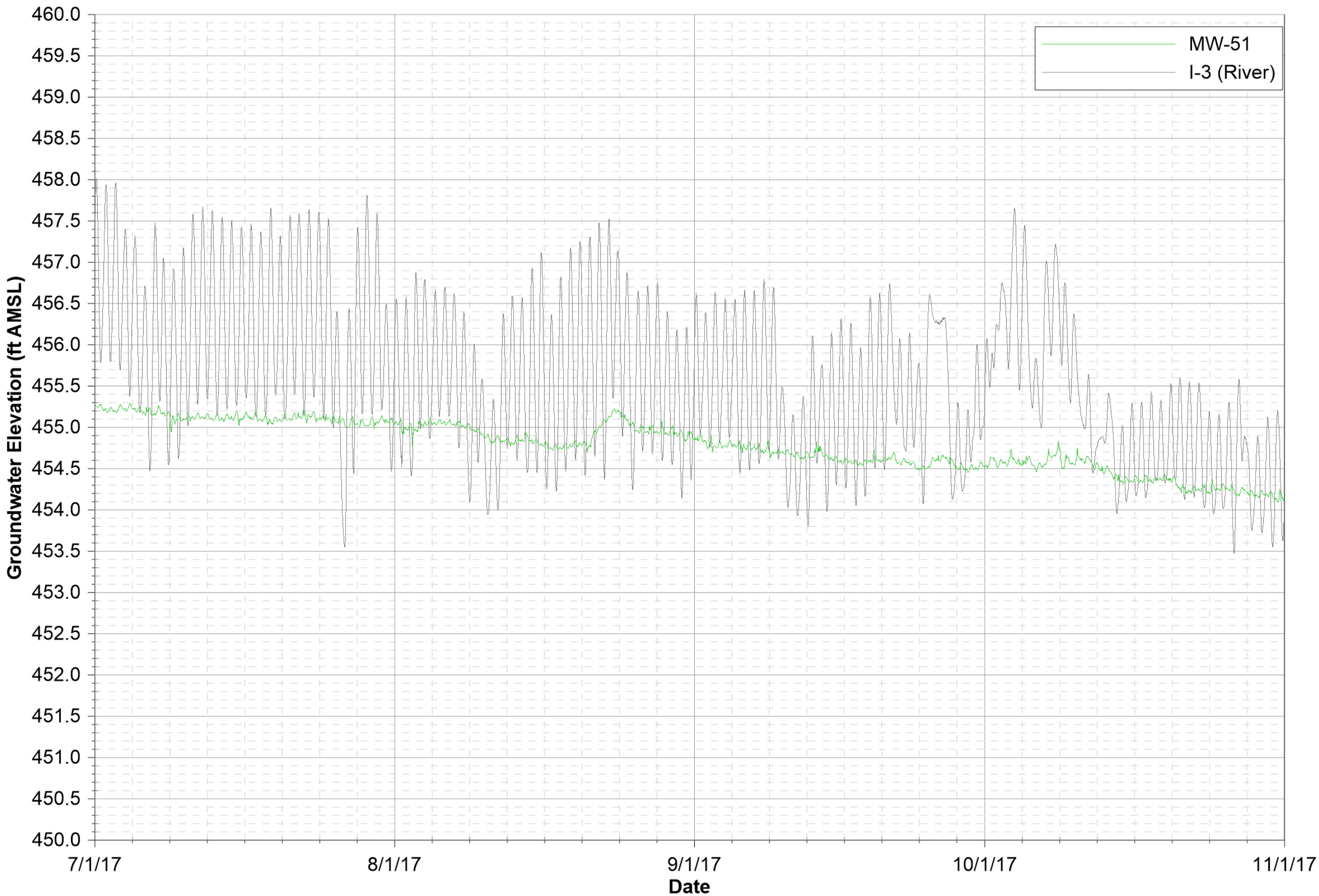

Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1U
MW-51 HYDROGRAPHS
THIRD QUARTER 2017 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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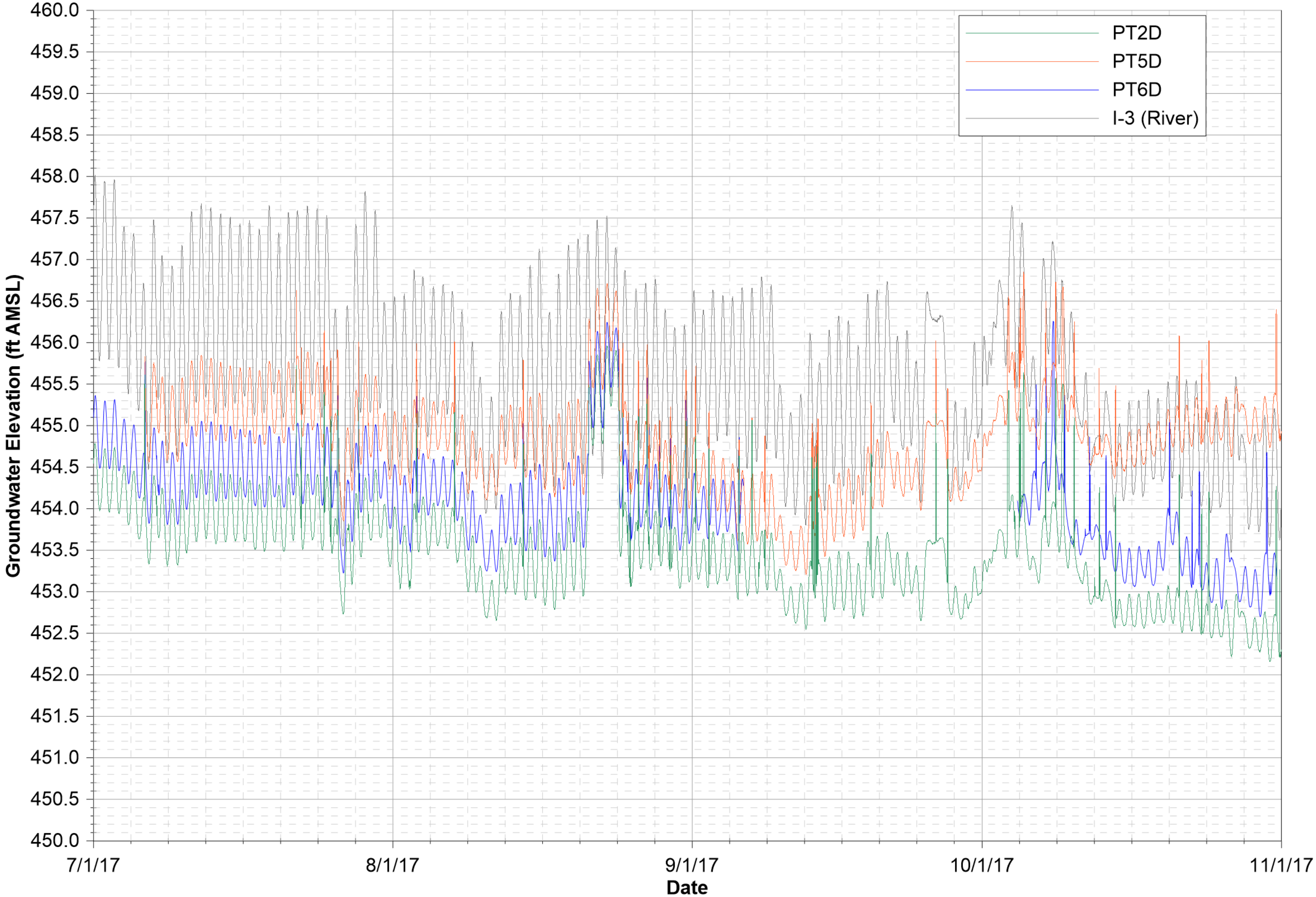

Note:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.
3. PT6D data unavailable from September 6, 2017 through October 3, 2017 due to transducer malfunction.

FIGURE F-1V
INSITU PILOT STUDY WELL HYDROGRAPHS

THIRD QUARTER 2017 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, Third Quarter 2017

Third Quarter 2017 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles, California

Well ID	Aquifer Zone	July 2017	August 2017	September 2017	October 2017	Quarter Average	Days in Quarter Average
I-3	River Station	456.22	455.59	455.38	455.15	454.67	123
MW-20-070	Shallow Zone	INC	453.91	453.42	453.25	INC	90
MW-20-100	Middle Zone	453.49	453.45	452.85	452.69	453.12	123
MW-20-130	Deep Zone	453.00	453.05	452.36	452.21	452.66	123
MW-22	Shallow Zone	INC	INC	INC	INC	INC	6
MW-25	Shallow Zone	455.84	INC	INC	454.97	INC	63
MW-26	Shallow Zone	455.48	455.27	454.99	454.84	455.15	123
MW-27-020	Shallow Zone	455.77	455.13	454.93	454.76	455.15	123
MW-27-060	Middle Zone	455.69	455.06	454.84	454.67	455.07	123
MW-27-085	Deep Zone	455.66	455.04	454.80	454.63	455.03	123
MW-28-025	Shallow Zone	455.67	455.04	454.81	454.62	455.03	123
MW-28-090	Deep Zone	455.54	454.97	454.71	454.52	454.94	123
MW-30-050	Middle Zone	455.27	454.75	454.47	454.30	454.70	123
MW-31-060	Shallow Zone	455.18	454.89	454.52	454.35	454.74	123
MW-31-135	Deep Zone	454.39	454.20	453.74	453.57	453.98	123
MW-32-035	Shallow Zone	455.38	454.84	454.53	454.42	454.79	123
MW-33-040	Shallow Zone	455.46	455.01	454.73	454.61	454.96	123
MW-33-090	Middle Zone	455.63	455.17	454.89	454.69	455.09	123
MW-33-150	Deep Zone	455.81	455.32	455.01	454.91	455.27	123
MW-34-055	Middle Zone	455.62	455.01	454.78	454.58	455.00	123
MW-34-080	Deep Zone	455.85	455.21	455.01	454.81	455.22	123
MW-34-100	Deep Zone	455.71	454.96	454.82	454.65	455.03	123
MW-35-060	Shallow Zone	455.96	455.39	455.17	454.95	455.37	123
MW-35-135	Deep Zone	455.75	455.30	455.06	454.92	455.26	123
MW-36-020	Shallow Zone	455.50	455.00	454.73	454.61	454.96	123
MW-36-040	Shallow Zone	455.43	454.88	454.63	454.46	454.85	123
MW-36-050	Middle Zone	455.39	454.91	454.67	454.49	454.84	118
MW-36-070	Middle Zone	455.35	454.78	454.53	454.35	454.76	123
MW-36-090	Deep Zone	454.74	454.22	454.05	453.88	454.22	123
MW-36-100	Deep Zone	454.93	454.45	454.28	454.09	454.42	118
MW-39-040	Shallow Zone	455.18	454.70	454.40	454.21	454.62	123
MW-39-050	Middle Zone	455.04	454.59	454.27	454.10	454.50	123
MW-39-060	Middle Zone	454.85	454.44	454.11	453.94	454.34	123
MW-39-070	Middle Zone	454.23	453.95	453.52	453.36	453.77	123
MW-39-080	Deep Zone	454.23	453.96	453.52	453.37	453.77	123
MW-39-100	Deep Zone	454.81	454.54	454.12	453.94	454.35	123
MW-42-030	Shallow Zone	455.14	454.63	454.37	454.22	454.59	123
MW-42-065	Middle Zone	454.79	454.70	454.48	454.32	454.57	123
MW-43-025	Shallow Zone	INC	INC	INC	INC	INC	6
MW-43-090	Deep Zone	455.83	455.14	454.88	454.72	455.14	123
MW-44-070	Middle Zone	455.46	454.88	454.65	454.47	454.87	123
MW-44-115	Deep Zone	454.93	454.45	454.17	453.95	454.38	123
MW-44-125	Deep Zone	455.50	454.94	454.68	454.50	454.91	123
MW-45-095a	Deep Zone	455.04	453.69	454.38	454.24	454.34	123
MW-46-175	Deep Zone	455.60	455.18	455.01	454.64	455.11	123
MW-47-055	Shallow Zone	455.94	455.49	455.17	454.98	455.40	123
MW-47-115	Deep Zone	455.37	454.95	454.69	454.53	454.88	123

Table F-1

Average Monthly and Quarterly Groundwater Elevations, Third Quarter 2017

Third Quarter 2017 Interim Measures Performance Monitoring and Site-wide
Groundwater and Surface Water Monitoring Report,
PG&E Topock Compressor Station, Needles, California

Well ID	Aquifer Zone	July 2017	August 2017	September 2017	October 2017	Quarter Average	Days in Quarter Average
MW-49-135	Deep Zone	455.94	455.43	455.11	455.02	455.38	123
MW-50-095	Middle Zone	455.47	455.12	454.82	454.66	455.02	123
MW-51	Middle Zone	455.13	454.94	454.65	454.41	454.78	123
MW-54-085	Deep Zone	455.98	455.38	455.06	454.92	455.34	123
MW-54-140	Deep Zone	455.43	454.89	454.68	454.53	454.89	123
MW-54-195	Deep Zone	454.82	454.32	454.04	453.89	454.27	123
MW-55-045	Middle Zone	INC	456.18	455.97	455.92	456.11	112
MW-55-120	Deep Zone	INC	456.23	456.03	455.98	456.17	112
PT2D	Deep Zone	453.94	453.67	453.22	453.06	453.48	123
PT5D	Deep Zone	455.15	454.87	454.22	455.04	454.81	118
PT6D	Deep Zone	454.49	454.20	454.04	453.57	454.10	96
RRB	River Station	455.69	455.05	454.85	454.65	454.11	123

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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