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March 15, 2018

Mr. Aaron Yue
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Cypress, CA 90630

Subject: *Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles, California (PGE20170415A)*

Dear Mr. Yue:

Enclosed is the Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles, California, for Pacific Gas and Electric Company's Interim Measures (IMs) Performance Monitoring Program, the Groundwater Monitoring Program, and the Surface Water Monitoring Program for the Topock Project. This report presents the Fourth Quarter (November through December 2017) performance monitoring results for the IM-3 hydraulic containment system, and provides the annual performance evaluation for the 2017 Annual Reporting Period (January through December 2017). This report also presents groundwater and surface water monitoring activities, results, and analyses related to the Groundwater and Surface Water Monitoring Programs during the 2017 Annual 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; July 20, 2015, and August 18, 2017.

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

Sincerely,

A handwritten signature in dark ink, appearing to read 'C. Russell', is written over a light blue circular stamp.

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: Fourth Quarter 2017 and Annual 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: March 15, 2018 Who Created this Document?: (i.e. PG&E, DTSC, DOI, Other) – PG&E
Priority Status: ☐ HIGH ☐ MED ☒ LOW Is this time critical? ☐ Yes ☒ No	Action Required: ☒ Information Only ☐ Review & Comment Return to: _____ By Date: _____ ☐ Other / Explain:
Type of Document: ☐ Draft ☒ Report ☐ Letter ☐ Memo ☐ 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:
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.	Is this a Regulatory Requirement? ☒ Yes ☐ No If no, why is the document needed?
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 Fourth Quarter 2017 and the 2017 Annual 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 November 1, 2017 through December 31, 2017. The average pumping rate for the IM extraction system during Fourth Quarter 2017 was 132.1 gallons per minute, and an estimated 82.7 pounds (37.5 kilograms) of chromium were removed in October, November, and December 2017. To date, the IM extraction system has removed 9,100 pounds (4,130 kilograms) of chromium. Written by: PG&E	

Recommendations:

Updated recommendations for sampling method trials presented in Section 7. Additional “pending” recommendations from previous reports also provided in Section 7.

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

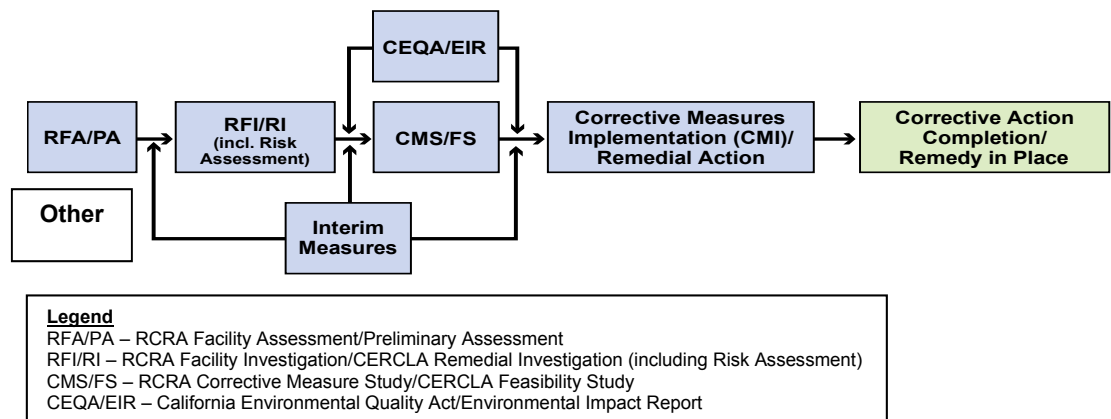
This report is required by DTSC as part of the Interim Measures Performance Monitoring Program.

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).

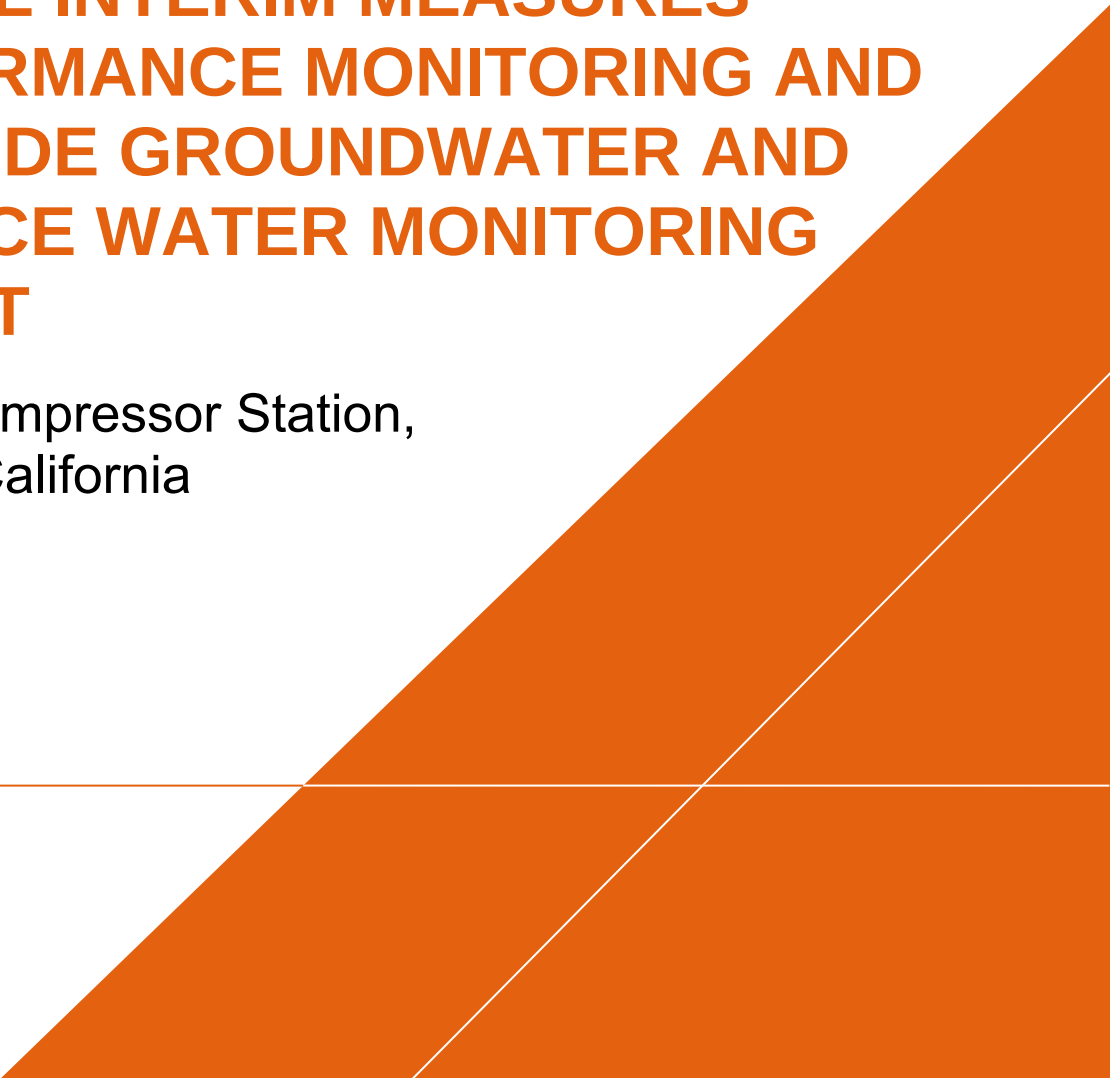


Pacific Gas and Electric Company

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

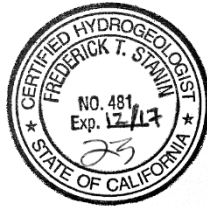
Topock Compressor Station,
Needles, California

March 15, 2018

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

This report was prepared under the supervision of a
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**FOURTH QUARTER
2017 AND ANNUAL
INTERIM MEASURES
PERFORMANCE
MONITORING AND
SITE-WIDE
GROUNDWATER AND
SURFACE WATER
MONITORING REPORT**

PG&E Topock Compressor Station,
Needles, California

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March 15, 2018

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

TABLE OF CONTENTS

Executive Summary.....	ES-1
1 Introduction.....	1
1.1 2017 Regulatory Communication	2
1.2 History of Groundwater Impact at the Site	3
1.2.1 Cr(VI) Impacts to Groundwater	3
1.2.2 Background Concentrations of Cr(VI).....	3
1.3 Site-wide Groundwater and Surface Water Monitoring Programs	3
1.3.1 Basis for GMP and RMP Programs	3
1.3.2 GMP and RMP Sampling Networks.....	4
1.4 Interim Measure Performance Monitoring Program	4
1.4.1 Basis for PMP Program	4
1.4.2 PMP – Aquifer Hydraulics	5
1.4.3 PMP Monitoring Network	5
1.4.3.1 IM Extraction Wells	6
1.4.3.2 IM Hydraulic Monitoring Network.....	6
1.4.3.3 IM Contingency Plan Wells	6
1.4.3.4 IM Chemical Performance Monitoring Wells.....	7
1.4.3.5 Wells Monitored for Conditional Shutdown of PE-01.....	7
1.5 Sustainability.....	7
2 Fourth Quarter 2017 Monitoring Activities.....	9
2.1 Groundwater Monitoring Program	9
2.1.1 Monthly Sampling.....	9
2.1.2 Quarterly/Annual Sampling	9
2.1.3 Well Maintenance.....	10
2.1.4 Fourth Quarter Implementation of Alternative Sampling Methods.....	10
2.2 Surface Water Monitoring Program	10
2.3 Performance Monitoring Program	10
3 Fourth Quarter 2017 and Annual Site-wide Groundwater and Surface Water Monitoring Program Evaluations	12

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

3.1	Groundwater Results for Cr(VI) and Dissolved Chromium	12
3.1.1	Fourth Quarter Groundwater Results for Cr(VI) and Dissolved Chromium	12
3.1.2	Annual Evaluation of Groundwater Results for Cr(VI) and Dissolved Chromium.....	12
3.2	Other Groundwater Monitoring Results.....	14
3.2.1	Fourth Quarter and Annual Constituents of Potential Concern and In Situ Byproducts Evaluation	15
3.2.2	Fourth Quarter and Annual Arsenic Sampling in Monitoring Wells	16
3.2.3	Fourth Quarter and Annual Title 22 Metals Sampling.....	16
3.2.4	Annual Laboratory-Specific Conductance Results	16
3.2.5	Annual Water Level Monitoring.....	16
3.3	Fourth Quarter and Annual Surface Water Evaluation for Cr(VI) and Dissolved Chromium	17
3.4	Fourth Quarter Data Validation and Completeness	17
3.5	Annual Evaluation of Alternative Sampling Methods.....	18
3.5.1	Existing Sampling Method Trials at MW-38 and MW-40	18
3.5.2	Expanded Sampling Method Trials at Additional Wells Starting Fourth Quarter 2017..	19
3.6	Summary of 2017 Groundwater Monitoring Program and Surface Water Monitoring Program Results.....	20
4	Fourth Quarter Interim Measures Performance Monitoring Program Evaluation.....	22
4.1	Water Quality Results for Performance Monitoring Program Floodplain Wells	22
4.2	Cr(VI) Distribution and Trends in Performance Monitoring Program Wells	22
4.3	Performance Monitoring Program Contingency Plan Cr(VI) Monitoring	23
4.3.1	Chromium Concentrations in IMCP Wells.....	23
4.3.2	Chromium Concentrations in Wells Monitored for Conditional Shutdown of PE-01	23
4.4	Fourth Quarter Extraction Systems Operations	24
4.5	Hydraulic Gradient and River Levels during Quarterly Period	25
4.6	Projected River Levels during Next Quarter	26
4.7	Quarterly Performance Monitoring Program Evaluation Summary	27
5	Annual Performance Monitoring Program Evaluation	28
5.1	Extraction System Operations for Annual Reporting Period	28
5.1.1	Extraction Facilities and Operations	28
5.1.2	Extracted Groundwater Quality and Trends	28

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

5.2	Capture Zone Analysis for Annual Reporting Period.....	29
5.2.1	Updates to the Program in 2017	29
5.2.2	Monthly Average Gradients	29
5.2.3	Annual Average Gradients	30
5.2.4	Analysis and Evaluation of Capture Zone.....	30
5.2.4.1	Well Group Gradient Averaging.....	30
5.2.4.2	Particle Track Analysis.....	30
5.3	Evaluation of Groundwater Quality Trend	31
5.3.1	Cr(VI) Distribution and Trends	31
5.3.2	Groundwater Geochemistry in Interim Measures Extraction Area	32
5.3.2.1	Oxidation-Reduction Potential Evaluation	32
5.3.2.2	General Chemistry Evaluation	32
5.3.2.3	Stable Isotope Evaluation	32
5.4	Summary, Conclusions, and Status of Interim Measures Operations.....	33
5.4.1	Performance Evaluation.....	33
5.4.1.1	Attainment of Performance Standard	33
5.4.1.2	Cr(VI) Distribution and Trends	33
5.4.2	Status of Operations and Maintenance.....	34
6	Upcoming Operation and Monitoring Events	35
6.1	Groundwater Monitoring Program	35
6.1.1	Monthly Monitoring.....	35
6.1.2	Quarterly Monitoring.....	35
6.1.3	Well Inspections.....	35
6.1.4	Sampling Method Trials	35
6.2	Surface Water Monitoring Program.....	35
6.3	Performance Monitoring Program	36
6.3.1	Extraction	36
6.3.2	PMP Monitoring and Notifications.....	36
6.3.3	Transducer Download	36
6.3.4	Monthly IM-3 Updates	36
7	Recommendations.....	37

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

7.1	Performance Monitoring Program	37
7.1.1	Trigger Levels	37
7.1.2	Suggested Change in Location for Upgradient River Gauging Station (Currently Located at RRB)	37
7.2	Groundwater Monitoring Program	37
7.2.1	Recommendations from the Current Sampling Methods Evaluation	37
7.2.1.1	Recommendations from Sampling Method Trials at MW-38 and MW-40	37
7.2.1.2	Recommendations from Sampling Method Trials at Expanded Well Network	38
7.2.2	Groundwater Monitoring Program Requests under Agency Review	38
8	References	39

TABLES

1-1	Topock Monitoring Reporting Schedule
2-1a	Results of MW-38 and MW-40 Sampling Method Trials through Fourth Quarter 2017
2-1b	Results of Expanded Sampling Method Trials, Fourth Quarter 2017
3-1	Groundwater Sampling Results, September 2016 through December 2017
3-2a	Groundwater COPCs and In Situ Byproducts Sampling Results, January 2017 through December 2017
3-2b	Groundwater COPCs and In Situ Byproducts Sampling Results, Fourth Quarter 2017
3-3	Title 22 Metals Results, January 2017 through December 2017
3-4	Surface Water Sampling Results, January 2017 through December 2017
3-5	COPCs, In Situ Byproducts, and Geochemical Indicator Parameters in Surface Water Samples, January 2017 through December 2017
4-1	Pumping Rate and Extracted Volume for IM System, Fourth Quarter 2017 and Annual 2017
4-2	Average Hydraulic Gradients Measured at Well Pairs, Fourth Quarter 2017
4-3	Predicted and Actual Monthly Average Davis Dam Discharge and Colorado River Elevation at I-3
5-1	Summary of Pumping Rate and Extracted Volume for 2017 Reporting Period
5-2	Analytical Results for Extraction Wells, January 2017 through December 2017
5-3	Calculated Hydraulic Gradients for Well Pairs by Month for 2017 Reporting Period

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

FIGURES

- 1-1 Locations of IM-3 Facilities and Monitoring Locations
- 1-2 Monitoring Locations and Sampling Frequency for GMP
- 1-3 Monitoring Locations and Sampling Frequency for RMP
- 1-4 Locations of Wells and Cross Sections Used for IM Performance Monitoring
- 3-1a Cr(VI) Sampling Results, Shallow Wells in Alluvial Aquifer and Bedrock, Fourth Quarter 2017
- 3-1b Cr(VI) Sampling Results, Mid-depth Wells in Alluvial Aquifer and Bedrock, Fourth Quarter 2017
- 3-1c Cr(VI) Sampling Results, Deep Wells in Alluvial Aquifer and Bedrock, Fourth Quarter 2017
- 3-2a Molybdenum Sampling Results, Fourth Quarter 2017
- 3-2b Nitrate Sampling Results, Fourth Quarter 2017
- 3-2c Selenium Sampling Results, Fourth Quarter 2017
- 3-2d Arsenic Sampling Results, Fourth Quarter 2017
- 3-2e Manganese Sampling Results, Fourth Quarter 2017
- 3-3 Groundwater Elevation Map Shallow Zone of the Alluvial Aquifer (Water Table), December 13, 2017
- 4-1 Cr(VI) Concentrations in Alluvial Aquifer and Bedrock, Fourth Quarter 2017
- 4-2 Cr(VI) Concentrations, Floodplain Cross-section B, Fourth Quarter 2017
- 4-3a Average Groundwater Elevations in Shallow Wells and River Elevations, Fourth Quarter 2017
- 4-3b Average Groundwater Elevations in Mid-depth Wells, Fourth Quarter 2017
- 4-3c Average Groundwater Elevations in Deep Wells, Fourth Quarter 2017
- 4-4 Average Groundwater Elevations for Wells in Floodplain Cross-section A, Fourth Quarter 2017
- 4-5 Past and Predicted Future River Levels at Topock Compressor Station
- 5-1 Monthly Combined Pumping Volumes and Percent Uptime, 2017 Reporting Period
- 5-2 Cr(VI) and Total Dissolved Solids Concentrations in Extraction Wells TW-03D and PE-01, 2017 Reporting Period
- 5-3 Measured Hydraulic Gradients, River Elevation, and Pumping Rate, 2017 Reporting Period
- 5-4a Average Groundwater Elevations in Shallow Wells and River Elevations, 2017 Reporting Period
- 5-4b Average Groundwater Elevations in Mid-depth Wells, 2017 Reporting Period
- 5-4c Average Groundwater Elevations in Deep Wells, 2017 Reporting Period

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

- 5-5 Average Groundwater Elevations for Wells in Floodplain Cross-section A, 2017 Reporting Period
- 5-6 Magnitude and Direction of Hydraulic Gradients in Lower Depth Interval during 2017 Annual Period
- 5-7 Cr(VI) Concentration Trends in Selected Performance Monitoring Wells, April 2005 through December 2017
- 5-8 Distribution of Cr(VI), Geochemical Indicator Parameters, and In Situ Byproducts in Floodplain Wells
- 5-9 Distribution of Cr(VI), Geochemical Indicator Parameters, and In Situ Byproducts in Floodplain Wells, Cross-section A, Fourth Quarter 2017
- 5-10 Stable Isotopes of Oxygen and Deuterium, Fourth Quarter 2017

APPENDICES

- A Well Inspections and Construction Information
- B January through December 2017 Field Sampling Forms and November through December 2017 Analytical Lab Reports (Provided on CD Only with Hard Copy Submittal)
- C Chromium, Molybdenum, Nitrate, and Selenium Concentration Graphs and PE-01 Notification Table
- D Other Groundwater Monitoring Results
- E Hydraulic Data for Interim Measures Reporting Period
- F Groundwater Monitoring Data for Groundwater Monitoring Program and Performance Monitoring Program
- G Interim Measures Extraction System Operations Log, Fourth Quarter 2017

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

ACRONYMS AND ABBREVIATIONS

$\delta^2\text{H}$	deuterium
$\delta^{18}\text{O}$	oxygen-18, stable isotope of oxygen
$\mu\text{g/L}$	micrograms per liter
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMP	Compliance Monitoring Program
COPC	constituent of potential concern
Cr(VI)	hexavalent chromium
CWG	Consultative Work 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
MCL	maximum contaminant level
ORP	oxidation-reduction potential
PG&E	Pacific Gas and Electric Company
PMP	Performance Monitoring Program
RCRA	Resource Conservation and Recovery Act
RMP	Surface Water Monitoring Program
RRB	Red Rock Bridge
T22	Title 22
TDS	total dissolved solids
USBR	United States Bureau of Reclamation
USEPA	United States Environmental Protection Agency
UTL	upper tolerance limit

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

EXECUTIVE SUMMARY

This combined quarterly and annual 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 Fourth Quarter 2017 and Annual Reporting Period. The average pumping rate for the IM extraction system during Fourth Quarter 2017 was 132.1 gallons per minute, and an estimated 82.7 pounds (37.5 kilograms) of chromium were removed between October 1, 2017 and December 31, 2017. To date, the IM extraction system has removed 9,100 pounds (4,130 kilograms) of chromium.

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

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 PMP-GMP Monitoring Report (hereinafter referred to as this report) presents the monitoring data collected from PG&E's GMP, RMP, and PMP between November 1, 2017 and December 31, 2017 (hereafter referred to as **Fourth Quarter 2017**; the duration of the monitoring quarters for GMP, PMP, and RMP field data collection was adjusted to minimize floodplain area disturbance during the May through September bird nesting season. Table 1-1 shows the lengthened Third Quarter and shortened Fourth Quarter for these programs).

In addition, this report serves as an annual report and provides a summary of groundwater and surface water monitoring results for samples collected between January 1, 2017 and December 31, 2017 (hereafter referred to as the **Annual Reporting Period**) under the Topock GMP, RMP, and PMP programs. Table 1-1 shows the current reporting schedule for these programs.

This report is divided into the following eight sections:

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

Section 2 describes the Fourth Quarter 2017 monitoring activities and site operations conducted in support of these programs.

Section 3 presents GMP and RMP monitoring results for the Fourth Quarter 2017 (November and December) and Annual Reporting Period.

Section 4 presents PMP monitoring results and the IM evaluation for the Fourth Quarter 2017 (November and December) reporting period.

Section 5 presents the PMP IM evaluation for the Annual Reporting Period.

Section 6 describes upcoming monitoring events for the First Quarter 2018.

Section 7 provides recommendations regarding future monitoring activities.

Section 8 lists the references cited throughout this report.

FOURTH QUARTER 2017 AND ANNUAL INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING 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 2017 Regulatory Communication

PG&E communications with DTSC in 2017 that resulted in updates to the Topock GMP, RMP, or PMP programs are outlined below and described in appropriate sections throughout the report. Section 1.1 has been abbreviated compared to previous annual reports to focus on information from the current reporting cycle and to reduce redundancy throughout the report.

Communication with DTSC in 2017 included:

- Quarterly submittal to DTSC of regular PG&E Topock PMP-GMP Monitoring Reports (PG&E 2017c, 2017e, 2017g), including required GMP/RMP/PMP notifications. Notifications submitted in 2017 included:
 - o Quarterly email notifications were sent in advance of formal reporting from Arcadis (on behalf of PG&E) to DTSC for hexavalent chromium (Cr[VI]) and total dissolved chromium results at four subject floodplain wells (notifications sent March 15, 2017; June 21, 2017; November 8, 2017; and January 30, 2018).
 - o As part of the conditional approval for the shutoff of PE-01, GMP monitoring results from wells listed in the July 20, 2015 DTSC approval letter (DTSC 2015) are compared to the maximum Cr(VI) and dissolved chromium concentrations measured in 2014 (or for biennial sampling frequency, the 2013 maximum concentrations), and results that exceed the previous maximum are required to be reported to DTSC within 40 days after the end of the quarterly GMP sampling event. Sampled wells met this criteria in the Second, Third, and Fourth Quarters of 2017. Arcadis (on behalf of PG&E) subsequently submitted notifications for each of these events to DTSC on June 9, 2017; October 17, 2017; and January 24, 2018 (Arcadis 2017c, 2017e, 2018b).
- DTSC conditionally approved (by email) PG&E's request to adjust key gradient well pairs (i.e., use MW-20-130 instead of MW-45-95 as the landward well in the central and southern key gradient well pairs), when PE-01 is not in operation for gradient control at the site (DTSC 2017b). Modifications to reporting based on this approval are documented throughout this report.
- Two directives were issued by DTSC in 2017 in response to PG&E requests for consideration of proposed changes to sampling methods used at the site. PG&E provided a response memorandum summarizing planned changes to the sampling program. Details of these changes are documented throughout this report.
 - o April 6: A memorandum from DTSC to PG&E provided conditional approval to expand sampling method trials (DTSC 2017a) as a response to changes requested by PG&E in a letter to DTSC in August 2015 (PG&E 2015).
 - o October 20: A memorandum from DTSC to PG&E provided updated conditional approval to expand sampling method trials following discussions with PG&E (DTSC 2017c).
 - o November 30: A memorandum from PG&E to DTSC outlined procedures for changes to the sampling program and expanded sampling method trials in accordance with DTSC communication and directives (PG&E 2017).

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 historical water discharge practices. A comprehensive library documenting the history of remediation at the Topock Compressor Station is available on the DTSC website at: <http://dtsc-topock.com/> (DTSC 2018).

1.2.2 Background Concentrations of Cr(VI)

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

1.3 Site-wide Groundwater and Surface Water Monitoring Programs

1.3.1 Basis for GMP and RMP Programs

The Topock GMP and RMP were initiated as part of a Resource Conservation and Recovery Act (RCRA) and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) facility investigation/remedial investigation 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, Pacific Gas and Electric Company, 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, Pacific Gas and Electric Company, 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 Fourth Quarter 2017 IM monitoring activities conducted from November 1, 2017 through December 31, 2017 and the Annual GMP and RMP Report for 2017.

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

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 16 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.

1.4 Interim Measure Performance Monitoring Program

1.4.1 Basis for PMP Program

In compliance with the requirements for IM monitoring and reporting outlined in the DTSC IM Performance Directive of February 2005, and in subsequent directives from the DTSC in 2007 (DTSC 2005b, 2007a, 2007b, 2007c), this report presents the Fourth Quarter 2017 PMP evaluation results for the IM monitoring activities from November 1, 2017 through December 31, 2017.

The Topock IM project consists of groundwater extraction for hydraulic control of the chromium plume boundaries in the Colorado River floodplain and management of extracted groundwater. The groundwater extraction, treatment, and injection systems are collectively referred to as IM-3. The IM monitors only the Alluvial Aquifer. Currently, the IM-3 facilities include a groundwater extraction system (four extraction wells: TW-02D, TW-03D, TW-02S, and PE-01), conveyance piping, a groundwater treatment plant, and an injection well field for the discharge of the treated groundwater. During Fourth Quarter 2017, extraction wells TW-03D and PE-01 operated (with flow primarily from TW-03D) at a combined pumping rate of 132.1 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, Pacific Gas and Electric Company, Topock Compressor Station, Needles, California

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

(CH2M Hill 2005a; herein referred to as the Performance Monitoring Plan) was submitted to DTSC on April 15, 2005.

The February 2005 DTSC directive also defined the monitoring and reporting requirements for the IM (DTSC 2005b, 2005c). In October 2007, DTSC 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; March 3, 2010; April 28, 2010; July 23, 2010, and June 27, 2014 (DTSC 2007a, 2008a, 2008b, 2010a, 2010b, 2010c, 2014b). On July 20, 2015, DTSC conditionally approved the proposal to modify the IM-3 pumping regime by allowing PE-01 to be shut off and pumping to be shifted to TW-03D and TW-02D or TW-02S, so long as gradient targets are maintained (DTSC 2015). Because PE-01 pumps water with low concentrations of chromium (typically less than 5 µg/L), shifting more pumping to a higher-concentration extraction well can increase the rate of chromium removal from the floodplain. On February 3, 2016, PE-01 was turned off, and the pumping shifted to TW-03D and supplemented by TW-02D. Since this initial shutoff, PE-01 has been operated sparingly in 2016 and 2017 to support gradient control. On August 18, 2017, DTSC conditionally approved (by email) PG&E's request to adjust key gradient well pairs (i.e., use MW-20-130 instead of MW-45-95 as the landward well in the central and southern key gradient well pairs) when PE-01 is not in operation for gradient control at the site (DTSC 2017b). A full accounting of PE-01 operation in 2016 and 2017 has been documented in the quarterly editions of this report (Arcadis 2016b, 2016c, 2016d, 2017a, 2017b, 2017d, 2017f). Operation of PE-01 during Fourth Quarter 2017 is documented in Section 4.3.2 of this report.

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 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 hydraulic gradient measurements, IM chemical performance monitoring, IM groundwater extraction, and the IM Contingency Plan (IMCP). With approval from DTSC, the list of wells included in the PMP was modified beginning August 1, 2008 (PG&E 2008). The PMP wells and monitoring locations are described in the table below.

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

PMP Wells and Monitoring Locations

IM Extraction Wells (4 Wells)

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

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

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

IMCP Wells (24 Wells)

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

Chemical Performance Monitoring Locations (11 wells)

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

1.4.3.1 IM Extraction Wells

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

1.4.3.2 IM Hydraulic Monitoring Network

The IM Hydraulic Monitoring Network consists of 53 wells (shown on Figure 1-4) used to evaluate the performance of the IM and demonstrate compliance of required hydraulic gradients. Section 4.7 of this report presents a summary of the IM hydraulic monitoring results for Fourth 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, results from any sampled IMCP wells are evaluated against their established trigger levels. If any exceedances are observed, a notification

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

process is initiated as outlined in the Revised Contingency Plan Flow Chart (Figure 1; PG&E 2008). Results of IMCP well evaluations following Fourth 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 2017a). Results of the 2017 chemical performance monitoring evaluation are presented in Section 5.3.2 of this report.

1.4.3.5 Wells Monitored for Conditional Shutdown of PE-01

As part of the conditional approval for PE-01 shutoff, GMP monitoring results from wells listed in the July 20, 2015 DTSC approval letter 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 Fourth 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 (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 for Topock to replace the previous 48-hour holding time method. These changes increased field efficiency by reducing the number of sample pickups needed and the overall courier travel time. The use of the DTSC website and electronic report submittal has reduced the number of report hard copies and conserved natural resources. The number of report hard copies has been reduced over the years from 18 to 10 for the annual 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 between 2011 and 2012 at the five key gradient compliance well locations. The telemetry systems are still currently used. The solar-powered data telemetry systems eliminated the need for weekly download visits (reduced mobilizations of off-site

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

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 First Quarter 2018. 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 alluvial screened wells. Low-flow sampling reduced the volume of purge water and sampling footprint at most wells. For wells still using the three-volume purge sampling methods (primarily bedrock and long screened wells), pumps and tubing are sized for the optimum purge technique at each monitoring well. Utility vehicles (e.g., Polaris Ranger or Kawasaki Mule) and one quiet electric four-wheel-drive utility vehicle are used to access wells on the floodplain and in some culturally sensitive areas rather than the full-size pickup truck. These best practices reduce generator use, impacts from well access, and decontamination water volume to further decrease the monitoring footprint. Starting in the Fourth Quarter of 2017, nine additional wells (across multiple programs) were switched to low-flow sampling. In addition, well trials began at 16 new wells, where positive trials could result in even more wells switching to low-flow sampling in the near future. More recently, on July 20, 2015, DTSC conditionally approved a modification to the IM-3 pumping regime by allowing 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 FOURTH QUARTER 2017 MONITORING ACTIVITIES

This section summarizes the monitoring and sampling activities completed during Fourth Quarter 2017 for the GMP, RMP, and PMP. This section also includes results of sampling method trials at select wells.

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 November and December 2017 and was analyzed for Cr(VI), dissolved chromium, total dissolved solids (TDS), pH, and several additional analytes.

2.1.2 Quarterly/Annual Sampling

The Fourth Quarter 2017 GMP groundwater monitoring event was conducted between December 4 and December 15, 2017, and included sampling from 128 groundwater monitoring wells. No samples were collected at highway median well cluster MW-40 due to ongoing access concerns, and no samples were collected at compressor station well cluster MW-68 due to a tank temporarily blocking access to the wells. A make-up sampling event was carried out at the MW-68 cluster in First Quarter 2018, and sampling at MW-40 is planned to resume in Second Quarter 2018, once contracting has been finalized with an approved traffic-control vendor.

Samples from Fourth Quarter 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:

- California Code of Regulations Title 22 (T22) metals analyses (including arsenic) at ten alluvial wells (MW-10, MW-12, MW-14, MW-22, MW-24A, MW-24B, MW-26, MW-35-060, MW-35-135, and MW-59-100)
- 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
- Constituents of potential concern (COPCs), including molybdenum, nitrate/nitrite as nitrogen (referred to as nitrate hereafter), selenium, and potential in situ byproducts (manganese, iron, and arsenic) from a subset of wells (DTSC 2010c, 2011, 2015).

As part of baseline sampling in support of the groundwater remedy design, select monitoring wells were analyzed for additional non-routine parameters during the Fourth Quarter 2017 monitoring event.

Sample analysis included chloride, sulfate, bromide, calcium, magnesium, potassium, sodium, boron, alkalinity, TDS, and stable isotopes of oxygen ($\delta^{18}\text{O}$) and deuterium ($\delta^2\text{H}$).

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

Results and conclusions from the Fourth Quarter 2017 and annual GMP monitoring are discussed further in subsequent sections with historical data where applicable.

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, 2005b). Table A-1 in Appendix A summarizes the quarterly inspection log, field observations, and mitigation actions, if any, for well maintenance.

2.1.4 Fourth Quarter Implementation of Alternative Sampling Methods

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 Fourth Quarter 2017. In October 2017 (DTSC 2017c), DTSC approved additional wells to be switched to from three-volume purge to low-flow sampling as part of conditional approval for expanded well sampling trials. One well in the GMP program (bedrock well MW-61-110) was approved to switch from three-volume purge to low-flow sampling (with the rest of the wells approved for this switch included under the CMP Program – reported under separate cover). Additional details of the existing and expanded well sampling method trials are now reported in Section 3.5 of this report.

2.2 Surface Water Monitoring Program

Quarterly surface water sampling was conducted on November 15 and 16, 2017 in the RMP monitoring network. Samples 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 Fourth Quarter 2017 GMP sampling event. In addition, PMP pressure transducers, which monitor water levels used to calculate hydraulic gradients within the Alluvial Aquifer, were downloaded in the first 2 weeks of each month (November and December). 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 First Quarter 2018. Addition of this well expands the network of “key” wells in the program from five to six.

PE-01 was only run in Fourth Quarter 2017 for brief periods of sampling and testing, and was not run to support groundwater gradient control. However, samples collected were still evaluated (and required notification sent) in accordance with the DTSC conditional approval letter for PE-01 shutdown (DTSC

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

2015). A further discussion of these results and required notifications associated with this well is presented in Section 4.3.2 of this report.

3 FOURTH QUARTER 2017 AND ANNUAL SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING PROGRAM EVALUATIONS

This section presents the analytical results for groundwater and surface water monitoring conducted during Fourth Quarter 2017. In addition, this section summarizes the site-wide groundwater and surface water sample results for the 2017 Annual Reporting Period.

3.1 Groundwater Results for Cr(VI) and Dissolved Chromium

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

3.1.1 Fourth Quarter Groundwater Results for Cr(VI) and Dissolved Chromium

Figures 3-1a through 3-1c present the Fourth Quarter 2017 Cr(VI) results in map view for wells monitoring the upper-depth (shallow wells), middle-depth (mid-depth wells), and lower-depth (deep wells) intervals, respectively, of the Alluvial Aquifer and bedrock. Figures 3-1a through 3-1c 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 Fourth Quarter 2017, the maximum detected Cr(VI) concentration was 6,500 µg/L in well MW-66-230 (Table 3-1). The maximum detected (total dissolved) chromium concentration was also in well MW-66-230 at 6,900 µg/L (Table 3-1). As noted previously, these results do not reflect sampling at the MW-68 cluster (which historically exhibit some of the higher concentrations observed at the site), which could not be accessed during the Fourth Quarter 2017 sampling event due to a tank placed over the well that was temporarily blocking access. A makeup sampling event was carried out at the MW-68 cluster in First Quarter 2018, and results of this sampling will be reported in the First Quarter 2018 edition of this report.

3.1.2 Annual Evaluation of Groundwater Results for Cr(VI) and Dissolved Chromium

Appendix C presents graphs of Cr(VI) concentration versus time (Figures C-1 through C-19) for the GMP monitoring wells since the initiation of IM groundwater extraction in 2004. This section discusses observed qualitative trends in Cr(VI) concentrations through 2017 for wells that are not evaluated under the PMP (see also Section 5).

A review of Appendix C, Figures C-1 through C-19, reveals the following observed Cr(VI) trends. These observations are qualitative (i.e., based on visual review of the concentration plots), and are not quantified using statistical analysis. Cr(VI) and dissolved chromium results (see also Table 3-1) for the Arizona wells and Park Moabi (water production) wells are also discussed below.

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

Monitoring Well	Trend in Cr(VI) Concentrations
MW-14	Concentrations are less than 32 µg/L (Figure C-2).
MW-18	Declining concentrations from 2007 to 2010; stable (less than 32 µg/L) since 2010 (Figure C-2).
MW-25	Steadily decreasing concentrations (Figure C-3).
MW-26	Initially decreasing concentrations; slightly increasing concentrations since 2013, which appear to have stabilized (Figure C-4).
MW-31 cluster	Initially decreasing concentrations; generally stable since 2009; concentrations are less than 32 µg/L in MW-31-135 (Figure C-4).
MW-37D	Decreasing concentrations beginning in 2006 to less than 32 µg/L since December 2014 (Figure C-8).
MW-40D	Generally increasing concentrations from 2004 to 2011; since 2011, concentrations have generally decreased (Figure C-9). No samples were collected at this location in 2017 due to location access issues.
MW-50-095	Decreasing concentrations from 2007 to 2011; currently stable below 32 µg/L (Figure C-12).
MW-50-200	Generally decreasing concentrations since 2007 (Figure C-12).
MW-60BR-245	An anomalously high (690 µg/L) Cr(VI) result was observed in Fourth Quarter 2017 at well MW-60BR-245. Cr(VI) results at this well are typically low (or non-detect). This high result was only observed with the three-volume purge method, is similar in concentration to that from nearby MW-60-125, and did not agree with the more typical result (2.3 µg/L) observed from the low-flow sampling method being tested at this location. This location is sampled quarterly, and will be evaluated in First Quarter 2018.
MW-62-110	Generally increasing concentrations until a decrease to non-detect in October 2015 (Figure C-14); concentrations have remained near or below the laboratory reporting limit since October 2015.
MW-65 cluster	Slightly increasing concentrations in MW-65-160; in MW-65-225, concentrations increased to a maximum in 2012 before generally decreasing, and another decrease was observed in September 2014. Since September 2014, concentrations in MW-65-225 have not shown a prevailing trend (Figure C-15).
MW-66-165 and MW-66BR-270	Stable concentrations since well cluster installation in 2011 (Figure C-16).
MW-66-230	Generally, increasing concentrations from 2011 to a maximum of 7,700 µg/L in December 2015; concentrations have decreased since December 2015 (Figure C-16).
MW-67 cluster	Initial increasing concentrations in 2011 but generally stable or decreasing (MW-67-185) since January 2012; decreased concentrations observed in MW-67-260 since 2014 (Figure C-16).

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

Monitoring Well	Trend in Cr(VI) Concentrations
MW-68-180	General overall increasing trend with seasonal changes (higher in fall/winter, lower in spring); the maximum Cr(VI) concentrations observed in site groundwater have been detected in this well (Figure C-16).
MW-68-240	Generally stable concentrations since 2012 (Figure C-16). Concentrations at MW-68BR-280 have been non-detect since the well was installed.
MW-69-195	Initial increase in concentrations from 2011 to early 2013; generally stable between 2013 and May 2015. Concentrations generally decreased between May 2015 and February 2017. Since February 2017, data indicate a steady concentration increase. This well is sampled quarterly and will be further evaluated in First Quarter 2018. (Figure C-17).
MW-70-105	Generally stable concentrations since 2013 (Figure C-17).
MW-70BR-225	Generally decreasing concentrations since 2011. (Figure C-17).
MW-54 cluster, MW-55 cluster, and MW-56 cluster (Arizona wells)	In 2017, Cr(VI) and dissolved total chromium were non-detect in six of eight wells, with MW-54-195 and MW-55-120 being the exceptions. Dissolved total chromium was detected in MW-54-195 (in Fourth Quarter 2017) at 1.2 µg/L. For MW-55-120: - Dissolved total chromium and Cr(VI) concentrations have gradually increased since 2008, reaching maximums of 10.6 and 11.1 µg/L, respectively, in May 2016. Concentrations have since stabilized. - The current dissolved total chromium concentration is well below the federal drinking water standard (maximum contaminant level [MCL] of 100 µg/L) and Arizona's Aquifer Water Quality Standard of 50 µg/L. - Concentrations are consistent with regional background concentrations. - Increasing dissolved total chromium and Cr(VI) trends at MW-55-120 may be a result of geochemical conditions near the well screen slowly returning to equilibrium conditions with the aquifer since initial well installation disturbance.
Park Moabi-3 (PM-03) and Park Moabi-4 (PM-04) (water production wells)	In PM-03, Cr(VI) and dissolved total chromium were detected at concentrations of 9.4 µg/L and 9.6 µg/L, respectively, in December 2017. In PM-04, both Cr(VI) and dissolved total chromium were detected at a concentration of 18 µg/L in December 2017. These concentrations are within the range of previously detected concentrations, and are below Federal and California MCLs for total chromium of 100 µg/L and 50 µg/L, respectively (there is currently no Federal or California MCL for Cr(VI)).

3.2 Other Groundwater Monitoring Results

Table 3-2a presents the COPCs (molybdenum, nitrate, and selenium) and in situ byproducts (arsenic and manganese) sampling results for groundwater monitoring well samples collected in 2017. The Fourth Quarter 2017 data presented in Table 3-2a are summarized in Table 3-2b. Field parameter data and additional water quality results are provided in Appendix D.

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

3.2.1 Fourth Quarter and Annual Constituents of Potential Concern and In Situ Byproducts Evaluation

Figures 3-2a through 3-2e present the molybdenum, nitrate (as N), selenium, arsenic, and manganese results for Fourth Quarter 2017, respectively. Results were compared to the background UTLs calculated and reported in CH2M Hill 2009a and MCLs where available. Background UTLs were only calculated for regional alluvial wells during the background study; therefore, these background UTLs may not be appropriate for bedrock wells.

Graphs of the concentrations of molybdenum, nitrate, and selenium over time are presented in Appendix C. Results for in situ byproducts and geochemical indicator parameters are presented in Tables 3-2a and 3-2b and in Table D-1 in Appendix D. An evaluation of in situ byproduct sample results for floodplain wells with additional geochemical parameters collected for annual PMP performance monitoring is presented in Section 5.3.2. Below is a summary of results for molybdenum, nitrate, selenium, and manganese in Fourth Quarter 2017 (arsenic is discussed in Section 3.2.2).

Constituent (# of wells sampled)	Calculated Background UTL (#exceedances in Q4 2017)	MCL (#exceedances in Q4 2017)	Highest Detected Concentration (Location)
Molybdenum (160)	36.3 µg/L (111)	None (NA)	340 µg/L (MW-33-040)
Nitrate (73)	5.03 mg/L (22)	10.0 µg/L (16)	84 mg/L MW-67-185)
Selenium (68)	10.3 µg/L (13) ²	50 µg/L (2)	350 µg/L (MW-67-185)
Manganese (148)	None (NA)	50 µg/L (NA) ³	6,000 µg/L (MW-22)

Notes:

¹ Nitrate samples were analyzed using USEPA Method 4500NO₃, except for TW-03D and PE-01, 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.

² Includes non-detects with reporting limits higher than 10.3 µg/L.

³ This is a secondary MCL.

Molybdenum, selenium, and nitrate were within historical ranges and/or consistent with historical concentration trends throughout the 2017 Annual Reporting Period as evidenced by the concentration graphs in Appendix C for these three constituents.

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

3.2.2 Fourth Quarter and Annual Arsenic Sampling in Monitoring Wells

Eighty-two fluvial/alluvial and 27 bedrock wells were sampled for arsenic in Fourth Quarter 2017.

Highlights of the results (Tables 3-2a and 3-2b) are as follow.

Well Type (# of wells sampled)	Calculated Background UTL (# of exceedances in Q4 2017)	MCL (# of exceedances in Q4 2017)	Highest Detected Concentration (Location)
Alluvial/Fluvial (82)	24.3 µg/L (3)	10 µg/L (10)	38 µg/L (MW-12)
Bedrock (27)	24.3 µg/L (---)	10 µg/L (6)	20 µg/L (MW-62-110)

Note:

¹ The California MCL for arsenic is 10 µg/L. The background study UTL for arsenic is 24.3 µg/L.

--- = not applicable

Additional arsenic results are presented in Appendix D, Table D-1.

3.2.3 Fourth Quarter and Annual Title 22 Metals Sampling

Table 3-3 presents the T22 metals results for the GMP monitoring wells MW-10, MW-12, MW-14, MW-22, MW-24A, MW-24B, MW-26, MW-35-060, MW-35-135, and MW-59-100, sampled during Fourth Quarter 2017 or previous 2017 monitoring events. The concentrations of T22 metals detected in these monitoring wells remained generally stable overall during the Annual Reporting Period.

3.2.4 Annual Laboratory-Specific Conductance Results

Laboratory-specific conductance results for the 2017 reporting period are presented in Table 3-1. The salient trend in specific conductance is a correlation of lower specific conductance over time at floodplain wells with an increasing river water isotopic signature. This is interpreted to indicate that IM-3 pumping has been drawing river water into the floodplain groundwater (see Section 5.3.2). For wells adjacent to the Colorado River, generally more of a river water signature (based on specific conductance) has been historically observed during the summer months when river levels are higher.

Conductivity profiling data were collected at all sampled site wells during Fourth Quarter 2017 as part of expanded sampling method trials approved by DTSC in 2017 (see Section 3.5 below). Results of these conductivity profiles will be reported in 2018 under separate cover.

3.2.5 Annual Water Level Monitoring

Table D-2 in Appendix D presents the manual water level measurements and salinity data collected at GMP/PMP monitoring locations (as part of transducer download activities) during the 2017 Annual Reporting Period. Groundwater salinity during the 2017 Annual Reporting Period ranged from 0.06 percent (MW-27-020, MW-27-060, MW-34-055, and MW-36-070) to 1.33 percent (well MW-22), consistent with results of previous monitoring. Due to the variation in groundwater salinity at the site, the

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

groundwater elevations measured in the monitoring wells have been adjusted (normalized) to an equivalent freshwater head (Fetter 1994).

Figure 3-3 presents a snapshot of groundwater elevations for the shallow-depth interval of the Alluvial Aquifer, representative of the water table. A site-wide water level survey was conducted on December 13, 2017, involving the manual collection of groundwater level data at 25 shallow wells within an approximate 3-hour period. Because groundwater levels at the site fluctuate continuously in response to changes in the river stage, these groundwater elevation contours are affected by transient conditions during the period of measurement and may not be representative of the average groundwater gradient directions.

3.3 Fourth Quarter and Annual Surface Water Evaluation for Cr(VI) and Dissolved Chromium

During the 2017 Annual Reporting Period (including sampling in Fourth Quarter 2017), Cr(VI) and dissolved chromium were not detected at concentrations higher than reporting limits at any surface water monitoring locations (Table 3-4).

Table 3-5 presents results for the COPCs (molybdenum, nitrate, and selenium), in situ byproducts (manganese, iron, and arsenic), and other geochemical indicator parameters in surface water between January and December 2017.

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

3.4 Fourth Quarter Data Validation and Completeness

Project chemists reviewed laboratory analytical data from the Fourth Quarter 2017 sampling events to assess data quality and to identify deviations from analytical requirements.

The following bullets summarize the notable analytical qualifications in data reported for the 2017 Annual Report:

- Thirty-Four Cr(VI) (USEPA Method 218.6) results out of 222 of 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.
- Total alkalinity (2 out of 26), dissolved barium (2 out of 15), boron (1 out of 23), cadmium (2 out of 11), calcium (3 out of 26), copper (6 out of 11), iron (6 out of 10), magnesium (11 out of 26), molybdenum (5 out of 25), selenium (1 out of 25), sodium (5 out of 32), total iron (2 out of 10), and bromide (13 out of 35) contained QC recoveries impacted by matrix interference, and the recoveries demonstrated a high or low bias in one or more samples. No results were rejected for decision-making, but several were qualified as estimated detects or non-detects and flagged “J” and “UJ” accordingly.

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

- Two out of 21 laboratory duplicates for total dissolved solids did not meet precision criteria, and several samples were qualified as estimated detects and flagged “J”.
- Field duplicate pairs met precision criteria except for the analytes listed below:

Parent Sample	Field Duplicate	Analyte	# Affected vs. # Collected	Flag(s) Applied
CW-03D-3V-Q417	MW-902-Q417	Turbidity	1 out of 3	J
MW-20-100-Q417	MW-905-Q417	Alkalinity, total as CaCO ₃	1 out of 16	J
MW-20-100-Q417	MW-905-Q417	Iron, dissolved	1 out of 16	J
MW-24A-Q417	MW-906-Q417	Chromium, total dissolved	1 out of 19	J
MW-26-Q417	MW-907-Q417	Manganese, dissolved	1 out of 16	J
MW-62-190-Q417	MW-917-Q417	Arsenic, dissolved	1 out of 15	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 Fourth Quarter 2017 sampling events analyzed in a certified lab are considered estimated.

No other significant analytical deficiencies were identified in the Fourth 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).

3.5 Annual Evaluation of Alternative Sampling Methods

3.5.1 Existing Sampling Method Trials at MW-38 and MW-40

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, and the trial continued through 2017. The purpose of the method trials is to directly compare two different sampling methods. At MW-38S and MW-38D, both low-flow and three-volume purge samples were collected for comparison at approved sampling intervals in 2017. At MW-40S and MW-40D, planned HYDRASleeve™ and low-flow samples were not collected 2017 due to pending access approval in the highway right-of-way. Sampling at these wells is planned to resume in Second Quarter 2018 once contracting with an approved traffic-control vendor has been finalized. Results for Cr(VI) sampling to date at each well are shown in Table 2-1a, with additional sampling parameter results provided in Table D-5 of Appendix D.

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

At MW-38S, results for both low-flow and three-volume pure samples have been low or non-detect through 13 rounds of quarterly sampling (from Fourth Quarter 2014 to Fourth Quarter 2017). For this reason, Section 7 of this report includes a recommendation that MW-38S be removed from the comparison method trial and sampled by only the low-flow method moving forward (This recommendation was also made in the past 2 years' annual reports [Arcadis 2016a, 2017a]). These recommendations are currently under agency review.

At MW-38D, results of low-flow and three-volume pure sampling have been consistent with each other through nine rounds of semi-annual method trials (Fourth Quarter 2014 to Fourth Quarter 2017). These results show that low-flow sampling is providing results comparable to those of three-volume sampling. Section 7 of this report includes a recommendation that MW-38D also be removed from the comparison method trial and sampled by only the low-flow method moving forward. This recommendation was also made in the past 2 years' annual reports (Arcadis 2016a, 2017a). Recommendations are currently under agency review.

At MW-40S, while no samples were collected in 2016 or 2017 (due to pending access approval in the highway right-of-way), results for low-flow and HYDRASleeve™ samples collected annually in 2014 and 2015 were consistent between the two methods. These results suggest that HYDRASleeve™ sampling may be a viable sampling alternative to low-flow sampling at this location (three-volume purge sampling was not evaluated at MW-40S). Section 7 of this report includes a recommendation to continue the method trial sampling at this location but increase the frequency to semiannual (to collect data more quickly for the method trial in 2018). This recommendation was also made in the last 2 years' annual reports (Arcadis 2016a, 2017a). Recommendations are currently under agency review.

At MW-40D, results for low-flow and HYDRASleeve™ samples were consistent for two of three semiannual sampling events between Fourth Quarter 2014 and Fourth Quarter 2015, with the HYDRASleeve™ reading non-detect for one event where low-flow sampling yielded a detection of 120 µg/L. In 2016, the low-flow and HYDRASleeve™ results were 130 and 120 µg/L, respectively, during the Second Quarter (semi-annual) sampling event; however, planned sampling for Fourth Quarter was not completed pending access approval in the highway right-of-way, and no samples were collected in 2017 pending this approval. These earlier results suggest that HYDRASleeve™ sampling may be a viable alternative to low-flow sampling at this location; however, additional sampling is needed to complete the evaluation. Section 7 of this report includes a recommendation to continue the method trial sampling at this location in 2018 with no change to sampling frequency (at this already semiannual well) once access concerns have been resolved and sampling has resumed at this location (with access resolution underway and sampling planned to resume in Second Quarter 2018).

3.5.2 Expanded Sampling Method Trials at Additional Wells Starting Fourth Quarter 2017

In August 2015, PG&E sent a letter to DTSC (PG&E 2015) recommending additional wells for low-flow sampling and proposing an additional sampling method trial for select bedrock wells. DTSC responded to this request with technical memoranda on April 6 and October 20, 2017, which provided conditional

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

approval for actions including expanding the sampling method trials to specific long-screen and bedrock wells (DTSC 2017a, 2017b).

Fourth Quarter 2017 comparison results at the expanded network of sampling trial wells have been compiled in Table 2-1b. Initial results show reasonable consistency (within an order of magnitude) between sampling methods at five of the six GMP wells in the expanded program. The Cr(VI) result for three-volume purge sampling at MW-60BR-245 was anomalously high during Fourth Quarter 2017 (690 µg/L). Concentrations are normally non-detect (or below 50 µg/L) for chromium at this well, and this result does not match historical sampling results at this location or align with the results from the “low-flow” Cr(VI) sample at this location (2.3 µg/L) during Fourth Quarter 2017. MW-60BR-245 is sampled quarterly, and results for First Quarter 2018 will be evaluated to assess if three-volume purge sampling results remain high or return to the typical low value.

Additional data collection is needed at all of the expanded sampling trial locations before any meaningful evaluation of these results can be performed. Results at these wells will be evaluated during the 2018 Annual Reporting Period and reported in the 2018 edition of this report or under separate cover. To collect a consistent data set, any wells (added as part of the expanded trials) previously sampled at less than a semiannual frequency will be sampled semiannually during the trials.

Conductivity profiling data were collected at all sampled wells during Fourth Quarter 2017 as part of expanded sampling method trials approved by DTSC in 2017 (DTSC 2017a, 2017c). Results of these conductivity profiles will be reported in 2018 under separate cover.

Compliance Monitoring Program (CMP) wells are also being included in the expanded sampling method trials (Arcadis 2018a). These wells were also sampled in Fourth Quarter 2017. Results of sampling method trials at CMP wells will be reported in the annual CMP Report, which is scheduled to be submitted in January 2019.

3.6 Summary of 2017 Groundwater Monitoring Program and Surface Water Monitoring Program Results

Key observations and data trends for the Fourth Quarter 2017 and 2017 Annual Reporting Period include the following:

- Chromium concentrations in many GMP monitoring wells near the floodplain and active extraction wells are stable or declining, with concentrations fluctuating and/or increasing at some locations. Increasing concentrations are limited to wells located near the National Trails Highway that are under the hydraulic influence of active extraction well TW-03D.
- Concentrations in several of the East Ravine/Topock Compressor Station wells are generally fluctuating or stable with a few exceptions. Concentrations at bedrock well MW-62-110 have been fluctuating, but overall were increasing until a decrease to non-detect in October and December 2015, and remained non-detect through 2016, with only small detections occurring throughout 2017 (0.45 µg/L Cr(VI) on February 8, 2017; 1.7 µg/L dissolved chromium on May 3, 2017; and 3 µg/L dissolved chromium on December 7, 2017). Concentrations at MW-68-180 have demonstrated a general overall increasing trend, with seasonal fluctuations, and were the highest chromium detections of any

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

well at the site in 2016. Cr(VI) concentrations continued to fluctuate at this well during the first three quarters of 2017. Access to the MW-68 cluster was blocked in Fourth Quarter 2017, and a makeup sampling event was carried out in First Quarter 2018. During the 2017 reporting period, Cr(VI) and dissolved chromium were not detected at concentrations higher than reporting limits at any surface water monitoring locations.

- Molybdenum, selenium, and nitrate continue to be detected in a subset of monitoring wells at concentrations consistent with historical ranges (CH2M Hill 2009a, 2009b, 2009c).
- Sixteen arsenic concentrations among the 109 fluvial/alluvial and bedrock well samples exceeded the California MCL (10 µg/L), while three of these samples yielded results higher than the background study UTL of 24.3 µg/L.
- Sampling method trials continued at select wells, and were expanded to six additional GMP wells, in Fourth Quarter 2017. Recommendations from sampling method trials in 2017 are documented in Section 7 of this report.

4 FOURTH QUARTER INTERIM MEASURES PERFORMANCE MONITORING PROGRAM EVALUATION

This section presents the quarterly PMP evaluation summary for Fourth Quarter 2017.

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).

Table F-1 in Appendix F presents the results of general chemistry and stable isotope analyses for 15 PMP monitoring wells and two river stations during sampling events from March 2005 through December 2017. These monitoring locations were selected to evaluate long-term trends in general water quality in response to IM groundwater extraction. Water samples from the selected performance monitoring locations are analyzed for general chemistry parameters, including TDS, chloride, sulfate, nitrate, bromide, calcium, potassium, magnesium, sodium, boron, alkalinity, $\delta^2\text{H}$, and $\delta^{18}\text{O}$, to monitor the effects of IM pumping on groundwater chemistry. Section 5.3.2 of this report provides an evaluation of the general chemistry groundwater data for the floodplain area.

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

The Fourth Quarter 2017 distribution of Cr(VI) in the upper (shallow wells), middle (mid-depth wells), and lower (deep wells) intervals of the Alluvial Aquifer is shown in plan view and cross-section view on Figure 4-1.¹ Figure 4-2 presents the Fourth 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.

Appendix C includes graphs of Cr(VI) concentration vs time in selected monitoring well clusters through December 2017. Analytical results for the 2017 Annual Reporting Period are presented in Table 3-1. An evaluation of chromium trends in PMP wells is presented in the annual performance evaluation in Section 5.3.

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 $\mu\text{g/L}$ (CH2M Hill 2009a). The 20 $\mu\text{g/L}$ and 50 $\mu\text{g/L}$ 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.

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 any 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 if their trigger levels are exceeded. The IMCP well Cr(VI) results from the Fourth Quarter 2017 and 2017 Annual Reporting Period were all lower than their trigger levels. Appendix C 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

Extraction well PE-01 was operated in Fourth Quarter 2017 only for brief periods to support groundwater collection or for testing.

Conditional approval for shutdown of PE-01 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 the most recent year if a well was not sampled in 2014) when PE-01 is shut down (DTSC 2015).

During the Fourth Quarter 2017 monitoring event, 10 of the 47 wells monitored met the criteria where either Cr(VI) or total dissolved chromium (or both) was detected at concentrations exceeding the notification levels. These wells are listed in Appendix Table C-1. For the other 37 wells monitored in the Fourth Quarter 2017, total dissolved chromium and Cr(VI) concentrations were below their notification levels and/or were non-detect. DTSC was notified of Fourth Quarter 2017 exceedances at the 10 wells on January 24, 2018 (Arcadis 2018b).

For eight of the 10 exceedance wells identified in Fourth Quarter 2017, chromium concentrations appear to be within expectations based on recent data trends/fluctuation (chromium concentration charts included with the notification letter to DTSC). At MW-30-30, total dissolved chromium (non-detect in 2014) was detected at 78 µg/L. Hexavalent chromium at this location also exceeded its historical maximum of 0.21 µg/L, with a detection of 1.2 µg/L, well below the established background level of 32 µg/L. However, this result should be viewed as anomalous, with additional monitoring necessary for confirmation or deriving any conclusions.

At MW-33-40, total dissolved chromium (non-detect in 2014) was detected at 1.7 µg/L during the Fourth Quarter 2017 monitoring event. However, this concentration is similar to those previously reported between 2005 and 2012. Hexavalent chromium at this location was non-detect during Fourth Quarter 2017 sampling.

Due to ongoing remediation, chromium concentrations at the site continue to show a downward trend over time. Concentrations remain within expected ranges and are generally declining. Further, landward

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

hydraulic gradients measured across the floodplain are consistent with gradients in previous years before the modification to the PE-01 pumping plan, as discussed in Section 5.2.2.

4.4 Fourth Quarter Extraction Systems Operations

From November 1, 2017 through December 31, 2017, the volume of groundwater extracted and treated by the IM-3 system was 11,608,261 gallons. An estimated 82.7 pounds (37.5 kilograms) of chromium were removed from the aquifer between October 1, 2017 and December 31, 2017 (Table 4-1). Groundwater extraction is reported on a schedule different from that of chromium removal reporting (i.e., November-December and October-December, respectively; see Tables 1-1 and 4-1).

During Fourth Quarter 2017, extraction wells TW-03D and PE-01 (with most of the pumping from TW-03D) operated at a combined pumping rate of 132.1 gpm, including periods of planned and unplanned downtime (PE-01 only ran for brief periods of sampling and testing and was not used for gradient control in Fourth Quarter 2017). The average monthly combined pumping rates were 131.9 gpm (November 2017) and 132.4 gpm (December 2017) during the Fourth Quarter 2017. Extraction wells TW-02D and TW-02S were not operated in November, and only operated in December for brief periods of sampling and testing. The operational runtime percentage for the IM extraction system was 98.3 percent during this reporting period. Table 4-1 shows the average pumping rate and total volume pumped for the system during Fourth Quarter 2017 (and 2017 Annual Reporting Period), as well as monthly average pumping rates and total volumes pumped per extraction well during the quarter (and year). The operations log for the extraction system during Fourth Quarter 2017, including planned and unplanned downtime, is included as Appendix G.

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. Four containers of solids from the IM-3 facility were disposed of at the U.S. Ecology Chemical Waste Management facility in Beatty, Nevada during Fourth 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 Fourth Quarter 2017, Cr(VI) concentrations in primary extraction well TW-03D remained stable, with a value of 550 µg/L in both November and December, as shown in Table 5-2. TDS concentrations in TW-3D for this reporting period have also remained stable, as shown in Table 5-2.

Cr(VI) concentrations in groundwater at extraction well PE-01 on the floodplain during Fourth Quarter 2017 ranged from a minimum of non-detect in December to a maximum of 0.52 µg/L in November, as shown in Table 5-2. TDS concentrations in PE-01 for this reporting period have remained stable. PE-01 was only run in Fourth Quarter 2017 for brief periods of sampling and testing.

Sampling at TW-02D during Fourth Quarter 2017 showed a detection of 110 µg/L for Cr(VI). TW-02D was only run in Fourth Quarter 2017 for brief periods of sampling and testing. Results will continue to be monitored at this location quarterly while this well remains available for groundwater extraction.

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

Groundwater samples are currently collected annually at extraction well TW-02S. TW-02S was only run in Fourth Quarter 2017 for brief periods of sampling and testing. Sampling results at this well during the quarter showed 250 µg/L Cr(VI). The next round of sampling at this location is planned for Fourth Quarter 2018.

4.5 Hydraulic Gradient and River Levels during Quarterly Period

During Fourth Quarter 2017, water levels were recorded at intervals of 30 minutes with pressure transducers in 56 wells (excluding five Arizona locations) and two river monitoring stations (I-3 and Red Rock Bridge [RRB]; Figure 4-3a). The data are typically continuous, with only short interruptions for sampling or maintenance. It should be noted that data from river monitoring station RRB were rejected for Fourth Quarter 2017, when river levels were too low at this location to achieve proper readings.

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 Fourth Quarter 2017. Thus, MW-20-130 was used in the gradient calculations for these months. Tables 4-2 and 5-3, and Figure 5-3 of this report have been expanded to include these updates to the program.

Hydraulic gradients were measured during the Fourth Quarter 2017 for well pairs selected for performance monitoring of the two pumping centers (TW-03D and PE-01). Table 4-2 presents the monthly average hydraulic gradients measured for each of the gradient well pairs in November and December 2017 as well as the overall average of all well pairs. Strong landward gradients were measured each month. The overall average gradients for all well pairs were 0.0036 and 0.0034 foot per foot (ft/ft) for November and December, respectively. This is 3.6 and 3.4 times greater than the required gradient of 0.001 ft/ft, respectively. The monthly average gradient for the northern well pair for November and December was 2.7 and 2.5 times the target gradient of 0.001 ft/ft, respectively. For the central well pair, the monthly average gradients were 4.4 and 4.3 times the target gradient, respectively. The southern well pair average gradients were 3.6 and 3.5 times the target gradient, respectively. Graphs of the hydraulic gradients, monthly average pumping rates, and river levels for the Fourth Quarter 2017 are discussed in the annual performance evaluation in Section 5.2.

Deep-zone water levels shown on Figure 4-3c 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.

Daily average groundwater and river elevations, calculated from the pressure transducer data for the Fourth Quarter 2017, are summarized in Table E-1 in Appendix E. Groundwater elevations (or total hydraulic heads) are adjusted for temperature and salinity differences between wells (i.e., adjusted to a common freshwater equivalent). Groundwater elevation hydrographs for the PMP wells during the 2017 Annual Reporting Period are included in Appendix E. The elevation of the Colorado River measured at the I-3 gauging station (location shown on Figure 4-3a) is also shown on the hydrographs in Appendix E.

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

Average Fourth Quarter 2017 groundwater elevations for the shallow, mid-depth, and deep wells are presented and contoured in plan view on Figures 4-3a through 4-3c. Average groundwater elevations for wells on floodplain cross-section A are presented and contoured on Figure 4-4. 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 view Figures 4-3a, 4-3b, 4-3c, or on the cross-section Figure 4-4.

For the Fourth Quarter 2017, transducer data were also 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 4-3c, if available, and are used for contouring where appropriate. Except for well MW-55-045, all wells in the MW-54 and MW-55 clusters are screened in the deep interval of the Alluvial Aquifer. Well MW-55-045 is screened across portions of the shallow and middle intervals.

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 4-5 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 January 2018 is based on the December 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 5 years; plotted on Figure 4-5) are summarized in Table 4-3. The future projections shown on Figure 4-5 (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 December 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 4-3, show that the average Davis Dam release for January 2018 (8,100 cubic feet per second) will be less than the actual release in December 2017 (9,000 cubic feet per second). Based on December 2017 USBR projections, it is anticipated that the Colorado River level at the I-3 gage location in January 2018 will be approximately 1.59 ft lower compared to the actual levels in December 2017. Current projections show that the water levels will increase through the First Quarter 2018 (January through March), further increasing to the maximum levels of the year projected for April, as shown on Figure 4-5.

4.7 Quarterly Performance Monitoring Program Evaluation Summary

The groundwater elevation and hydraulic gradient data from November and December 2017 performance monitoring indicate that the minimum landward gradient target of 0.001 ft/ft was exceeded each month during the Fourth Quarter 2017. The overall average landward gradients during Fourth Quarter 2017 for November and December were 3.6 and 3.4 times the required minimum magnitude, respectively, as shown in Table 4-2. 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 extraction wells TW-03D and PE-01. Based on the hydraulic and monitoring data and evaluation presented in this report, the IM performance standard has been met for the Fourth Quarter 2017 reporting period.

A total of 11,608,261 gallons of groundwater was extracted during Fourth Quarter 2017 by the IM-3 treatment facility. The average pumping rate for the IM extraction system during Fourth Quarter 2017, including system downtime, was 132.1 gpm. An estimated 82.7 pounds (37.5 kilograms) of chromium were removed from groundwater during Fourth Quarter 2017, as presented in Table 4-1. Groundwater extraction is reported on a schedule different from that of chromium removal reporting (i.e., November-December and October-December, respectively; see Tables 1-1 and 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 demonstrate overall stable or declining Cr(VI) concentrations relative to previous monitoring results, as shown in Appendix C. The Cr(VI) trends observed in the performance monitoring area during the Fourth Quarter 2017 reporting period are presented and evaluated in Section 5.3.

5 ANNUAL PERFORMANCE MONITORING PROGRAM EVALUATION

This section presents the annual PMP evaluation summary.

5.1 Extraction System Operations for Annual Reporting Period

5.1.1 Extraction Facilities and Operations

Extraction wells TW-03D and PE-01 (with pumping primarily from TW-03D) operated throughout the 2017 Annual Reporting Period consistent with the target pumping rate of 135 gpm, excluding periods of planned and unplanned downtime (Table 5-1). During the 2017 Annual Reporting Period, PE-01 was run intermittently in January to maintain groundwater gradients, then continuously in February and March (primarily to support IM-3 maintenance work, which required full PE-01 flow). PE-01 was run intermittently in April (for testing after First Quarter 2017 IM-3 maintenance) and in May (pumped late in the month to maintain key well gradients). After June 1, PE-01 was not operated for the remainder of the month. 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 year (which included the second half of Third Quarter and all of Fourth Quarter 2017). PE-01 was pumped briefly during this time to support sampling or system maintenance. Extraction wells TW-02D and TW-02S were only operated in 2017 for brief periods to support sampling and system maintenance, and were not used to support gradient controls.

An estimated total of 68,005,033 gallons of groundwater was extracted between January 2017 and December 2017. Approximately 306 pounds (139 kilograms) of chromium were removed from the aquifer and treated at the IM-3 treatment plant over the 2017 Annual Reporting Period (Table 4-1). The total mass of chromium removed by the IM-2 and IM-3 extraction systems during IM pumping from March 2004 through December 31, 2017 is approximately 9,100 pounds (4,130 kilograms). The average annual pumping rate during the 2017 Annual Reporting Period was 129.4 gpm, with pumping mainly from extraction wells TW-03D and PE-01.

Figure 5-1 summarizes the monthly pumping rates, cumulative volumes extracted, and the percentage of time during which the extraction system was in operation during the 2017 Annual Reporting Period. This figure shows that pumping rates were relatively consistent from month to month, with IM-3 running at close to design capacity. The consistent high pumping rates are corroborated by the high percentage of uptime for the IM extraction and treatment facilities throughout the year. The decrease in uptime during April 2017 was due to the planned annual treatment plant maintenance event. The decrease in August 2017 was due to the planned semiannual treatment plant maintenance event.

5.1.2 Extracted Groundwater Quality and Trends

Extraction well TW-03D was brought online in late December 2005, and groundwater extraction at well PE-01 on the floodplain began on January 25, 2006. While TW-03D operated continuously in 2017, PE-01 only ran intermittently throughout the year (see Section 5.1.1), was shut down in August, and

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

remained off for the remainder of the year (except for brief periods to support sampling and maintenance).

During the 2017 Annual Reporting Period, Cr(VI) concentrations in TW-03D decreased slightly during the early months of the year (January through May), and remained relatively stable from June through December. During the 2017 Annual Reporting Period, concentrations ranged from a maximum value of 620 µg/L in January 2017 to a minimum value of 540 µg/L in August 2017 (Table 5-2 and Figure 5-2). TDS concentrations were stable (Figure 5-2).

During the 2017 Annual Reporting Period, Cr(VI) concentrations in the extracted groundwater at PE-01, located on the floodplain, decreased during the early months of the year, and were not detected during the remainder of the year except for two detections (September and November). The Cr(VI) concentration ranged from a maximum of 9.0 µg/L in September 2017 to non-detect for 7 months of the year (Figure 5-2). TDS concentrations were relatively stable.

5.2 Capture Zone Analysis for Annual Reporting Period

5.2.1 Updates to the Program in 2017

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 the later months of Third Quarter 2017 (September or October), and PE-01 was not pumped for gradient control in Fourth Quarter 2017 (November or December). Thus, MW-20-130 was used in the gradient calculations for September through December 2017. Tables 4-2 and 5-3, and Figure 5-3 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 First Quarter 2018. This addition of well MW-20-130 in gradient calculations expands the network of “key” wells in the program from five to six.

5.2.2 Monthly Average Gradients

For each month of the 2017 Annual Reporting Period, the overall average hydraulic gradient (combining the three well pairs) exceeded the IM target landward gradient of 0.001 ft/ft (Table 5-3). In addition, this target was met each month for each of the three well pairs during the reporting period. This was the case even during the lower river stages observed in January-February and December 2017 (Figure 5-3). During the 2017 Annual Reporting Period, the average daily river level at river station I-3 (Figure 1-3) ranged from 452.73 to 457.58 feet above mean sea level (Table E-2). Surface water elevation data at RRB were incomplete (or unreliable) throughout the year and were not used for estimating river gradients in 2017. Efforts are underway to identify a potential new “upgradient” river gauging location in 2018 to replace RRB for this function.

While exceeding the performance standard each month for which the gradient was calculated, the northern well pair (MW-31-135/MW-33-150) generally exhibited the lowest measured gradients because the line connecting the two wells is not oriented in the same direction as that of the hydraulic gradient

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

generated by pumping. Thus, the hydraulic gradient measurements for the northern well pair underestimate the true value.

5.2.3 Annual Average Gradients

The net annual landward gradients illustrated on the aquifer interval maps (Figures 5-4a through 5-4c, and Figure 5-5, with values listed on Table E-2) show that the gradients are landward and are comparable to the gradient maps prepared using previous monitoring data (CH2M Hill 2012a, 2012b, 2012c, 2012d, 2013a, 2013b, 2013c, 2013d, 2014a, 2014b, 2014c, 2014d).

5.2.4 Analysis and Evaluation of Capture Zone

The methodology and results of the capture zone evaluations for 2017 are summarized in the following subsections.

5.2.4.1 Well Group Gradient Averaging

The temporal variation in magnitude and direction of horizontal hydraulic gradients in the lower-depth aquifer interval was assessed using quarterly average water levels and triangulation with linear interpretation for three well groupings (including the addition of a well grouping when PE-01 is not run for gradient control; MW-31-135/MW-33-150/MW-34-100, MW-45-095/MW-34-100/MW-27-085, and new group MW-20-130/MW-34-100/MW-27-085) in the IM performance area. Figure 5-6 shows the three well groupings and the calculated average gradients for all four quarterly monitoring periods in 2017.

This analysis shows that landward gradients were achieved during the 2017 Annual Reporting Period, and that the magnitude and direction of the landward gradients were similar during each quarter (with an especially large gradient at well group 2a during First Quarter 2017). These gradients are not necessarily exactly the same as those calculated between the hydraulic gradient control well pairs (Table 5-3) because they are planar defined by each three-well group (i.e., a three-point solution) as opposed to relying on only two wells. Stronger landward gradients were calculated using the three-well method than those measured for the northern well pair MW-31-135/MW-33-150 (Table 5-3) due to a more optimally aligned gradient direction; the northern gradient pair is not aligned parallel to the direction of the hydraulic gradient in this area during IM-3 pumping.

5.2.4.2 Particle Track Analysis

Particle tracking was conducted in 2006 to calculate the direction and distance that groundwater would likely flow using selected starting points in the floodplain under the dual-well (TW-3D and PE-1) IM pumping system. At the time, TW-3D and PE-1 were pumping a combined annual average rate of 131.8 gpm. The 2006 Annual IM Performance Evaluation Report (CH2M Hill 2007) contains the particle tracking figure and the methods, input parameters, and data used for this analysis.

A particle tracking analysis using 2017 data was not performed because the pumping locations have not changed, the combined pumping rates for 2017 are estimated to be essentially the same (129.4 gpm) as

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

those from 2006, the river elevations were similar, and the gradients for the lower interval were comparable for the 2006 and 2017 Annual Reporting Periods.

5.3 Evaluation of Groundwater Quality Trend

5.3.1 Cr(VI) Distribution and Trends

Figure 4-1 presents the Fourth Quarter 2017 Cr(VI) concentration results in floodplain wells in the upper, mid-depth, and lower intervals of the Alluvial Aquifer. The Cr(VI) contours presented on this figure incorporate data from the most comprehensive sampling event of the year.

Figure 5-7 presents graphs of Cr(VI) concentration versus time for selected deep monitoring wells in the floodplain area through December 2016. Cr(VI) results are plotted for wells MW-34-100, MW-36-090, MW-36-100, MW-44-115, MW-44-125, and MW-46-175. Analytical results for September 2015 through the 2017 Annual Reporting Period are presented in Table 3-1. The locations of the deep wells selected for performance evaluation are shown on Figure 4-1. Also, Appendix C includes Cr(VI), molybdenum, nitrate, and selenium concentration graphs for selected monitoring well clusters through December 2017.

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 Fourth Quarter 2017 period. Cr(VI) concentrations have remained steady or have decreased in many wells since IM and PE-01 pumping began in 2004 and 2005, respectively (Figure 5-7 and Appendix C).

Key Cr(VI) concentration trends over the long term for the PMP wells sampled during the 2017 Annual Reporting Period 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), at MW-20-100 (since May 2007), and at MW-20-130 (since 2007; Figure C-3).
- As shown on Figure 5-7 and Figure C-6, well MW-34-100 has demonstrated a seasonally fluctuating trend in Cr(VI) concentration. Concentrations at this well demonstrated a general decreasing trend between 2006 and 2011, with a seasonally variable but stable/consistent concentration profile since 2011. Landward gradients have been present at this location since IM pumping began; therefore, the seasonal fluctuations in concentration observed at MW-34-100 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 5-7 and C-7. Between April and December 2016, Cr(VI) concentrations in MW-36-100 decreased to less than 32 µg/L and remained so throughout 2017 (Table 3-1).
- Deep well MW-39-100 concentrations steadily declined since the start of IM pumping (Figure C-8) and are currently less than 100 µg/L (Table 3-1).
- Deep well MW-44-115 has demonstrated a downward trend since July 2006, as presented on Figures 5-7 and C-10. Well MW-44-125 has also demonstrated an overall downward trend since November

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

2008, as presented on Figures 5-7 and C-10. Current Cr(VI) concentrations in these wells are less than 32 µg/L.

- Concentrations in deep well MW-46-175 have demonstrated a seasonally fluctuating but overall downward trend since 2007, as presented on Figures 5-7 and C-11. Current Cr(VI) concentrations in this well are less than 32 µg/L.
- Well TW-04, a deeper well, has demonstrated a declining trend since March 2007, as presented on Figure C-19, and detected Cr(VI) concentrations have been less than 32 µg/L since 2007.

5.3.2 Groundwater Geochemistry in Interim Measures Extraction Area

5.3.2.1 Oxidation-Reduction Potential Evaluation

Arsenic and manganese samples were collected to establish baseline conditions of in situ byproducts that may be produced or released upon implementation of the groundwater remedy. These parameters are compared with Cr(VI) and other redox indicators (including iron, nitrate, and ORP) on Figures 5-8 and 5-9. These results (including field ORP) are presented in Appendix Table D-1 of this report (with previous years' results presented in Appendix Table D-1 of previous editions of this annual report). The distribution of these redox indicator parameters is generally consistent with that from previous years. Reducing conditions are prevalent in wells completed near the Colorado River (where there is a higher level of organic material in the fluvial sediments) than in wells located farther west from the Colorado River completed in alluvial sediments with a lower organic carbon content.

5.3.2.2 General Chemistry Evaluation

Fifteen floodplain wells were sampled for chemical performance monitoring parameters from March 2005 through December 2017 (Appendix Tables F-1 and D-4). Shallow-depth wells exhibit both increases and decreases in some of these same parameters during this period. The majority of field parameters for groundwater samples from these wells remained relatively stable during the 2017 Annual Reporting Period (Table 3-1).

5.3.2.3 Stable Isotope Evaluation

Analysis of the $\delta^{18}\text{O}$ and $\delta^2\text{H}$ provides a method of tracking the mixing occurring in floodplain groundwater as a result of IM extraction. The lighter signatures (left side of Figure 5-10) are generally found in the river (R-28) and fluvial non-plume well samples, whereas the heaviest signatures are found in selected alluvial plume wells (for example MW-20-130 on the right side of the plot), which likely contain higher percentages of water that has flowed from the upland areas or has been affected by evaporation in the cooling towers (Figure 5-10).

The effects of IM pumping on the isotopic signature of floodplain wells have been presented in previous reports (CH2M Hill 2015b). The percent river water signature was calculated using composite statistics for $\delta^2\text{H}$ isotope data from site river water samples (light fraction) and groundwater samples with greater than 3,000 µg/L Cr(VI) (heavy fraction; termed "industrial water"). This report suggests that the isotopic signature in most industrial signature wells has progressed towards a river water signature since IM pumping began. This is likely a result of the continuous landward gradient created by IM pumping and the

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

resultant mixing of industrial water with river-influenced groundwater. These changes are most likely due to lateral and downward movement of shallow floodplain water, which has an isotopic signature similar to that of river water.

Figure 5-10 shows the water isotope results for industrial water samples (green points) compared with non-plume samples (purple points). For the industrial well samples, 2017 results are compared with 2016 results to evaluate temporal changes in the isotopic signature. Overall, differences between 2016 and 2017 isotopic results are minimal. Whereas MW-20-130 showed a strong difference in the isotopic signature between 2015 and 2016, the results were similar in 2016 and 2017, suggesting minimal mixing with river water over the past year. Other industrial wells (including MW-20-070, MW-20-100, MW-25, MW-26, and MW-31-060) did show a slight lightening in $\delta^{18}\text{O}$, but showed either no change or a slight increase in $\delta^2\text{H}$, suggesting that river water mixing over the past year was likely minimal.

5.4 Summary, Conclusions, and Status of Interim Measures Operations

5.4.1 Performance Evaluation

As of March 2018, the IM has operated full-time for 13 years and has been successful in meeting the IM objectives and performance criteria. This section summarizes the conclusions of IM operations and performance monitoring for the 2017 Annual Reporting Period.

5.4.1.1 Attainment of Performance Standard

Throughout 2017, the IM extraction system (combined wells TW-03D and PE-01) operated at the target pumping rate of 135 gpm, excluding periods of planned and unplanned downtime. The operational run-time percentage for the extraction system was 96.0 percent during the 2017 Annual Reporting Period. The average pumping rate for the IM extraction system, including downtime, during the 2017 Annual Reporting Period was 129.4 gpm.

The following are results and conclusions of the 2017 performance evaluation.

- A total of 68,005,033 gallons of groundwater was extracted and treated at the IM-3 system during the 2017 Annual Reporting Period. The IM system removed approximately 306 pounds (139 kilograms) of chromium from the aquifer during the 2017 Annual Reporting Period.
- The IM pumping rate was sufficient to exceed the minimum overall average landward gradient metric throughout the 2017 Annual Reporting Period. The strong landward gradients were maintained, even during the period of lower river stages in January and December 2017.
- The hydraulic gradients measured in the approved well pairs exceed the metric used as a line of evidence for hydraulic plume control as a result of pumping from extraction wells TW-03D and PE-01.

5.4.1.2 Cr(VI) Distribution and Trends

The following are key conclusions on Cr(VI) distribution and trends observed in the IM performance monitoring area during 2017.

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

- Overall, the groundwater Cr(VI) concentrations in the floodplain are stable or decreasing. The ongoing monitoring has demonstrated marked decreases in Cr(VI) concentration in the floodplain areas, where IM pumping exerts a strong influence on hydraulic gradients (e.g., well clusters MW-36, MW-39, and MW-44).
- MW-34-100 has demonstrated a seasonally fluctuating trend in Cr(VI) concentration over the past 10 years but with a general downward trend. Also, landward gradients have been present at this location since IM pumping began.
- The groundwater ORP and stable isotope data continue to confirm that continued IM extraction is drawing more oxidizing river-influenced groundwater into the performance monitoring area.

5.4.2 Status of Operations and Maintenance

Per DTSC acknowledgment in a letter dated July 20, 2015 (DTSC 2015), PG&E will continue to operate TW-03D at a target pumping rate of 135 gpm, except for periods of planned and unplanned downtime, to maintain appropriate hydraulic gradients across the Alluvial Aquifer. If needed, PE-01, TW-02D, or TW-02S will be pumped to supplement and achieve the total flow, and PE-01 will also be operated when needed to maintain hydraulic gradients.

Current USBR projections show that river levels will increase during the next quarterly reporting period (January through March 2018) on through April, and then will decline from April into the winter (Figure 4-5). By April 2018, the average monthly river elevations are projected to reach their maximum level of the year. The lowest river levels during the upcoming IM operations year are expected to occur in December 2018.

6 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 reported in the First Quarter 2018 Quarterly Monitoring Report, which will be submitted by April 30, 2018.

6.1 Groundwater Monitoring Program

6.1.1 Monthly Monitoring

Monthly sampling of TW-03D will continue during the first 2 weeks of each month. Results will be reported in the First Quarter 2018 Quarterly Monitoring Report.

6.1.2 Quarterly Monitoring

Consistent with the July 23, 2010 DTSC sampling schedule approval (DTSC 2010a), the First Quarter 2018 monitoring event occurred February 19 through February 22, 2018. This sampling event was conducted at 25 wells (including two wells for makeup sampling at well cluster MW-68). Results of sampling will be reported in the First Quarter 2018 Quarterly Monitoring Report.

As noted previously, locations that could not be sampled in Fourth Quarter 2017 (i.e., MW-68 cluster), or where anomalous results were observed (MW-60-BR-245), will be revisited during First Quarter 2018 reporting.

Sampling at MW-40 is expected to resume in Second Quarter 2018 once contracting with an approved traffic -vendor has been finalized.

6.1.3 Well Inspections

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

6.1.4 Sampling Method Trials

Sampling method trials are planned to continue in 2018. Sampling frequency at two GMP wells (TW-04 and TW-05) will increase to semiannual to support method trials at these wells. Recommendations for changes to the GMP based on sampling method trial results from 2017 are proposed in Section 7 of this report.

6.2 Surface Water Monitoring Program

The First Quarter 2018 surface water monitoring event was conducted February 21 and 22, 2018 at 25 locations in the RMP monitoring network. In addition, First Quarter 2018 includes an additional “low river” surface water monitoring event, conducted on January 3 and 4, 2018. Results for both events will be reported in the First Quarter 2018 Quarterly Monitoring Report.

6.3 Performance Monitoring Program

6.3.1 Extraction

The IM3 extraction system will continue to operate in compliance with the DTSC letter dated July 20, 2015 (DTSC 2015) giving conditional approval for PE-01 pumping modifications. PG&E will continue to operate both TW-03D and PE-01 (as needed) with a target combined pumping rate of 135 gpm, except during periods of planned or unplanned downtime, to maintain appropriate hydraulic gradients across the Alluvial Aquifer. Extraction will be primarily from TW-03D, with pumping from PE-01 only if needed to maintain gradient control. 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 and achieve total flow.

6.3.2 PMP Monitoring and Notifications

In 2018, hydraulic gradients will continue to be monitored at key well pairs to ensure that 0.001 ft/ft landward gradients are met.

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.

6.3.3 Transducer Download

Downloads of the transducers in the key gradient control wells (MW-27-085, MW-31-135, MW-33-150, MW-34-100, and MW-45-095) and the MW-33 cluster will continue via telemetry at monthly or more frequent intervals, as needed to support IM-3 pumping operations during First Quarter 2018. Downloads of the remainder of the transducers will occur monthly (within the first 2 weeks of each month) during First Quarter 2018. Installation of a solar-powered telemetry system is planned at MW-20-130 in First Quarter 2018. Addition of this well expands the network of “key” wells in the program from five to six.

6.3.4 Monthly IM-3 Updates

As requested at the July 2015 Consultative Working Group (CWG) meeting, monthly IM-3 hydraulic performance data continue to be shared with agencies, Tribes, and stakeholders (i.e., CH2M 2018). The next monthly data snapshot for February 2018 will be submitted by March 21, 2018.

7 RECOMMENDATIONS

This section presents the recommended modifications to the sampling program(s).

7.1 Performance Monitoring Program

7.1.1 Trigger Levels

Chromium sample results for all wells have generally remained lower than their respective trigger levels since they were established in August 2006 and approved in July 2008 (CH2M Hill 2006; DTSC 2008b). Most wells yielding concentrations higher than the IM performance standard of 20 µg/L for Cr(VI) demonstrate stable or decreasing trends (see Appendix C); therefore, no changes in trigger levels to the PMP program are recommended at this time.

7.1.2 Suggested Change in Location for Upgradient River Gauging Station (Currently Located at RRB)

River gradients at the site are intended to be calculated using an upgradient river gauging station (currently at RRB) in conjunction with a downgradient river location at I-3. However, gauging data collected at RRB over the past 2 years have consistently been incomplete, with the water gauged at RRB not in connection with the river channel surface. This condition resulted in the data having to be discarded, and historical gradients used for calculations. Efforts are underway to identify a new “upgradient” location to take the place of the RRB location for river gauging. This recommendation does not affect continued chemical sampling at RRB.

7.2 Groundwater Monitoring Program

7.2.1 Recommendations from the Current Sampling Methods Evaluation

This section provides recommendations based on results of ongoing sampling method trials at select wells. Recommendations provided herein are additional (and do not take the place of) existing recommendations under agency review discussed in Section 7.2.2.

7.2.1.1 Recommendations from Sampling Method Trials at MW-38 and MW-40

Results from 3 years of sampling method trials at select wells were evaluated in Section 3.5 of this report. Results show consistency between the low-flow sampling method and historical three-volume purge sampling at both MW-38S and MW-38D. Therefore, it is recommended that the trial end at these two wells and both be sampled by low-flow methods moving forward. This recommendation was also made in last year’s annual report (Arcadis 2017a), currently under agency review. Sampling method trials for HYDRASleeve™ sampling were planned to continue in 2017 at wells MW-40S and MW-40D; however, at both wells, planned sampling in 2017 could not be performed due to pending access approval in the highway right-of-way. Pending access, sampling at these wells is planned to resume in Second Quarter 2018. At MW-40S, only two rounds of comparison samples have been collected to date, and while results have been consistent so far, it is recommended that low-flow and HYDRASleeve™ sample frequency be increased to the same (semiannual) frequency as MW-40D in 2018. This would double the

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

currently planned sample collection frequency and help to recommend a single future sample collection method. At MW-40D, four rounds of HYDRASleeve™ sampling results have been collected to date. Results from four rounds of sampling suggest that HYDRASleeve™ sampling may be a viable alternative to low-flow sampling at this location, but additional sampling is needed to complete the evaluation. It is recommended that the sampling trial at this location continue semiannually through 2018 to help recommend a single future sample collection method. An updated evaluation of the HYDRASleeve™ sampling method trials at MW-40S and MW-40D will be presented in the 2018 Annual Report.

7.2.1.2 Recommendations from Sampling Method Trials at Expanded Well Network

In August 2015, PG&E sent a letter to DTSC (PG&E 2015) recommending additional wells for low-flow sampling as well as proposing an additional sampling method trial for select bedrock wells. DTSC responded to this request with technical memoranda April 6 and October 20, 2017, which provided conditional approval for actions including, but not limited to, expanding the sampling method trials to specific long-screen and bedrock wells (DTSC 2017a, 2017b).

Sampling method trials beginning in Fourth Quarter 2018 will be evaluated during the 2018 annual review and reported in the 2018 edition of this report. Additional wells (currently being discussed with DTSC under separate cover) may be added to the trials in 2018.

7.2.2 Groundwater Monitoring Program Requests under Agency Review

With approval of the sampling frequency modification on June 27, 2014, the DTSC also requested a revised sampling plan for non-chromium metals and water quality analyses. The approved purge methods and sampling frequencies for several DTSC-approved sampling programs, as well as proposed sampling plans for other non-chromium analyses, were included in the 2014 Annual Report (CH2M Hill 2015a). These recommendations, presented in the 2014 Annual Report, are awaiting regulatory agency review and comment.

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

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TABLES



Table 1-1**Topock Monitoring Reporting Schedule***Fourth Quarter 2017 and Annual 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

Results of MW-38 and MW-40 Sampling Method Trials through Fourth Quarter 2017
Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report,
PG&E Topock Compressor Station, Needles, California

Note:
 "--" = Not Collected
 Sampling event conducted by Arcadis.
 Sampling event conducted by CH2M Hill
 3V = Three (3) volume sampling method
 LF = Low-flow sampling method
 2.7 [2.5] = indicates field duplicate sample results
 (µg/L) = micrograms per liter
 Groundwater sample not collected at MW-40S or MW-40D due to pending access approval.

Table 2-1b

Results of Expanded Sampling Method Trials, Fourth Quarter 2017

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

	Sampling Event	MW-57-185 Low-Flow Evaluation					MW-60BR-245 Low-Flow Evaluation				
		Date	Cr(VI) Concentration By Method (µg/L)			Evaluation	Date	Cr(VI) Concentration By Method (µg/L)			Evaluation
			3V Purge	Low-Flow 150'	Low-Flow 171'			3V Purge	Low-Flow 175'	Low-Flow 238'	
Pre-Trial Samples		12/13/2016	7.1	--	--	3V Only	5/3/2017	39	--	--	3V Only
		5/1/2017	5.9	--	--	3V Only	9/26/2017	< 1.0	--	--	3V Only
Method Trial	4Q 2017	12/11/2017	8.2	3	3.1	3V vs LF	12/13/2017	690	2.3	<1.0	3V vs LF
	Sampling Event	MW-72BR-200 Low-Flow Evaluation					MW-70BR-225 Low-Flow Evaluation				
		Date	Cr(VI) Concentration By Method (µg/L)			Evaluation	Date	Cr(VI) Concentration By Method (µg/L)			Evaluation
			3V Purge	Low-Flow 152'	Low-flow 195'			3V Purge	Low-Flow	--	
Pre-Trial Samples		5/2/2017	2.9	--	--	3V Only	12/14/2016	1900[1900]	--	--	3V Only
		9/27/2017	3.8	--	--	3V Only	5/2/2017	1800	--	--	3V Only
Method Trial	4Q 2017	12/6/2017	4.2	1.5	< 1.0	3V vs LF	12/11/2017	1700	1400	--	3V vs LF
	Sampling Event	TW-4 Low-Flow Evaluation					TW-5 Low-Flow Evaluation				
		Date	Cr(VI) Concentration By Method (µg/L)			Evaluation	Date	Cr(VI) Concentration By Method (µg/L)			Evaluation
			3V Purge	Low-Flow	--			3V Purge	Low-Flow	--	
Pre-Trial Samples		12/8/2015	6.9	--	--	3V Only	12/8/2015	16	--	--	3V Only
Method Trial	4Q 2017	12/14/2017	8.2	2.8	--	3V vs LF	12/14/2017	14	10	--	3V vs LF

Note:

"--" = Not Collected

3V = Three (3) volume sampling method

LF = Low-flow sampling method

1900 [1900] = indicates field duplicate sample results

(µg/L) = micrograms per liter

- Expanded sampling method trials are also being performed at 10 Compliance Monitoring Program (CMP) Wells beginning Fourth Quarter 2017. Results of these tests will be reported in the annual CMP report, planned for submittal in January, 2019.

Table 3-1

Groundwater Sampling Results, September 2016 through December 2017

Fourth Quarter 2017 and Annual 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-09	SA	12/7/2017	LF	150	140	---	2,500	8.8	7.5	5
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-10	SA	12/7/2017	LF	130	130	---	2,000	-2.1	7.4	28
MW-10	SA	12/7/2017	FD LF	130	120	---	2,000	---	---	---
MW-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-11	SA	12/7/2017	LF	64	61	---	2,000	-0.10	7.5	33
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-12	SA	12/11/2017	LF	1,800	2,100	---	7,200	68	8.1	6
MW-13	SA	12/8/2016	LF	21	21	---	2,300	-89	7.6	1
MW-13	SA	12/8/2017	LF	12	93	---	2,100	-28	7.5	47
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-14	SA	12/13/2017	LF	12	13	---	2,500	73	7.6	32
MW-15	SA	12/12/2016	LF	12	13	---	1,800	100	7.7	5
MW-15	SA	12/12/2017	LF	11	14	---	1,600	160	7.3	7
MW-16	SA	12/12/2017	LF	11	21	---	1,000	140	7.6	9
MW-17	SA	12/12/2017	LF	11	12	---	1,200	150	7.6	2
MW-18	SA	12/8/2016	LF	20	20	---	1,500	26	7.7	1
MW-18	SA	12/12/2017	LF	20	23	---	1,300	140	7.2	2

Table 3-1

Groundwater Sampling Results, September 2016 through December 2017

Fourth Quarter 2017 and Annual 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-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-19	SA	12/8/2017	LF	340	340	---	1,800	170	7.7	10
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-20-070	SA	12/7/2017	LF	1,800	1,900	---	1,700	-6.4	7.7	6
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-20-100	MA	12/8/2017	LF	1,500	1,400	---	1,800	13	7.4	10
MW-20-100	MA	12/8/2017	FD	LF	1,500	1,400	---	1,800	---	---
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-20-130	DA	12/7/2017	LF	4,100	4,400	---	7,100	35	7.3	5
MW-21	SA	12/14/2016	LF	1.3	1.3	---	16,000	25	7.2	15
MW-21	SA	5/3/2017	3V	2.1	2.7	---	---	150	7.2	10
MW-21	SA	12/12/2017	LF	2.3	2.7	---	14,000	83	7.4	12
MW-22	SA	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-22	SA	12/6/2017	LF	ND (1)	ND (1)	---	22,000	-59	6.8	41
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-23-060	BR	12/8/2017	LF	40	35	---	12,000	110	9.6	3
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-23-080	BR	12/8/2017	LF	1.5	1.9	---	12,000	54	10	4
MW-24A	SA	12/6/2016	LF	ND (0.2)	ND (1)	---	1,600	-180	8.4	2

Table 3-1

Groundwater Sampling Results, September 2016 through December 2017

Fourth Quarter 2017 and Annual 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-24A	SA	5/3/2017	LF	ND (0.2)	ND (1)	---	---	-210	8.4	2
MW-24A	SA	12/7/2017	LF	ND (0.2)	2.7 J	---	1,400	-30	8.3	7
MW-24A	SA	12/7/2017	FD LF	ND (0.2)	8.7 J	---	1,400	---	---	---
MW-24B	DA	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-24B	DA	12/7/2017	LF	250	250	---	14,000	-59	7.8	2
MW-24BR	BR	12/7/2016	3V	ND (1)	ND (1)	---	15,000	-220	8.2	3
MW-24BR	BR	12/8/2017	3V	ND (1)	ND (1)	---	11,000	-260	8.1	1
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-25	SA	12/8/2017	LF	91	90	---	1,600	190	7.4	13
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-26	SA	12/11/2017	LF	2,300	2,600	---	3,800	76	7.4	16
MW-26	SA	12/11/2017	FD LF	2,400	2,500	---	3,800	---	---	---
MW-27-020	SA	12/6/2016	LF	ND (0.2)	ND (1)	---	1,000	40	7.6	3
MW-27-020	SA	12/4/2017	LF	ND (0.2)	ND (1)	---	1,000	46	7.7	4
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-27-060	MA	12/4/2017	LF	ND (0.2)	ND (1)	---	990	-120	7.8	3
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-27-085	DA	12/4/2017	LF	ND (1)	ND (1)	---	10,000	-32	7.3	2
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-28-025	SA	12/7/2017	LF	ND (0.2)	ND (1)	---	1,000	79	7.5	2

Table 3-1

Groundwater Sampling Results, September 2016 through December 2017

Fourth Quarter 2017 and Annual 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-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
MW-28-090	DA	12/7/2017	LF	ND (0.2)	ND (1)	---	5,400	-56	7.2	8
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-29	SA	12/7/2017	LF	ND (0.2)	ND (1)	---	1,400	-120	7.4	5
MW-30-030	SA	12/6/2016	LF	ND (1)	ND (1)	---	17,000	-140	7.6	8
MW-30-030	SA	12/6/2017	LF	1.2	78	---	12,000	-170	7.8	23
MW-30-050	MA	12/6/2016	LF	ND (0.2)	ND (1)	---	1,000	49	7.6	1
MW-30-050	MA	12/6/2017	LF	ND (0.2)	ND (1)	---	950	77	7.8	2
MW-30-050	MA	12/6/2017	FD	LF	ND (0.2)	ND (1)	---	930	---	---
MW-31-060	SA	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-31-060	SA	12/12/2017	LF	390	410	---	2,900	150	7.1	2
MW-31-135	DA	12/9/2016	LF	12	11	---	11,000	-91	7.7	17
MW-31-135	DA	12/12/2017	LF	13	13	---	11,000	69	7.3	3
MW-31-135	DA	12/12/2017	FD	LF	13	13	---	11,000	---	---
MW-32-020	SA	12/6/2016	LF	ND (1)	ND (5)	---	36,000	-93	7.0	3
MW-32-020	SA	12/4/2017	LF	ND (1)	ND (5)	---	30,000	-130	7.1	5
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-32-035	SA	12/4/2017	LF	ND (1)	ND (1)	---	9,200	-120	7.3	4
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-33-040	SA	12/7/2017	LF	ND (1)	1.7	---	11,000	180	8.0	25
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

Table 3-1

Groundwater Sampling Results, September 2016 through December 2017

Fourth Quarter 2017 and Annual 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-33-090	MA	12/7/2017	LF	5.5	5	---	7,700	200	7.5	2
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-33-150	DA	12/7/2017	LF	7	7.2	---	12,000	46	7.4	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-33-210	DA	12/7/2017	LF	14	15	---	14,000	140	7.4	9
MW-34-055	MA	12/6/2016	LF	ND (0.2)	ND (1)	---	1,000	21	7.7	1
MW-34-055	MA	12/6/2017	LF	ND (0.2)	ND (1)	---	920	-62	7.8	5
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-34-080	DA	12/6/2017	LF	ND (0.2)	ND (1)	---	7,000	-10	7.3	4
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	---	---	---	---	---
MW-34-100	DA	4/27/2017	LF	0.67	1.8	---	---	-66	7.4	1
MW-34-100	DA	10/2/2017	LF	ND (1)	ND (1)	---	10,000	-33	7.7	10
MW-34-100	DA	12/6/2017	LF	ND (1)	ND (1)	---	11,000	---	---	---
MW-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-35-060	SA	12/8/2017	LF	21	20	---	5,300	120	7.4	5
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-35-135	DA	12/8/2017	LF	29	29	---	8,100	130	7.7	7
MW-36-020	SA	12/7/2016	LF	ND (0.2)	ND (1)	---	9,400	-99	7.3	4.2

Table 3-1

Groundwater Sampling Results, September 2016 through December 2017

Fourth Quarter 2017 and Annual 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-36-020	SA	12/6/2017	LF	ND (0.2)	ND (1)	---	4,800	-140	7.6	6
MW-36-040	SA	12/7/2016	LF	ND (0.2)	ND (1)	---	1,300	-150	7.8	1
MW-36-040	SA	12/6/2017	LF	ND (0.2)	ND (1)	---	990	-160	7.9	9
MW-36-050	MA	12/7/2016	LF	ND (0.2)	ND (1)	---	1,100	-52	7.6	1
MW-36-050	MA	12/6/2017	LF	ND (0.2)	ND (1)	---	970	-85	7.8	2
MW-36-070	MA	12/7/2016	LF	ND (0.2)	ND (1)	---	1,000	66	7.9	1
MW-36-070	MA	12/6/2017	LF	ND (0.2)	ND (1)	---	970	-25	7.7	3
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-36-090	DA	12/6/2017	LF	ND (0.2)	ND (1)	---	5,100	-38	7.7	2
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-36-100	DA	12/6/2017	LF	12	14	---	7,200	-31	7.5	21
MW-36-100	DA	12/6/2017	FD LF	12	15	---	7,200	---	---	---
MW-37D	DA	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-37D	DA	12/8/2017	LF	5	6.4	---	11,000	-56	7.8	6
MW-37S	MA	12/8/2016	LF	11	11	---	6,100	-98	7.6	19
MW-37S	MA	12/8/2017	LF	12	12	---	5,300	-46	7.7	21
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-38D	DA	12/7/2017	3V	21	18	---	16,000	-46	7.9	21
MW-38D	DA	12/7/2017	LF	20	18	---	16,000	-50	8.3	46
MW-38S	SA	9/29/2016	3V	0.99	2.3	---	---	-80	7.8	1
MW-38S	SA	9/29/2016	LF	ND (0.2)	1.4	---	---	---	---	---

Table 3-1

Groundwater Sampling Results, September 2016 through December 2017

Fourth Quarter 2017 and Annual 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-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	---	---	---
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-38S	SA	12/7/2017	3V	2.9	3.1	---	1,400	-24	7.9	1
MW-38S	SA	12/7/2017	LF	2.3	2.5	---	1,400	-36	7.9	2
MW-39-040	SA	12/7/2016	LF	ND (0.2)	ND (1)	---	1,200	-150	8.0	4.8
MW-39-040	SA	12/5/2017	LF	ND (0.2)	ND (1)	---	1,100	-190	8.2	38
MW-39-040	SA	12/5/2017	FD LF	ND (0.2)	ND (1)	---	1,100	---	---	---
MW-39-050	MA	12/7/2016	LF	ND (0.2)	ND (1)	---	1,100	12	7.6	1
MW-39-050	MA	12/5/2017	LF	ND (0.2)	ND (1)	---	1,000	-54	7.6	3
MW-39-060	MA	12/7/2016	LF	ND (0.2)	ND (1)	---	1,200	23	7.7	1
MW-39-060	MA	12/5/2017	LF	ND (0.2)	1.8	---	1,100	-63	7.9	2
MW-39-070	MA	12/7/2016	LF	ND (0.2)	ND (1)	---	1,800	77	7.7	2
MW-39-070	MA	12/5/2017	LF	ND (0.2)	ND (1)	---	1,700	7.0	7.8	2
MW-39-080	DA	12/7/2016	LF	ND (0.2)	ND (1)	---	2,200	33	7.9	1
MW-39-080	DA	12/5/2017	LF	0.26	1.2	---	5,000	-78	7.5	4
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-39-100	DA	12/5/2017	LF	71	66	---	12,000	91	6.9	5
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-41D	DA	12/13/2017	LF	ND (1)	ND (1)	---	19,000	-60	7.2	2

Table 3-1

Groundwater Sampling Results, September 2016 through December 2017

Fourth Quarter 2017 and Annual 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-41D	DA	12/13/2017	FD	LF	ND (1)	1.2	---	19,000	---	---	---
MW-41M	DA	12/8/2016		LF	9.2	8.9	---	15,000	-120	7.6	30
MW-41M	DA	12/13/2017		LF	9.3	14	---	13,000	3.5	7.1	9
MW-41S	SA	12/8/2016		LF	15	14	---	5,900	-120	7.8	47
MW-41S	SA	12/13/2017		LF	12	12	---	5,600	31	7.8	36
MW-42-030	SA	12/6/2016		LF	ND (0.2)	ND (1)	---	2,700	-110	7.9	8.2
MW-42-030	SA	12/4/2017		LF	ND (0.2)	ND (1)	---	2,800	-180	8.0	9
MW-42-030	SA	12/4/2017	FD	LF	ND (0.2)	ND (1)	---	2,800	---	---	---
MW-42-055	MA	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-42-055	MA	12/4/2017		LF	ND (0.2)	1.3	---	1,100	-99	8.6	4
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-42-065	MA	12/4/2017		LF	ND (0.2)	ND (1)	---	2,700	59	7.9	2
MW-43-025	SA	12/7/2016		LF	ND (0.2)	ND (1)	---	1,400	-71	7.4	2
MW-43-025	SA	12/5/2017		LF	ND (0.2)	ND (1)	---	1,200	-150	7.6	2
MW-43-075	DA	12/9/2016		LF	ND (1)	ND (1)	---	10,000	-110	7.2	5
MW-43-075	DA	12/5/2017		LF	ND (1)	ND (1)	---	9,900	-120	7.2	5
MW-43-090	DA	12/9/2016		LF	ND (1)	ND (5)	---	16,000	22	7.3	4.6
MW-43-090	DA	12/5/2017		LF	ND (1)	ND (1)	---	15,000	-68	7.2	7
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
MW-44-070	MA	12/6/2017		LF	ND (0.2)	ND (1)	---	1,400	-130	7.6	30
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

Table 3-1

Groundwater Sampling Results, September 2016 through December 2017

Fourth Quarter 2017 and Annual 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-44-115	DA	10/2/2017	LF	15	13	---	12,000	52	8.1	8
MW-44-115	DA	12/6/2017	LF	14	13	---	9,800	---	---	---
MW-44-125	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-44-125	DA	12/6/2017	LF	2.9	4.8	---	11,000	-52	7.9	4
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	90	8.4	9
MW-46-175	DA	12/7/2017	LF	11	11	---	14,000	---	---	---
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-46-205	DA	12/7/2017	3V	ND (1)	ND (1)	---	17,000	140	8.5	2
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-47-055	SA	12/7/2017	LF	18	20	---	3,600	99	7.7	11
MW-47-055	SA	12/7/2017	FD LF	19	20	---	3,600	---	---	---
MW-47-115	DA	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-47-115	DA	12/7/2017	LF	18	16	---	10,000	59	7.5	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-48	BR	12/13/2017	LF	ND (1)	ND (1)	---	16,000	82	8.0	9
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-49-135	DA	12/7/2017	3V	2.9	2.7	---	10,000	-39	7.8	9

Table 3-1

Groundwater Sampling Results, September 2016 through December 2017

Fourth Quarter 2017 and Annual 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-49-275	DA	12/8/2016	LF	ND (1)	ND (5)	---	26,000	2.0	8.0	2
MW-49-275	DA	12/7/2017	LF	ND (1)	3.5	---	18,000	-130	8.2	1
MW-49-365	DA	12/8/2016	LF	ND (1)	ND (5)	---	38,000	-100	7.8	1
MW-49-365	DA	12/7/2017	LF	ND (1)	ND (1)	---	25,000	-110	7.7	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
MW-50-095	MA	12/8/2017	LF	13	14	---	4,500	100	8.0	11
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-50-200	DA	12/8/2017	LF	4,100	4,300	---	15,000	170	7.9	42
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-51	MA	12/11/2017	LF	3,700	4,100	---	12,000	66	7.5	3
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-52D	DA	12/5/2017	LF	ND (1)	ND (1)	---	19,000	-92	7.5	2
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-52M	DA	12/5/2017	LF	ND (1)	ND (1)	---	14,000	-69	6.8	3
MW-52M	DA	12/5/2017	FD LF	ND (1)	ND (1)	---	14,000	---	---	---
MW-52S	MA	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-52S	MA	12/5/2017	LF	ND (1)	ND (1)	---	8,800	-80	6.9	7
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-53D	DA	12/5/2017	LF	ND (1)	ND (5)	---	24,000	-100	7.4	2

Table 3-1

Groundwater Sampling Results, September 2016 through December 2017

Fourth Quarter 2017 and Annual 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-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-53M	DA	12/5/2017	LF	ND (0.2)	ND (1)	---	13,000	-140	7.8	2
MW-54-085	DA	12/15/2016	(a) 3V	ND (1) (b)	ND (1) (b)	---	---	-110	7.4	3
MW-54-085	DA	5/4/2017	(a) LF	ND (0.2) (b)	ND (1) (b)	---	---	-77	8.1	4
MW-54-085	DA	12/13/2017	(a) LF	ND (1)	ND (1)	---	9,530	-55	7.6	9
MW-54-140	DA	12/15/2016	(a) 3V	ND (1) (b)	ND (1) (b)	---	---	-120	7.7	24
MW-54-140	DA	5/4/2017	(a) LF	ND (0.2) (b)	ND (1) (b)	---	---	-14	8.2	3
MW-54-140	DA	12/13/2017	(a) LF	ND (1)	ND (1)	---	12,800	-80	7.9	10
MW-54-195	DA	12/15/2016	(a) LF	ND (1) (b)	ND (5) (b)	---	---	-97	8.2	1
MW-54-195	DA	12/15/2016	FD(a) LF	ND (1 J) (b)	ND (5) (b)	---	---	---	---	---
MW-54-195	DA	5/4/2017	(a) 3V	ND (1) (b)	ND (1) (b)	---	---	-220	8.2	1
MW-54-195	DA	12/13/2017	(a) LF	ND (1)	1.2	---	21,400	-160	7.6	4
MW-55-045	MA	12/15/2016	(a) LF	ND (0.2) (b)	ND (1) (b)	---	---	-14	7.8	22
MW-55-045	MA	5/2/2017	(a) LF	ND (0.2) (b)	ND (1) (b)	---	---	-130	7.8	6
MW-55-045	MA	12/13/2017	(a) LF	ND (0.2)	ND (1)	---	1,370	-110	7.9	8
MW-55-120	DA	9/30/2016	(a) LF	6.39	6.83	---	---	140	8.0	1
MW-55-120	DA	12/15/2016	(a) 3V	8.4	8.17	---	---	-110	7.9	13
MW-55-120	DA	2/10/2017	(a) LF	7.5	8.3	---	---	-130	8.1	5
MW-55-120	DA	2/10/2017	FD(a) LF	7.33	8.28	---	---	---	---	---
MW-55-120	DA	5/2/2017	(a) LF	8.1	8.2	---	---	-1.2	8.0	8
MW-55-120	DA	12/13/2017	(a) LF	7.11	9.03	---	8,160	78	7.5	4
MW-56D	DA	12/14/2016	(a) LF	ND (1) (b)	ND (5) (b)	---	---	-34	7.6	2
MW-56D	DA	5/4/2017	(a) LF	ND (1) (b)	ND (1) (b)	---	---	-160	7.3	1
MW-56D	DA	12/13/2017	(a) LF	ND (1)	ND (1)	---	21,100	-41	6.9	2
MW-56M	DA	12/14/2016	(a) LF	ND (1) (b)	ND (5) (b)	---	---	-110	7.2	6
MW-56M	DA	5/4/2017	(a) LF	ND (1) (b)	ND (1) (b)	---	---	-110	7.2	1
MW-56M	DA	12/13/2017	(a) LF	ND (1)	ND (1)	---	12,900	-97	7.2	2
MW-56S	SA	12/14/2016	(a) LF	ND (0.2) (b)	ND (1) (b)	---	---	-110	6.9	2

Table 3-1**Groundwater Sampling Results, September 2016 through December 2017**

*Fourth Quarter 2017 and Annual 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-56S	SA	5/4/2017	(a)	LF	ND (0.2) (b)	ND (1) (b)	---	---	-110	7.6	7
MW-56S	SA	12/13/2017	(a)	LF	ND (0.2)	ND (1)	---	5,060	-120	6.9	2
MW-57-070	BR	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-57-070	BR	12/11/2017		LF	420	430	---	2,400	-96	7.2	20
MW-57-185	BR	12/13/2016		3V	7.1	7.3	---	20,000	32	8.9	1
MW-57-185	BR	5/1/2017		3V	5.9	5.2	---	---	-47	9.4	2
MW-57-185	BR	12/11/2017		3V	8.2	7.4	---	18,000	41	9.5	21
MW-57-185	BR	12/11/2017		LF	3.1	3.3	---	16,000	100	11	25
MW-58BR	BR	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-58BR	BR	12/11/2017		LF	39	41	---	7,900	130	8.0	35
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-59-100	SA	12/7/2017		LF	3,600	3,900	---	10,000	-5.8	7.1	54
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-60-125	BR	12/6/2017		LF	770	730	---	8,800	-37	7.5	20
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-60BR-245	BR	12/13/2017		LF	2.3	12	---	16,000	110	8.1	11
MW-60BR-245	BR	12/14/2017		3V	690	830	---	14,000	70	8.2	24

Table 3-1

Groundwater Sampling Results, September 2016 through December 2017

Fourth Quarter 2017 and Annual 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-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-61-110	BR	12/6/2017	LF	410	380	---	15,000	-42	7.5	16
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-62-065	BR	12/6/2017	LF	510	500	---	5,800	-25	7.5	20
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
MW-62-110	BR	12/7/2017	Tap	ND (1)	3	---	7,400	-180	7.8	9
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-62-190	BR	12/7/2017	Tap	ND (1)	ND (1)	---	13,000	-200	7.8	10
MW-62-190	BR	12/7/2017	FD Tap	ND (1)	ND (1)	---	13,000	---	---	---
MW-63-065	BR	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-63-065	BR	12/12/2017	LF	1.2	2.6	---	5,800	73	6.9	6
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

Table 3-1

Groundwater Sampling Results, September 2016 through December 2017

Fourth Quarter 2017 and Annual 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-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-64BR	BR	12/6/2017		LF	ND (1)	ND (1)	---	12,000	-83	7.5	9
MW-65-160	SA	9/29/2016	FD	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-65-160	SA	12/5/2017		LF	160	190	---	3,500	-3.2	7.1	21
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	LF	520	520	---	---	---	---	---	
MW-65-225	DA	9/26/2017	LF	480	520	---	7,900	-83	7.2	25	
MW-65-225	DA	12/5/2017	LF	210	220	---	13,000	-37	7.6	25	
MW-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-66-165	SA	12/5/2017		LF	500	520	---	3,600	74	7.5	8
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
MW-66-230	DA	12/5/2017		LF	6,500	6,900	---	17,000	66	8.1	3
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-66BR-270	BR	12/14/2017		3V	ND (0.2)	ND (1)	---	2,900	-160	7.4	23
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

Table 3-1

Groundwater Sampling Results, September 2016 through December 2017

Fourth Quarter 2017 and Annual 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-67-185	SA	12/4/2017	LF	1,500	1,700	---	7,400	100	7.0	5
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-67-225	MA	12/4/2017	LF	3,100	3,100	---	7,200	77	7.5	38
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-67-260	DA	12/4/2017	LF	590	630	---	17,000	-53	11	5
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-69-195	BR	12/4/2017	LF	470	440	---	3,500	-5.0	7.3	5
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-70-105	BR	12/11/2017	LF	160	150	---	3,500	140	7.6	5
MW-70BR-225	BR	12/14/2016	3V	1,900	1,800	---	14,000	-57	7.3	2

Table 3-1

Groundwater Sampling Results, September 2016 through December 2017

Fourth Quarter 2017 and Annual 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	12/14/2016	FD	3V	1,900	1,800	---	14,000	---	---	---
MW-70BR-225	BR	5/2/2017		3V	1,800	1,800	---	---	-36	7.9	1
MW-70BR-225	BR	12/11/2017		3V	1,700	1,800	---	13,000	130	7.2	1
MW-70BR-225	BR	12/11/2017		LF	1,400	1,600	---	12,000	180	7.3	9
MW-71-035	SA	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-71-035	SA	12/12/2017		LF	ND (1)	1.5	---	15,000	79	7.4	49
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	Tap	110	97	---	16,000	---	---	---
MW-72-080	BR	12/7/2017		LF	94	95	---	12,000	-10	7.7	5
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-72BR-200	BR	12/6/2017		3V	4.2	3.8	---	15,000	-170	8.2	1
MW-72BR-200	BR	12/6/2017		LF	1.5	1.7	---	15,000	-170	8.2	9
MW-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-73-080	BR	12/6/2017		LF	28	29	---	11,000	-35	7.4	34

Table 3-1

Groundwater Sampling Results, September 2016 through December 2017

Fourth Quarter 2017 and Annual 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-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
MW-74-240	BR	12/6/2017	LF	ND (0.2)	5.3	---	860	-18	8.3	80
OW-03D	DA	12/8/2016	LF	12	13	---	9,800	28	8.9	1
OW-03D	DA	12/8/2017	LF	7.9	8.1	---	7,200	72	7.5	2
OW-03D	DA	12/8/2017	FD	7.9	8.4	---	7,100	---	---	---
OW-03M	MA	12/8/2016	LF	15	16	---	6,300	22	7.9	7
OW-03M	MA	12/8/2017	LF	16	16	---	5,200	85	8.0	3
OW-03S	SA	12/8/2016	3V	21	22	---	1,500	28	7.8	2
OW-03S	SA	12/8/2017	LF	18	18	---	1,300	75	7.7	2
PE-01	DA	9/8/2016	Tap	1.1	1.1	---	4,200	-5.3	7.3	1
PE-01	DA	10/6/2016	Tap	0.57	ND (1)	---	4,500	---	---	---
PE-01	DA	10/6/2016	FD	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	---	---	---
PE-01	DA	2/7/2017	Tap	1.9	1.8	---	4,600	-9.6	7.7	24
PE-01	DA	2/7/2017	FD	1.9	1.9	---	4,500	---	---	---
PE-01	DA	3/8/2017	Tap	1.7	2.1	---	4,300	70	7.8	4.39
PE-01	DA	4/25/2017	Tap	0.53	ND (1)	---	3,900	---	---	---
PE-01	DA	5/4/2017	Tap	ND (0.2)	ND (1)	---	4,100	---	---	---
PE-01	DA	6/7/2017	Tap	ND (0.2)	ND (1)	---	4,500	210	7.5	3
PE-01	DA	7/18/2017	Tap	ND (0.2)	ND (1)	---	4,000	-44	7.8	12
PE-01	DA	8/2/2017	Tap	ND (0.2)	ND (1)	---	3,900	73	7.3	2
PE-01	DA	9/7/2017	Tap	9	4.5	---	4,300	---	---	---
PE-01	DA	10/3/2017	Tap	ND (0.2)	ND (1)	---	3,200	---	---	---
PE-01	DA	11/2/2017	Tap	0.52	ND (1)	---	4,800	110	7.3	3
PE-01	DA	12/7/2017	Tap	ND (0.2)	ND (1)	---	3,700	-54	7.3	10
PGE-07BR	BR	12/7/2016	3V	ND (1)	ND (1)	---	20,000	-280	7.3	38

Table 3-1

Groundwater Sampling Results, September 2016 through December 2017

Fourth Quarter 2017 and Annual 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
PGE-07BR	BR	12/8/2017	3V	ND (1)	ND (5)	---	14,000	-230	7.0	20
PGE-08	BR	12/7/2016	3V	ND (1)	ND (1)	---	19,000	-190	8.3	5
PGE-08	BR	12/14/2017	3V	ND (1)	ND (1)	---	17,000	-85	8.4	9
PM-03	---	12/9/2016	Tap	9.4	9.4	8.7	1,500	46	7.5	2
PM-03	---	12/14/2017	Tap	9.4	9.6	10	1,300	-80.8	7.5	3.68
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	---	---	---
PM-04	---	12/14/2017	Tap	18	18	18	2,000	-79.5	7.22	4.52
PM-04	---	12/14/2017	FD Tap	18	18	18	2,000	---	---	---
TW-01	SA	5/3/2017	LF	2,200	2,400	---	---	110	7.5	1
TW-01	SA	12/13/2017	3V	2,200	2,300	---	7,100	-77	7.3	4
TW-01	SA	12/13/2017	FD LF	2,200	2,400	---	7,000	---	---	---
TW-02D	DA	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	7.3	9
TW-02D	DA	12/7/2017	Tap	110	93	---	4,800	---	---	---
TW-02S	SA	12/13/2016	Tap	64	93	---	3,900	130	7.7	1
TW-02S	SA	12/7/2017	Tap	250	260	---	2,000	-44	7.2	9
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	---	---	---
TW-03D	DA	2/7/2017	Tap	600	630	---	7,800	-3.7	7.4	9
TW-03D	DA	3/8/2017	Tap	560	630	---	7,600	---	---	---
TW-03D	DA	3/8/2017	FD Tap	570	580	---	7,800	---	---	---

Table 3-1**Groundwater Sampling Results, September 2016 through December 2017**

*Fourth Quarter 2017 and Annual 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	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	---	---	---
TW-03D	DA	11/2/2017	Tap	550	570	---	7,600	100	7.3	2
TW-03D	DA	12/7/2017	Tap	550	570	---	6,100	-34	7.1	26
TW-04	DA	12/14/2017	3V	8.2	8.3	---	19,000	94	8.1	9
TW-04	DA	12/14/2017	LF	2.8	4	---	22,000	150	8.2	44
TW-05	DA	12/14/2017	3V	14	12	---	12,000	41	7.3	1
TW-05	DA	12/14/2017	LF	10	13	---	12,000	3.5	7.4	9

Notes:

(a) = ADHS approved lab

(b) = Results were originally reported to the laboratory's sample specific limit of detection instead of the sample specific reporting limit as required,

The laboratory sample specific reporting limit replaced the sample specific laboratory limit of detection as of January 2018.

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

ADHS = Arizona Department of Health Services

FD = field duplicate sample.

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

mV = millivolts.

ND = not detected at listed RL.

ORP = oxidation-reduction potential.

RL = reporting limit.

UF = unfiltered.

µg/L = micrograms per liter.

µS/cm = microSiemens per centimeter.

Table 3-1**Groundwater Sampling Results, September 2016 through December 2017**

*Fourth Quarter 2017 and Annual 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

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.

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

Table 3-2a

Groundwater COPCs and In Situ Byproducts Sampling Results, January 2017 through December 2017

Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide

Groundwater and Surface Water Monitoring Report,

PG&E Topock Compressor Station, Needles, California

Location ID	Aquifer Zone	Sample Date	Sample Method	Arsenic Dissolved (µg/L)	Molybdenum Dissolved (µg/L)	Selenium Dissolved (µg/L)	Manganese Dissolved (µg/L)	Nitrate as N (mg/L)
MW-09	SA	2/9/2017	LF	1.7	3.9	4.6	ND (0.5)	11
MW-09	SA	5/3/2017	LF	1.7	4.2	5	ND (0.5)	12
MW-09	SA	12/7/2017	LF	1.5	4.2	5.3	ND (0.5)	11
MW-10	SA	2/9/2017	LF	--	22	5.4	--	11
MW-10	SA	5/3/2017	LF	--	24	5.6	--	12
MW-10	SA	12/7/2017	LF	2.6	19	5.9	0.53	13
MW-10	SA	12/7/2017	FD LF	2.5	19	5.5	0.58	12
MW-11	SA	2/9/2017	LF	1.4	6.1	4.1	ND (0.5)	5.8
MW-11	SA	5/3/2017	LF	1.3	6.2	4.1	1.9	5.8
MW-11	SA	12/7/2017	LF	1.3	7	4.6	2.6	6
MW-12	SA	5/1/2017	LF	--	7.5	22	--	15
MW-12	SA	12/11/2017	LF	38	9.7	24	2.2	15
MW-13	SA	12/8/2017	LF	2.2	14	3.1	160	--
MW-14	SA	5/1/2017	LF	0.75	12	1.8	ND (0.5)	3.4
MW-14	SA	5/1/2017	FD 3V	0.74	12	2	ND (0.5)	3.4
MW-14	SA	12/13/2017	LF	0.78	13	2	1.9	3.4
MW-15	SA	12/12/2017	LF	--	14	3.5	8.3	--
MW-16	SA	12/12/2017	LF	--	17	2.3	33	--
MW-17	SA	12/12/2017	LF	--	17	8	0.92	--
MW-18	SA	12/12/2017	LF	--	5.9	4	0.62	--
MW-19	SA	12/8/2017	LF	--	10	3.6	ND (0.5)	--
MW-20-070	SA	4/27/2017	LF	--	35	5.4	--	8.8
MW-20-070	SA	12/7/2017	LF	--	36	5	ND (0.5)	9
MW-20-100	MA	4/27/2017	LF	--	4.3	5.9	--	8.7
MW-20-100	MA	12/8/2017	LF	--	4.7	5.3	ND (0.5)	8.3
MW-20-100	MA	12/8/2017	FD LF	--	4.8	5	ND (0.5)	8.4
MW-20-130	DA	4/27/2017	LF	4.8	43	25	2.4	11
MW-20-130	DA	4/27/2017	FD LF	4.5	39	26	1.7	11
MW-20-130	DA	12/7/2017	LF	3.6	21	42	1.6	15
MW-21	SA	5/3/2017	3V	--	62	29	--	1.4
MW-21	SA	12/12/2017	LF	--	76	47	11	0.46
MW-22	SA	4/28/2017	LF	13	--	--	1,900	--
MW-22	SA	12/6/2017	LF	17	30	ND (2.5)	6,000	--
MW-23-060	BR	4/28/2017	LF	3.1	--	--	4	--
MW-23-060	BR	12/8/2017	LF	4	23	4.8	3.5	--
MW-23-080	BR	4/28/2017	LF	4.4	--	--	4.9	--
MW-23-080	BR	12/8/2017	LF	4.9	40	5.1	4.2	--
MW-24A	SA	5/3/2017	LF	ND (0.1)	150	ND (0.5)	26	0.06
MW-24A	SA	12/7/2017	LF	0.14	140	ND (0.5)	19	ND (0.05)
MW-24A	SA	12/7/2017	FD LF	0.22	140	ND (0.5)	21	ND (0.05)
MW-24B	DA	5/3/2017	LF	2.6	61	ND (2.5)	120	1.9
MW-24B	DA	5/3/2017	FD LF	2.8	57	ND (2.5)	110	1.7
MW-24B	DA	12/7/2017	LF	3.1	63	ND (2.5)	98	1.7
MW-24BR	BR	12/8/2017	3V	0.37	58	ND (2.5)	140	ND (0.05)
MW-25	SA	5/1/2017	LF	1	3.5	7.4	ND (0.5)	12
MW-25	SA	12/8/2017	LF	1.2	4.7	7.6	ND (0.5)	12
MW-26	SA	4/26/2017	LF	1.9	32	44	ND (0.5)	23
MW-26	SA	12/11/2017	LF	2	34	41	3.6 J	21
MW-26	SA	12/11/2017	FD LF	1.9	33	40	0.96 J	20
MW-27-020	SA	12/4/2017	LF	1.2	5.7	ND (0.5)	65	ND (0.05)
MW-27-060	MA	12/4/2017	LF	11	4.5	ND (0.5)	240	ND (0.05)
MW-27-085	DA	4/28/2017	LF	1.3	17	ND (2.5)	84	ND (0.05)
MW-27-085	DA	4/28/2017	FD LF	1.3	17	ND (2.5)	85	ND (0.05)
MW-27-085	DA	12/4/2017	LF	1.7	18	ND (2.5)	81	ND (0.05)
MW-28-025	SA	4/26/2017	LF	0.99	6.2	ND (0.5)	17	ND (0.05)
MW-28-025	SA	12/7/2017	LF	0.71	4.3	1.2	ND (0.5)	ND (0.05)
MW-28-090	DA	4/26/2017	LF	2.2	25	ND (2.5)	270	ND (0.05)
MW-28-090	DA	12/7/2017	LF	1.7	23	ND (0.5)	130	ND (0.05)
MW-29	SA	4/26/2017	LF	15	33	2	390	0.053 U
MW-29	SA	12/7/2017	LF	9.2	4.8	ND (0.5)	200	ND (0.05)
MW-30-030	SA	12/6/2017	LF	2	99	1.8	230	ND (0.1)
MW-30-050	MA	12/6/2017	LF	2.9	5.1	ND (0.5)	170	ND (0.05)
MW-30-050	MA	12/6/2017	FD LF	2.9	5	ND (0.5)	170	ND (0.05)
MW-31-060	SA	4/27/2017	LF	1.1	--	--	ND (0.5)	--
MW-31-060	SA	4/27/2017	FD LF	1.1	--	--	1	--

Table 3-2a

Groundwater COPCs and In Situ Byproducts Sampling Results, January 2017 through December 2017

Fourth Quarter 2017 and Annual 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-31-060	SA	12/12/2017	LF	1.1	14	2.6	ND (0.5)	3.4
MW-31-135	DA	12/12/2017	LF	3.5	26	0.85	1.5	--
MW-31-135	DA	12/12/2017	FD LF	3.6	26	0.74	1.5	--
MW-32-020	SA	12/4/2017	LF	3.4	260	3	250	--
MW-32-035	SA	4/27/2017	LF	26	--	--	730	--
MW-32-035	SA	12/4/2017	LF	20	13	ND (0.5)	900	ND (0.05)
MW-33-040	SA	4/26/2017	LF	11	120	ND (2.5)	16	ND (0.05)
MW-33-040	SA	12/7/2017	LF	9.7	340	ND (2.5)	14	0.3
MW-33-090	MA	4/26/2017	LF	1.2	10	ND (2.5)	3.1	1.2
MW-33-090	MA	12/7/2017	LF	1.1	11	ND (0.5)	5.4	1.1
MW-33-150	DA	4/26/2017	LF	1.6	47	ND (2.5)	65	1.3
MW-33-150	DA	4/26/2017	FD LF	1.5	48	ND (2.5)	63	1.4
MW-33-150	DA	12/7/2017	LF	1.8	41	ND (2.5)	3.8	1.6
MW-33-210	DA	4/26/2017	LF	1.2	19	ND (2.5)	14	1.6
MW-33-210	DA	12/7/2017	LF	1	17	ND (2.5)	18	1.8
MW-34-055	MA	12/6/2017	LF	2.5	5	ND (0.5)	82	ND (0.05)
MW-34-080	DA	4/27/2017	LF	1.3	--	--	41	--
MW-34-080	DA	12/6/2017	LF	1.4	13	ND (0.5)	42	ND (0.05)
MW-34-100	DA	2/6/2017	LF	1.2	52	ND (2.5)	25	0.19
MW-34-100	DA	2/6/2017	FD LF	1.4	53	ND (2.5)	24	0.18
MW-34-100	DA	4/27/2017	LF	1.1	34	ND (2.5)	120	ND (0.05)
MW-34-100	DA	10/2/2017	LF	1.4	20	ND (0.5)	230	ND (0.05)
MW-34-100	DA	12/6/2017	LF	1.3	54	ND (0.5)	120	ND (0.05)
MW-35-060	SA	5/1/2017	LF	0.94	10	1	ND (0.5)	2.2
MW-35-060	SA	12/8/2017	LF	0.99	8.9	1.1	ND (0.5)	2.3
MW-35-135	DA	5/1/2017	LF	0.67	18	ND (2.5)	2.1	2.6
MW-35-135	DA	12/8/2017	LF	0.84	24	1.1	4.9	2.7
MW-36-020	SA	12/6/2017	LF	2.3	36	ND (0.5)	180	--
MW-36-040	SA	12/6/2017	LF	4.8	4	ND (0.5)	99	ND (0.05)
MW-36-050	MA	12/6/2017	LF	4.7	3.2	ND (0.5)	230	--
MW-36-070	MA	12/6/2017	LF	2.3	4.1	ND (0.5)	230	--
MW-36-090	DA	4/27/2017	LF	5.5	--	--	170	--
MW-36-090	DA	12/6/2017	LF	4.6	11	ND (0.5)	140	--
MW-36-100	DA	4/27/2017	LF	5.1	22	ND (2.5)	260	0.075
MW-36-100	DA	4/27/2017	FD LF	5	23	ND (0.5)	250	0.062
MW-36-100	DA	12/6/2017	LF	4.3	23	ND (0.5)	310	ND (0.05)
MW-36-100	DA	12/6/2017	FD LF	4.5	24	ND (0.5)	330	ND (0.05)
MW-37D	DA	5/1/2017	LF	--	51	ND (2.5)	--	0.27
MW-37D	DA	12/8/2017	LF	--	53	ND (2.5)	5.9	0.33
MW-37S	MA	12/8/2017	LF	1.8	15	ND (2.5)	ND (0.5)	--
MW-38D	DA	5/3/2017	3V	6.7	83	ND (2.5)	44	0.069
MW-38D	DA	5/3/2017	LF	7.6	92	ND (2.5)	53	0.05
MW-38D	DA	12/7/2017	3V	7	87	ND (2.5)	22	ND (0.05)
MW-38D	DA	12/7/2017	LF	7.3	89	ND (2.5)	21	0.05
MW-38S	SA	2/9/2017	3V	8.4	46	0.54	110	1.6
MW-38S	SA	2/9/2017	LF	8.6	45	0.86	120	1.9
MW-38S	SA	5/3/2017	3V	7.9	37	1.3	110	2.5
MW-38S	SA	5/3/2017	LF	7.7	35	1.8	110	2.7
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-38S	SA	12/7/2017	3V	7.3	38	1.5	70	2.8
MW-38S	SA	12/7/2017	LF	7.1	38	1.4	68	3
MW-39-040	SA	12/5/2017	LF	18	--	--	130	--
MW-39-040	SA	12/5/2017	FD LF	18	--	--	130	--
MW-39-050	MA	12/5/2017	LF	2.1	4.4	ND (0.5)	160	--
MW-39-060	MA	12/5/2017	LF	4	6.2	ND (0.5)	83	0.3
MW-39-070	MA	12/5/2017	LF	--	22	ND (0.5)	1.9	--
MW-39-080	DA	12/5/2017	LF	--	32	ND (0.5)	4.4	--
MW-39-100	DA	4/27/2017	LF	2	6.5	ND (2.5)	6.9	ND (0.05)
MW-39-100	DA	12/5/2017	LF	2.1	7.1	ND (0.5)	7.9	ND (0.05)
MW-41D	DA	5/1/2017	LF	2	85	ND (2.5)	74	0.41
MW-41D	DA	12/13/2017	LF	2.8	76	ND (2.5)	68	0.47
MW-41D	DA	12/13/2017	FD LF	2.8	74	ND (2.5)	66	0.49
MW-41M	DA	12/13/2017	LF	2.2	25	0.54	7.3	0.66

Table 3-2a

Groundwater COPCs and In Situ Byproducts Sampling Results, January 2017 through December 2017

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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-41S	SA	12/13/2017	LF	1.6	14	1.2	0.5	1.6
MW-42-030	SA	12/4/2017	LF	2.6	20	ND (0.5)	48	0.053
MW-42-030	SA	12/4/2017	FD LF	2.6	20	ND (0.5)	48	0.051
MW-42-055	MA	4/28/2017	LF	28	--	--	18	--
MW-42-055	MA	12/4/2017	LF	28	5.9	ND (0.5)	20	--
MW-42-065	MA	4/28/2017	LF	5.7	--	--	290	--
MW-42-065	MA	12/4/2017	LF	14	14	ND (0.5)	280	--
MW-43-025	SA	12/5/2017	LF	25	7.1	ND (0.5)	300	--
MW-43-075	DA	12/5/2017	LF	12	14	ND (0.5)	740	--
MW-43-090	DA	12/5/2017	LF	3.1	30	ND (0.5)	750	--
MW-44-070	MA	4/27/2017	3V	3.7	--	--	160	--
MW-44-070	MA	12/6/2017	LF	4.6	11	ND (0.5)	150	--
MW-44-115	DA	2/6/2017	LF	5.2	75	ND (2.5)	4.5	0.15
MW-44-115	DA	4/27/2017	LF	5.8	98	ND (2.5)	5.4	0.14
MW-44-115	DA	10/2/2017	LF	5.4	79	ND (0.5)	7.6	0.073
MW-44-115	DA	12/6/2017	LF	5.9	84	ND (0.5)	5.7	0.097
MW-44-125	DA	4/27/2017	LF	3	13	ND (0.5)	210	ND (0.05)
MW-44-125	DA	12/6/2017	LF	4.8	230	ND (0.5)	380	ND (0.05)
MW-46-175	DA	2/7/2017	LF	--	200	ND (2.5)	--	1.2
MW-46-175	DA	4/26/2017	LF	--	180	ND (12 J)	--	1.3
MW-46-175	DA	10/2/2017	LF	--	160	ND (2.5)	--	1.1
MW-46-175	DA	12/7/2017	LF	--	180	ND (2.5)	17	1.1
MW-46-205	DA	12/7/2017	3V	--	320	ND (2.5)	39	--
MW-47-055	SA	4/26/2017	LF	0.96	--	--	ND (0.5)	--
MW-47-055	SA	4/26/2017	FD LF	0.96	--	--	ND (0.5)	--
MW-47-055	SA	12/7/2017	LF	1.2	8	ND (2.5)	2	--
MW-47-055	SA	12/7/2017	FD LF	1.2	8.1	0.99	1.4	--
MW-47-115	DA	4/26/2017	LF	1.8	21	ND (2.5)	1.9	--
MW-47-115	DA	12/7/2017	LF	--	21	ND (2.5)	4.3	--
MW-48	BR	12/13/2017	LF	--	11	ND (2.5)	14	--
MW-49-135	DA	12/7/2017	3V	1.8	38	ND (2.5)	260	--
MW-49-275	DA	12/7/2017	LF	--	250 J	ND (2.5)	340 J	--
MW-49-365	DA	12/7/2017	LF	--	190	ND (12)	300	--
MW-50-095	MA	12/8/2017	LF	--	17	0.82	1.1	--
MW-50-200	DA	12/8/2017	LF	--	42	2.6	4.6	--
MW-51	MA	4/26/2017	LF	3.5	45	13	2.1	9.3
MW-51	MA	4/26/2017	FD LF	3.5	48	13	1.8	9
MW-51	MA	12/11/2017	LF	3.8	48	14	4.1	8.7
MW-52D	DA	4/27/2017	LF	2	--	--	290	--
MW-52D	DA	12/5/2017	LF	2.6	82	ND (0.5)	280	--
MW-52M	DA	4/27/2017	LF	ND (0.5)	--	--	170	--
MW-52M	DA	12/5/2017	LF	0.83	34	ND (0.5)	210	--
MW-52M	DA	12/5/2017	FD LF	0.74	33	ND (0.5)	210	--
MW-52S	MA	4/27/2017	LF	0.36	--	--	1,200	--
MW-52S	MA	12/5/2017	LF	0.4	3.9	ND (0.5)	1,500	--
MW-53D	DA	4/27/2017	LF	3.3	--	--	1,100	--
MW-53D	DA	4/27/2017	FD LF	2.9	--	--	1,100	--
MW-53D	DA	12/5/2017	LF	2.9	180	ND (2.5)	1,300	--
MW-53M	DA	4/27/2017	LF	0.67	--	--	460	--
MW-53M	DA	12/5/2017	LF	0.63	32	ND (0.5)	330	--
MW-54-085	DA	5/4/2017	(a) LF	4	--	--	517	--
MW-54-085	DA	12/13/2017	(a) LF	4.22	45.9	ND (10)	745	--
MW-54-140	DA	5/4/2017	(a) LF	2.9	--	--	97.1	--
MW-54-140	DA	12/13/2017	(a) LF	3.51	59.1	ND (10)	89.3	--
MW-54-195	DA	5/4/2017	(a) 3V	0.94	--	--	345	--
MW-54-195	DA	12/13/2017	(a) LF	1.36	123	ND (10)	268	--
MW-55-045	MA	12/13/2017	(a) LF	--	44	ND (10)	845	--
MW-55-120	DA	12/13/2017	(a) LF	--	54.4	ND (10)	ND (10)	--
MW-56D	DA	12/13/2017	(a) LF	--	45.8	ND (10)	674	--
MW-56M	DA	12/13/2017	(a) LF	--	ND (10)	ND (10)	784	--
MW-56S	SA	12/13/2017	(a) LF	--	32.4	ND (10)	780	--
MW-57-070	BR	5/1/2017	LF	1.2	6.1	3.1	2	8.3
MW-57-070	BR	12/11/2017	LF	1.5	2.8	3.8	ND (0.5)	9.5
MW-57-185	BR	5/1/2017	3V	12	80	ND (2.5)	260	ND (0.05)
MW-57-185	BR	12/11/2017	3V	11	84	ND (2.5)	160	ND (0.05)

Table 3-2a

Groundwater COPCs and In Situ Byproducts Sampling Results, January 2017 through December 2017

Fourth Quarter 2017 and Annual 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-57-185	BR	12/11/2017	LF	3.9	89	ND (2.5)	6.9	0.15
MW-58BR	BR	2/7/2017	LF	1.4	26	1.2	380	0.35
MW-58BR	BR	5/2/2017	LF	1.5	25	1.3	350	0.4
MW-58BR	BR	9/27/2017	LF	1.6	21	1.8	340	1.1
MW-58BR	BR	12/11/2017	LF	1.8	24	ND (2.5)	330	1.2
MW-59-100	SA	5/1/2017	LF	2.2	9.5	ND (2.5)	ND (2.5)	2
MW-59-100	SA	12/7/2017	LF	1.8	7.1	2.4	7.3	2.3
MW-60-125	BR	5/2/2017	LF	1.5	17	5.2	4.1	4.2
MW-60-125	BR	12/6/2017	LF	1.6	19	5.4	11	4
MW-60BR-245	BR	2/8/2017	3V	6.4	62	ND (2.5)	13	0.16
MW-60BR-245	BR	5/3/2017	3V	6.9	56	ND (2.5)	14	0.24
MW-60BR-245	BR	9/26/2017	3V	5.3	56	3.4	14	ND (0.069)
MW-60BR-245	BR	12/13/2017	LF	6.3	64	ND (2.5)	21	0.072
MW-60BR-245	BR	12/14/2017	3V	2.9	36	1.9	42	0.82
MW-61-110	BR	5/2/2017	3V	3.1	22	ND (2.5)	140	0.68
MW-61-110	BR	12/6/2017	LF	3.4	24	ND (2.5)	250	0.83
MW-62-065	BR	2/9/2017	3V	1.3	13	3.6	0.58	4.8
MW-62-065	BR	5/2/2017	LF	1.3	13	3.7	ND (0.5)	4.8
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-62-065	BR	12/6/2017	LF	1.7	15	3.7	2	4.5
MW-62-110	BR	2/8/2017	3V	7.2	48	ND (0.5)	97	ND (0.05)
MW-62-110	BR	5/3/2017	Tap	12	56	ND (2.5)	120	ND (0.05)
MW-62-110	BR	9/27/2017	Tap	4.3	40	ND (2.5)	110	ND (0.05)
MW-62-110	BR	12/7/2017	Tap	20	46	ND (0.5)	220	ND (0.05)
MW-62-190	BR	5/3/2017	Tap	3.2	50	ND (2.5)	930	0.068
MW-62-190	BR	12/7/2017	Tap	3.4 J	42	ND (0.5)	1,200	ND (0.05)
MW-62-190	BR	12/7/2017	FD Tap	5.2 J	42	ND (0.5)	1,200	0.054
MW-63-065	BR	2/9/2017	3V	1.4	19	0.77	1.5	1.1
MW-63-065	BR	5/2/2017	LF	1.5	19	0.66	9.8	0.75
MW-63-065	BR	9/28/2017	LF	1.4	16	0.97	1.7	1.4
MW-63-065	BR	12/12/2017	LF	1.5	18	1	1.3	1.2
MW-64BR	BR	2/7/2017	LF	3.8	65	ND (2.5)	1,000	ND (0.05)
MW-64BR	BR	5/2/2017	LF	3.8	65	ND (2.5)	1,000	ND (0.05)
MW-64BR	BR	9/25/2017	LF	4.2	62	ND (0.5)	950	ND (0.051)
MW-64BR	BR	12/6/2017	LF	4.2	68	ND (2.5)	1,000	ND (0.05)
MW-65-160	SA	2/8/2017	LF	0.6	32	7.6	110	12
MW-65-160	SA	5/4/2017	LF	0.35	35	8	310	13
MW-65-160	SA	9/26/2017	LF	0.43	31	9	170	13
MW-65-160	SA	12/5/2017	LF	0.74	44	9.5 J	9.1 J	14
MW-65-225	DA	2/8/2017	LF	2.1	33	6.6	4.3	9.4
MW-65-225	DA	5/4/2017	LF	1.9	27	6.4	33	8.1
MW-65-225	DA	5/4/2017	FD LF	1.9	25	4.7	42	8.3
MW-65-225	DA	9/26/2017	LF	1.9	27	6.5	8.5	8.6
MW-65-225	DA	12/5/2017	LF	2.3	50	3.5	160	4.4
MW-66-165	SA	4/25/2017	LF	1	6.4	24 J	11	23
MW-66-165	SA	12/5/2017	LF	1.2	5.9	26	ND (0.5)	27
MW-66-230	DA	4/25/2017	LF	5.4	83	18	4.5	23
MW-66-230	DA	12/5/2017	LF	7.2	80	12	8.1	18
MW-66BR-270	BR	5/4/2017	3V	ND (0.1)	2.9	ND (2.5)	5,400	ND (0.05)
MW-66BR-270	BR	12/14/2017	3V	0.13	6	ND (0.5)	50	ND (0.05)
MW-67-185	SA	5/3/2017	LF	0.92	9.3	330	ND (0.5)	75
MW-67-185	SA	12/4/2017	LF	0.94	11	350	ND (0.5)	84
MW-67-225	MA	5/4/2017	LF	3.2	43	86	28	26
MW-67-225	MA	12/4/2017	LF	3.4	45	96	7.1	28
MW-67-260	DA	5/3/2017	LF	6.3	85	ND (2.5)	22	0.61
MW-67-260	DA	12/4/2017	LF	6.9	74	ND (2.5)	2.3	0.54
MW-68-180	SA	2/8/2017	LF	2.6	52	16	ND (0.5)	30
MW-68-180	SA	2/8/2017	FD LF	2.4	51	15	ND (0.5)	32
MW-68-180	SA	5/3/2017	LF	2.9	40	11	ND (0.5)	13
MW-68-180	SA	9/26/2017	LF	2.7	36	14	2.5	17
MW-68-240	DA	5/3/2017	LF	2	24	ND (12)	33	4.5
MW-68BR-280	BR	5/4/2017	3V	ND (0.5)	31	ND (12)	130	0.077
MW-68BR-280	BR	5/4/2017	FD 3V	ND (0.5)	31	ND (2.5)	130	ND (0.05)
MW-69-195	BR	2/9/2017	LF	2.2	75	12	0.96	16

Table 3-2a

Groundwater COPCs and In Situ Byproducts Sampling Results, January 2017 through December 2017

Fourth Quarter 2017 and Annual 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-69-195	BR	5/3/2017	LF	2.1	66	14	9.5	20
MW-69-195	BR	9/26/2017	LF	2.2	81	11	6.2	17
MW-69-195	BR	12/4/2017	LF	2.5	87	12	0.79	18
MW-70-105	BR	5/2/2017	LF	3.7	69	3.9	7.9	4.4
MW-70-105	BR	12/11/2017	LF	3.9	72	4.9	11	4.5
MW-70BR-225	BR	5/2/2017	3V	1.8	17	ND (2.5)	1.6	4.1
MW-70BR-225	BR	12/11/2017	3V	1.9	18	2.7	1.1	3.8
MW-70BR-225	BR	12/11/2017	LF	2.2	21	ND (2.5)	5.7	3.3
MW-71-035	SA	5/3/2017	LF	ND (2.5)	25	ND (12 J)	1,600	ND (0.05)
MW-71-035	SA	12/12/2017	LF	2.5	15	ND (2.5)	2,200	ND (0.05)
MW-72-080	BR	2/7/2017	3V	11	78	ND (2.5)	24	0.89
MW-72-080	BR	5/2/2017	LF	9	83	ND (2.5)	90	0.52
MW-72-080	BR	9/28/2017	LF	11	78	ND (2.5)	57	0.85
MW-72-080	BR	9/28/2017	FD Tap	11	75	ND (2.5)	60	0.88
MW-72-080	BR	12/7/2017	LF	11	78	ND (2.5)	46	0.75
MW-72BR-200	BR	2/8/2017	3V	15	79	ND (2.5)	9	0.13
MW-72BR-200	BR	5/2/2017	3V	13	79	ND (2.5)	38	0.12
MW-72BR-200	BR	9/27/2017	3V	15	78	ND (2.5)	8.8	0.12
MW-72BR-200	BR	12/6/2017	3V	15	79	ND (2.5)	11	0.16
MW-72BR-200	BR	12/6/2017	LF	13	78	ND (2.5)	100	0.062
MW-73-080	BR	2/8/2017	3V	1.6	25	4.3	1.7	3.9
MW-73-080	BR	5/2/2017	LF	1.5	26	4.1	12	3.8
MW-73-080	BR	9/27/2017	LF	1.3	30	4.3	34	3.2
MW-73-080	BR	12/6/2017	LF	1.4	36	3.2	34	2.7
MW-74-240	BR	4/27/2017	LF	9.7	27	1.2	8.7	0.52
MW-74-240	BR	12/6/2017	LF	13	31	0.66	43	ND (0.05)
OW-03D	DA	12/8/2017	LF	--	25	ND (2.5)	2	--
OW-03D	DA	12/8/2017	FD LF	--	26	ND (2.5)	1.9	--
OW-03M	MA	12/8/2017	LF	--	16	ND (2.5)	2	--
OW-03S	SA	12/8/2017	LF	--	6.1	5.3	ND (0.5)	--
PE-01	DA	1/4/2017	Tap	--	--	--	150	ND (0.05)
PE-01	DA	2/7/2017	Tap	--	--	--	94	ND (0.05)
PE-01	DA	2/7/2017	FD Tap	--	--	--	92	ND (0.05)
PE-01	DA	3/8/2017	Tap	--	--	--	92	ND (0.05)
PE-01	DA	4/25/2017	Tap	--	--	--	110	ND (0.05)
PE-01	DA	5/4/2017	Tap	--	--	--	120	ND (0.05)
PE-01	DA	6/7/2017	Tap	--	--	--	180	ND (0.05)
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)
PE-01	DA	11/2/2017	Tap	--	--	--	280	ND (0.05)
PE-01	DA	12/7/2017	Tap	--	--	--	310	ND (0.05)
PGE-07BR	BR	12/8/2017	3V	--	ND (2.5)	ND (2.5)	3,800	--
PGE-08	BR	12/14/2017	3V	--	110	ND (0.5)	630	ND (0.05)
PM-03	---	12/14/2017	Tap	--	5.5	1.7	ND (0.5)	3.1
PM-04	---	12/14/2017	Tap	--	5.7	1.4	ND (0.5)	2.3
PM-04	---	12/14/2017	FD Tap	--	5.6	1.3	ND (0.5)	2.1
TW-01	SA	5/3/2017	LF	--	16	14	--	19
TW-01	SA	12/13/2017	3V	--	14	15	ND (0.5)	16
TW-01	SA	12/13/2017	FD LF	--	14	14	ND (0.5)	15
TW-02D	DA	3/8/2017	Tap	--	--	--	84	ND (0.05)
TW-02D	DA	4/28/2017	Tap	--	22	4.8	15	13 J
TW-02D	DA	4/28/2017	FD Tap	--	21	4	14	2.4 J
TW-02D	DA	10/24/2017	Tap	--	11	2.2	2.4	--
TW-02D	DA	12/7/2017	Tap	--	14	1.4	24	--
TW-02S	SA	12/7/2017	Tap	--	12	3.1	ND (0.5)	4.5
TW-03D	DA	1/4/2017	Tap	--	--	--	11	3.4
TW-03D	DA	2/7/2017	Tap	--	--	--	11	3.1
TW-03D	DA	3/8/2017	Tap	--	--	--	13	3
TW-03D	DA	3/8/2017	FD Tap	--	--	--	12	2.9
TW-03D	DA	4/25/2017	Tap	--	--	--	12	3
TW-03D	DA	5/4/2017	Tap	--	--	--	9.8	3
TW-03D	DA	6/7/2017	Tap	--	--	--	9	2.8
TW-03D	DA	7/18/2017	Tap	--	--	--	9.8	3

Table 3-2a

Groundwater COPCs and In Situ Byproducts Sampling Results, January 2017 through December 2017*Fourth Quarter 2017 and Annual 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)
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
TW-03D	DA	11/2/2017	Tap	--	--	--	10	3
TW-03D	DA	12/7/2017	Tap	--	--	--	12	2.8
TW-04	DA	12/14/2017	3V	--	64	0.68	64	--
TW-04	DA	12/14/2017	LF	--	110	0.64	86	--
TW-05	DA	12/14/2017	3V	--	28 J	0.65	2.2	--
TW-05	DA	12/14/2017	LF	--	31	0.62	19	--

Notes:

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

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

COPC = constituent 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.

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 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 3-2b

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

Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide

Groundwater and Surface Water Monitoring Report,

PG&E Topock Compressor Station, Needles, California

Location ID	Aquifer Zone	Sample Date	Sample Method	Arsenic Dissolved (µg/L)	Molybdenum Dissolved (µg/L)	Selenium Dissolved (µg/L)	Manganese Dissolved (µg/L)	Nitrate as N (mg/L)
MW-09	SA	12/7/2017	LF	1.5	4.2	5.3	ND (0.5)	11
MW-10	SA	12/7/2017	LF	2.6	19	5.9	0.53	13
MW-10	SA	12/7/2017	FD LF	2.5	19	5.5	0.58	12
MW-11	SA	12/7/2017	LF	1.3	7	4.6	2.6	6
MW-12	SA	12/11/2017	LF	38	9.7	24	2.2	15
MW-13	SA	12/8/2017	LF	2.2	14	3.1	160	--
MW-14	SA	12/13/2017	LF	0.78	13	2	1.9	3.4
MW-15	SA	12/12/2017	LF	--	14	3.5	8.3	--
MW-16	SA	12/12/2017	LF	--	17	2.3	33	--
MW-17	SA	12/12/2017	LF	--	17	8	0.92	--
MW-18	SA	12/12/2017	LF	--	5.9	4	0.62	--
MW-19	SA	12/8/2017	LF	--	10	3.6	ND (0.5)	--
MW-20-070	SA	12/7/2017	LF	--	36	5	ND (0.5)	9
MW-20-100	MA	12/8/2017	LF	--	4.7	5.3	ND (0.5)	8.3
MW-20-100	MA	12/8/2017	FD LF	--	4.8	5	ND (0.5)	8.4
MW-20-130	DA	12/7/2017	LF	3.6	21	42	1.6	15
MW-21	SA	12/12/2017	LF	--	76	47	11	0.46
MW-22	SA	12/6/2017	LF	17	30	ND (2.5)	6,000	--
MW-23-060	BR	12/8/2017	LF	4	23	4.8	3.5	--
MW-23-080	BR	12/8/2017	LF	4.9	40	5.1	4.2	--
MW-24A	SA	12/7/2017	LF	0.14	140	ND (0.5)	19	ND (0.05)
MW-24A	SA	12/7/2017	FD LF	0.22	140	ND (0.5)	21	ND (0.05)
MW-24B	DA	12/7/2017	LF	3.1	63	ND (2.5)	98	1.7
MW-24BR	BR	12/8/2017	3V	0.37	58	ND (2.5)	140	ND (0.05)
MW-25	SA	12/8/2017	LF	1.2	4.7	7.6	ND (0.5)	12
MW-26	SA	12/11/2017	LF	2	34	41	3.6 J	21
MW-26	SA	12/11/2017	FD LF	1.9	33	40	0.96 J	20
MW-27-020	SA	12/4/2017	LF	1.2	5.7	ND (0.5)	65	ND (0.05)
MW-27-060	MA	12/4/2017	LF	11	4.5	ND (0.5)	240	ND (0.05)
MW-27-085	DA	12/4/2017	LF	1.7	18	ND (2.5)	81	ND (0.05)
MW-28-025	SA	12/7/2017	LF	0.71	4.3	1.2	ND (0.5)	ND (0.05)
MW-28-090	DA	12/7/2017	LF	1.7	23	ND (0.5)	130	ND (0.05)
MW-29	SA	12/7/2017	LF	9.2	4.8	ND (0.5)	200	ND (0.05)
MW-30-030	SA	12/6/2017	LF	2	99	1.8	230	ND (0.1)
MW-30-050	MA	12/6/2017	LF	2.9	5.1	ND (0.5)	170	ND (0.05)
MW-30-050	MA	12/6/2017	FD LF	2.9	5	ND (0.5)	170	ND (0.05)
MW-31-060	SA	12/12/2017	LF	1.1	14	2.6	ND (0.5)	3.4
MW-31-135	DA	12/12/2017	LF	3.5	26	0.85	1.5	--
MW-31-135	DA	12/12/2017	FD LF	3.6	26	0.74	1.5	--
MW-32-020	SA	12/4/2017	LF	3.4	260	3	250	--
MW-32-035	SA	12/4/2017	LF	20	13	ND (0.5)	900	ND (0.05)
MW-33-040	SA	12/7/2017	LF	9.7	340	ND (2.5)	14	0.3
MW-33-090	MA	12/7/2017	LF	1.1	11	ND (0.5)	5.4	1.1
MW-33-150	DA	12/7/2017	LF	1.8	41	ND (2.5)	3.8	1.6
MW-33-210	DA	12/7/2017	LF	1	17	ND (2.5)	18	1.8
MW-34-055	MA	12/6/2017	LF	2.5	5	ND (0.5)	82	ND (0.05)
MW-34-080	DA	12/6/2017	LF	1.4	13	ND (0.5)	42	ND (0.05)
MW-34-100	DA	12/6/2017	LF	1.3	54	ND (0.5)	120	ND (0.05)
MW-35-060	SA	12/8/2017	LF	0.99	8.9	1.1	ND (0.5)	2.3
MW-35-135	DA	12/8/2017	LF	0.84	24	1.1	4.9	2.7
MW-36-020	SA	12/6/2017	LF	2.3	36	ND (0.5)	180	--
MW-36-040	SA	12/6/2017	LF	4.8	4	ND (0.5)	99	ND (0.05)
MW-36-050	MA	12/6/2017	LF	4.7	3.2	ND (0.5)	230	--
MW-36-070	MA	12/6/2017	LF	2.3	4.1	ND (0.5)	230	--
MW-36-090	DA	12/6/2017	LF	4.6	11	ND (0.5)	140	--
MW-36-100	DA	12/6/2017	LF	4.3	23	ND (0.5)	310	ND (0.05)
MW-36-100	DA	12/6/2017	FD LF	4.5	24	ND (0.5)	330	ND (0.05)
MW-37D	DA	12/8/2017	LF	--	53	ND (2.5)	5.9	0.33
MW-37S	MA	12/8/2017	LF	1.8	15	ND (2.5)	ND (0.5)	--
MW-38D	DA	12/7/2017	3V	7	87	ND (2.5)	22	ND (0.05)
MW-38D	DA	12/7/2017	LF	7.3	89	ND (2.5)	21	0.05
MW-38S	SA	12/7/2017	3V	7.3	38	1.5	70	2.8
MW-38S	SA	12/7/2017	LF	7.1	38	1.4	68	3
MW-39-040	SA	12/5/2017	LF	18	--	--	130	--
MW-39-040	SA	12/5/2017	FD LF	18	--	--	130	--

Table 3-2b

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

Fourth Quarter 2017 and Annual 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-39-050	MA	12/5/2017	LF	2.1	4.4	ND (0.5)	160	--
MW-39-060	MA	12/5/2017	LF	4	6.2	ND (0.5)	83	0.3
MW-39-070	MA	12/5/2017	LF	--	22	ND (0.5)	1.9	--
MW-39-080	DA	12/5/2017	LF	--	32	ND (0.5)	4.4	--
MW-39-100	DA	12/5/2017	LF	2.1	7.1	ND (0.5)	7.9	ND (0.05)
MW-41D	DA	12/13/2017	LF	2.8	76	ND (2.5)	68	0.47
MW-41D	DA	12/13/2017	FD LF	2.8	74	ND (2.5)	66	0.49
MW-41M	DA	12/13/2017	LF	2.2	25	0.54	7.3	0.66
MW-41S	SA	12/13/2017	LF	1.6	14	1.2	0.5	1.6
MW-42-030	SA	12/4/2017	LF	2.6	20	ND (0.5)	48	0.053
MW-42-030	SA	12/4/2017	FD LF	2.6	20	ND (0.5)	48	0.051
MW-42-055	MA	12/4/2017	LF	28	5.9	ND (0.5)	20	--
MW-42-065	MA	12/4/2017	LF	14	14	ND (0.5)	280	--
MW-43-025	SA	12/5/2017	LF	25	7.1	ND (0.5)	300	--
MW-43-075	DA	12/5/2017	LF	12	14	ND (0.5)	740	--
MW-43-090	DA	12/5/2017	LF	3.1	30	ND (0.5)	750	--
MW-44-070	MA	12/6/2017	LF	4.6	11	ND (0.5)	150	--
MW-44-115	DA	12/6/2017	LF	5.9	84	ND (0.5)	5.7	0.097
MW-44-125	DA	12/6/2017	LF	4.8	230	ND (0.5)	380	ND (0.05)
MW-46-175	DA	12/7/2017	LF	--	180	ND (2.5)	17	1.1
MW-46-205	DA	12/7/2017	3V	--	320	ND (2.5)	39	--
MW-47-055	SA	12/7/2017	LF	1.2	8	ND (2.5)	2	--
MW-47-055	SA	12/7/2017	FD LF	1.2	8.1	0.99	1.4	--
MW-47-115	DA	12/7/2017	LF	--	21	ND (2.5)	4.3	--
MW-48	BR	12/13/2017	LF	--	11	ND (2.5)	14	--
MW-49-135	DA	12/7/2017	3V	1.8	38	ND (2.5)	260	--
MW-49-275	DA	12/7/2017	LF	--	250 J	ND (2.5)	340 J	--
MW-49-365	DA	12/7/2017	LF	--	190	ND (12)	300	--
MW-50-095	MA	12/8/2017	LF	--	17	0.82	1.1	--
MW-50-200	DA	12/8/2017	LF	--	42	2.6	4.6	--
MW-51	MA	12/11/2017	LF	3.8	48	14	4.1	8.7
MW-52D	DA	12/5/2017	LF	2.6	82	ND (0.5)	280	--
MW-52M	DA	12/5/2017	LF	0.83	34	ND (0.5)	210	--
MW-52M	DA	12/5/2017	FD LF	0.74	33	ND (0.5)	210	--
MW-52S	MA	12/5/2017	LF	0.4	3.9	ND (0.5)	1,500	--
MW-53D	DA	12/5/2017	LF	2.9	180	ND (2.5)	1,300	--
MW-53M	DA	12/5/2017	LF	0.63	32	ND (0.5)	330	--
MW-54-085	DA	12/13/2017	(a) LF	4.22	45.9	ND (10)	745	--
MW-54-140	DA	12/13/2017	(a) LF	3.51	59.1	ND (10)	89.3	--
MW-54-195	DA	12/13/2017	(a) LF	1.36	123	ND (10)	268	--
MW-55-045	MA	12/13/2017	(a) LF	--	44	ND (10)	845	--
MW-55-120	DA	12/13/2017	(a) LF	--	54.4	ND (10)	ND (10)	--
MW-56D	DA	12/13/2017	(a) LF	--	45.8	ND (10)	674	--
MW-56M	DA	12/13/2017	(a) LF	--	ND (10)	ND (10)	784	--
MW-56S	SA	12/13/2017	(a) LF	--	32.4	ND (10)	780	--
MW-57-070	BR	12/11/2017	LF	1.5	2.8	3.8	ND (0.5)	9.5
MW-57-185	BR	12/11/2017	3V	11	84	ND (2.5)	160	ND (0.05)
MW-57-185	BR	12/11/2017	LF	3.9	89	ND (2.5)	6.9	0.15
MW-58BR	BR	12/11/2017	LF	1.8	24	ND (2.5)	330	1.2
MW-59-100	SA	12/7/2017	LF	1.8	7.1	2.4	7.3	2.3
MW-60-125	BR	12/6/2017	LF	1.6	19	5.4	11	4
MW-60BR-245	BR	12/13/2017	LF	6.3	64	ND (2.5)	21	0.072
MW-60BR-245	BR	12/14/2017	3V	2.9	36	1.9	42	0.82
MW-61-110	BR	12/6/2017	LF	3.4	24	ND (2.5)	250	0.83
MW-62-065	BR	12/6/2017	LF	1.7	15	3.7	2	4.5
MW-62-110	BR	12/7/2017	Tap	20	46	ND (0.5)	220	ND (0.05)
MW-62-190	BR	12/7/2017	Tap	3.4 J	42	ND (0.5)	1,200	ND (0.05)
MW-62-190	BR	12/7/2017	FD Tap	5.2 J	42	ND (0.5)	1,200	0.054
MW-63-065	BR	12/12/2017	LF	1.5	18	1	1.3	1.2
MW-64BR	BR	12/6/2017	LF	4.2	68	ND (2.5)	1,000	ND (0.05)
MW-65-160	SA	12/5/2017	LF	0.74	44	9.5 J	9.1 J	14
MW-65-225	DA	12/5/2017	LF	2.3	50	3.5	160	4.4
MW-66-165	SA	12/5/2017	LF	1.2	5.9	26	ND (0.5)	27
MW-66-230	DA	12/5/2017	LF	7.2	80	12	8.1	18
MW-66BR-270	BR	12/14/2017	3V	0.13	6	ND (0.5)	50	ND (0.05)

Table 3-2b

Groundwater COPCs and In Situ Byproducts Sampling Results, Fourth Quarter 2017*Fourth Quarter 2017 and Annual 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-67-185	SA	12/4/2017	LF	0.94	11	350	ND (0.5)	84
MW-67-225	MA	12/4/2017	LF	3.4	45	96	7.1	28
MW-67-260	DA	12/4/2017	LF	6.9	74	ND (2.5)	2.3	0.54
MW-69-195	BR	12/4/2017	LF	2.5	87	12	0.79	18
MW-70-105	BR	12/11/2017	LF	3.9	72	4.9	11	4.5
MW-70BR-225	BR	12/11/2017	3V	1.9	18	2.7	1.1	3.8
MW-70BR-225	BR	12/11/2017	LF	2.2	21	ND (2.5)	5.7	3.3
MW-71-035	SA	12/12/2017	LF	2.5	15	ND (2.5)	2,200	ND (0.05)
MW-72-080	BR	12/7/2017	LF	11	78	ND (2.5)	46	0.75
MW-72BR-200	BR	12/6/2017	3V	15	79	ND (2.5)	11	0.16
MW-72BR-200	BR	12/6/2017	LF	13	78	ND (2.5)	100	0.062
MW-73-080	BR	12/6/2017	LF	1.4	36	3.2	34	2.7
MW-74-240	BR	12/6/2017	LF	13	31	0.66	43	ND (0.05)
OW-03D	DA	12/8/2017	LF	--	25	ND (2.5)	2	--
OW-03D	DA	12/8/2017	FD LF	--	26	ND (2.5)	1.9	--
OW-03M	MA	12/8/2017	LF	--	16	ND (2.5)	2	--
OW-03S	SA	12/8/2017	LF	--	6.1	5.3	ND (0.5)	--
PE-01	DA	11/2/2017	Tap	--	--	--	280	ND (0.05)
PE-01	DA	12/7/2017	Tap	--	--	--	310	ND (0.05)
PGE-07BR	BR	12/8/2017	3V	--	ND (2.5)	ND (2.5)	3,800	--
PGE-08	BR	12/14/2017	3V	--	110	ND (0.5)	630	ND (0.05)
PM-03	---	12/14/2017	Tap	--	5.5	1.7	ND (0.5)	3.1
PM-04	---	12/14/2017	Tap	--	5.7	1.4	ND (0.5)	2.3
PM-04	---	12/14/2017	FD Tap	--	5.6	1.3	ND (0.5)	2.1
TW-01	SA	12/13/2017	3V	--	14	15	ND (0.5)	16
TW-01	SA	12/13/2017	FD LF	--	14	14	ND (0.5)	15
TW-02D	DA	12/7/2017	Tap	--	14	1.4	24	--
TW-02S	SA	12/7/2017	Tap	--	12	3.1	ND (0.5)	4.5
TW-03D	DA	11/2/2017	Tap	--	--	--	10	3
TW-03D	DA	12/7/2017	Tap	--	--	--	12	2.8
TW-04	DA	12/14/2017	3V	--	64	0.68	64	--
TW-04	DA	12/14/2017	LF	--	110	0.64	86	--
TW-05	DA	12/14/2017	3V	--	28 J	0.65	2.2	--
TW-05	DA	12/14/2017	LF	--	31	0.62	19	--

Notes:

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

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

COPC = constituent 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

Table 3-2b

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

Fourth Quarter 2017 and Annual 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)
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reported as nitrate as nitrogen.

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

The background study upper tolerance limit (UTL) for arsenic is 24.3 µg/L.
The USEPA and California maximum contaminant level (MCL) for arsenic is 10 µg/L.
The background study UTL for molybdenum is 36.3 µg/L.
There is no USEPA or California MCL for molybdenum.
The background study UTL for selenium is 10.3 µg/L.
The USEPA and California MCL for selenium is 50.0 µg/L.
The secondary USEPA and California MCL for manganese is 50 µg/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
Title 22 Metals Results, January 2017 through December 2017
Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report,
PG&E Topock Compressor Station, Needles, California

Location ID	California MCL: Sample Date		8 Antimony (µg/L)	10 Arsenic (µg/L)	1,000 Barium (µg/L)	4 Beryllium (µg/L)	5 Cadmium (µg/L)	NE Cobalt (µg/L)	50 Chromium (µg/L)	1,000* Copper (µg/L)	15 Lead (µg/L)	2 Mercury (µg/L)	NE Molybdenum (µg/L)	100 Nickel (µg/L)	50 Selenium (µg/L)	100* Silver (µg/L)	2 Thallium (µg/L)	NE Vanadium (µg/L)	5,000 Zinc (µg/L)
MW-10	2/9/2017		--	--	--	--	--	150	--	--	--	--	22	--	5.4	--	--	--	--
MW-10	5/3/2017		--	--	--	--	--	200	--	--	--	--	24	--	5.6	--	--	--	--
MW-10	12/7/2017	FD	ND (0.5)	2.5	49	ND (0.5)	ND (0.5)	0.52	120	ND (1)	ND (1)	ND (0.2)	19	4.4	5.5	ND (0.5)	ND (0.5)	15	ND (10)
MW-10	12/7/2017		ND (0.5)	2.6	51	ND (0.5)	ND (0.5)	0.54	130	ND (1)	ND (1)	ND (0.2)	19	4.5	5.9	ND (0.5)	ND (0.5)	16	ND (10)
MW-12	5/1/2017		--	--	--	--	--	2,000	--	--	--	--	7.5	--	22	--	--	--	--
MW-12	12/11/2017		ND (0.5)	38	46	ND (0.5)	ND (0.5)	ND (0.5)	2,100	ND (1)	ND (1)	ND (0.2)	9.7	1.6	24	ND (0.5)	ND (0.5)	16	ND (10)
MW-14	5/1/2017	FD	--	0.74	--	--	--	13	--	--	--	--	12	--	2	--	--	--	--
MW-14	5/1/2017		--	0.75	--	--	--	13	--	--	--	--	12	--	1.8	--	--	--	--
MW-14	12/13/2017		ND (0.5)	0.78	170	ND (0.5)	ND (0.5)	ND (0.5)	13	ND (1)	ND (1)	ND (0.2)	13	6.2	2	ND (0.5)	ND (0.5)	2.8	ND (10)
MW-22	4/28/2017		--	13	--	--	--	ND (1)	--	--	--	--	--	--	--	--	--	--	--
MW-22	12/6/2017		ND (2.5)	17	100	ND (2.5)	ND (2.5)	2.2	ND (1)	ND (5)	ND (25)	ND (0.2)	30	ND (5)	ND (2.5)	ND (2.5)	ND (12)	ND (1)	ND (50)
MW-24A	5/3/2017		--	ND (0.1)	--	--	--	ND (1)	--	--	--	--	150	--	ND (0.5)	--	--	--	--
MW-24A	12/7/2017	FD	ND (0.5)	0.22	23	ND (0.5)	ND (0.5)	ND (0.5)	8.7 J	ND (1)	ND (1)	ND (0.2)	140	1.3	ND (0.5)	ND (0.5)	ND (0.5)	ND (1)	ND (10)
MW-24A	12/7/2017		ND (2.5)	0.14	23	ND (0.5)	ND (2.5 J)	ND (0.5)	2.7 J	ND (1)	ND (5)	ND (0.2)	140	1.2	ND (0.5)	ND (2.5)	ND (2.5)	ND (1)	ND (10)
MW-24B	5/3/2017	FD	--	2.8	--	--	--	210	--	--	--	--	57	--	ND (2.5)	--	--	--	--
MW-24B	5/3/2017		--	2.6	--	--	--	220	--	--	--	--	61	--	ND (2.5)	--	--	--	--
MW-24B	12/7/2017		ND (2.5)	3.1	64	ND (2.5)	ND (0.5)	250	ND (5)	ND (5)	ND (0.2)	63	ND (5)	ND (2.5)	ND (2.5)	ND (2.5)	ND (2.5)	3.7	ND (50)
MW-26	4/26/2017		--	1.9	--	--	--	2,600	--	--	--	--	32	--	44	--	--	--	--
MW-26	12/11/2017	FD	ND (0.5)	1.9	35	ND (0.5)	ND (0.5)	ND (0.5)	2,500	ND (1)	ND (1)	ND (0.2)	33	6.1	40	ND (0.5)	ND (0.5)	7.9	ND (10)
MW-26	12/11/2017		ND (0.5)	2	36	ND (0.5)	ND (0.5)	ND (0.5)	2,600	ND (1)	ND (1)	ND (0.2)	34	4.9	41	ND (0.5)	ND (0.5)	8.4	ND (10)
MW-35-060	5/1/2017		--	0.94	--	--	--	20	--	--	--	--	10	--	1	--	--	--	--
MW-35-060	12/8/2017		ND (0.5)	0.99	70	ND (2.5)	ND (0.5)	ND (0.5)	20	ND (1 J)	ND (5)	ND (0.2)	8.9	ND (1)	1.1	ND (2.5)	ND (2.5)	2.7	ND (10)
MW-35-135	5/1/2017		--	0.67	--	--	--	22	--	--	--	--	18	--	ND (2.5)	--	--	--	--
MW-35-135	12/8/2017		ND (0.5)	0.84	35	ND (0.5)	ND (0.5)	ND (0.5)	29	ND (1)	ND (5)	ND (0.2)	24	ND (1)	1.1	ND (0.5)	ND (2.5)	1.6	ND (10)
MW-59-100	5/1/2017		--	2.2	--	--	--	2,600	--	--	--	--	9.5	--	ND (2.5)	--	--	--	--
MW-59-100	12/7/2017		ND (0.5)	1.8	72	ND (2.5)	ND (0.5)	ND (0.5)	3,900	ND (1)	ND (5)	ND (0.2)	7.1	2.9	2.4	ND (2.5)	ND (2.5)	ND (1)	ND (10)

Notes:
* = Secondary USEPA MCL
--- = data were either not collected, not available or were rejected
FD = Field duplicate sample
J = concentration or reporting limit estimated by laboratory or data validation.
MCL = Maximum contaminant levels.
ND = not detected at listed reporting limit.
NE = Not Established
µg/L = micrograms per liter.
USEPA = United States Environmental Protection Agency

Title 22 metals are the metals listed in California Code of Regulations, Title 22, Section 66261.24(a)(2)(A).

The MCLs listed, in micrograms per liter (ug/L), are the California primary drinking water standards, except where noted.
All results are dissolved metals concentrations in µg/L from field-filtered samples.
Metals analyzed by USEPA Methods SW6020A or SW7470A.

Table 3-4

Surface Water Sampling Results, January 2017 through December 2017

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

Location ID	Sample Date		Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)	Specific Conductance (µS/cm)	Lab pH*
In-channel Locations						
C-BNS	1/24/2017		ND (0.2)	ND (1)	964	8.2
C-BNS	2/21/2017		ND (0.2)	ND (1)	--	8.3
C-BNS	5/10/2017		ND (0.2)	ND (1)	--	8.3
C-BNS	8/16/2017		ND (0.2)	ND (1)	1,020	8.0
C-BNS	11/15/2017		ND (0.2)	ND (1)	989	8.2
C-CON-D	1/25/2017		ND (0.2)	ND (1)	977	8.1
C-CON-D	2/22/2017		ND (0.2)	ND (1)	--	8.3
C-CON-D	5/11/2017		ND (0.2)	ND (1)	--	8.3
C-CON-D	8/17/2017		ND (0.2)	ND (1)	1,020	8.0
C-CON-D	11/16/2017		ND (0.2)	ND (1)	987	8.2
C-CON-S	1/25/2017		ND (0.2)	ND (1)	970	8.2
C-CON-S	2/22/2017		ND (0.2)	ND (1)	--	8.2
C-CON-S	5/11/2017		ND (0.2)	ND (1)	--	8.3
C-CON-S	8/17/2017		ND (0.2)	ND (1)	1,020	8.1
C-CON-S	11/16/2017		ND (0.2)	ND (1)	986	8.2
C-I-3-D	1/24/2017		ND (0.2)	ND (1)	972	8.3
C-I-3-D	1/24/2017	FD	ND (0.2)	ND (1)	--	8.3
C-I-3-D	2/21/2017		ND (0.2)	ND (1)	--	8.3
C-I-3-D	5/10/2017		ND (0.2)	ND (1)	--	8.3
C-I-3-D	5/10/2017	FD	ND (0.2)	ND (1)	--	8.3
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-D	11/15/2017		ND (0.2)	ND (1)	987	8.3
C-I-3-S	1/24/2017		ND (0.2)	ND (1)	964	8.3
C-I-3-S	2/21/2017		ND (0.2)	ND (1)	--	8.4
C-I-3-S	5/10/2017		ND (0.2)	ND (1)	--	8.3
C-I-3-S	8/16/2017		ND (0.2)	ND (1)	1,020	8.1
C-I-3-S	11/15/2017		ND (0.2)	ND (1)	987	8.3
C-MAR-D	1/25/2017		ND (0.2)	ND (1)	1,010	8.2
C-MAR-D	2/22/2017		ND (0.2)	ND (1)	--	8.0
C-MAR-D	5/11/2017		ND (0.2)	ND (1)	--	7.5
C-MAR-D	8/17/2017		ND (0.2)	ND (1)	1,030	8.0
C-MAR-D	11/16/2017		ND (0.2)	ND (1)	991	8.1
C-MAR-S	1/25/2017		ND (0.2)	ND (1)	1,010	8.0
C-MAR-S	2/22/2017		ND (0.2)	ND (1)	--	8.0
C-MAR-S	2/22/2017	FD	ND (0.2)	ND (1)	--	8.0
C-MAR-S	5/11/2017		ND (0.2)	ND (1)	--	7.6
C-MAR-S	8/17/2017		ND (0.2)	ND (1)	1,020	8.1
C-MAR-S	11/16/2017		ND (0.2)	ND (1)	996	8.1
C-NR1-D	1/25/2017		ND (0.2)	ND (1)	972	8.2
C-NR1-D	2/22/2017		ND (0.2)	ND (1)	--	8.2
C-NR1-D	5/11/2017		ND (0.2)	ND (1)	--	8.3
C-NR1-D	8/17/2017		ND (0.2)	ND (1)	1,020	8.1
C-NR1-D	11/16/2017		ND (0.2)	ND (1)	988	8.2
C-NR1-S	1/25/2017		ND (0.2)	ND (1)	969	8.3
C-NR1-S	2/22/2017		ND (0.2)	ND (1)	--	8.2
C-NR1-S	5/11/2017		ND (0.2)	ND (1)	--	8.3

Table 3-4**Surface Water Sampling Results, January 2017 through December 2017**

*Fourth Quarter 2017 and Annual 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*
C-NR1-S	8/17/2017		ND (0.2)	ND (1)	1,020	8.1
C-NR1-S	11/16/2017		ND (0.2)	ND (1)	989	8.2
C-NR3-D	1/25/2017		ND (0.2)	ND (1)	976	8.2
C-NR3-D	2/22/2017		ND (0.2)	ND (1)	--	8.2
C-NR3-D	5/11/2017		ND (0.2)	ND (1)	--	8.3
C-NR3-D	8/17/2017		ND (0.2)	ND (1)	1,020	8.0
C-NR3-D	11/16/2017		ND (0.2)	ND (1)	989	8.2
C-NR3-S	1/25/2017		ND (0.2)	ND (1)	966	8.2
C-NR3-S	1/25/2017	FD	ND (0.2)	ND (1)	--	8.2
C-NR3-S	2/22/2017		ND (0.2)	ND (1)	--	8.2
C-NR3-S	5/11/2017		ND (0.2)	ND (1)	--	8.3
C-NR3-S	5/11/2017	FD	ND (0.2)	ND (1)	--	8.3
C-NR3-S	8/17/2017		ND (0.2)	ND (1)	1,020	8.1
C-NR3-S	11/16/2017		ND (0.2)	ND (1)	990	8.2
C-NR4-D	1/25/2017		ND (0.2)	ND (1)	967	8.2
C-NR4-D	2/22/2017		ND (0.2)	ND (1)	--	8.2
C-NR4-D	5/11/2017		ND (0.2)	ND (1)	--	8.3
C-NR4-D	8/17/2017		ND (0.2)	ND (1)	1,020	8.0
C-NR4-D	11/16/2017		ND (0.2)	ND (1)	990	8.2
C-NR4-S	1/25/2017		ND (0.2)	ND (1)	969	8.2
C-NR4-S	2/22/2017		ND (0.2)	ND (1)	--	8.2
C-NR4-S	5/11/2017		ND (0.2)	ND (1)	--	7.6
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-NR4-S	11/16/2017		ND (0.2)	ND (1)	990	8.2
C-R22A-D	1/24/2017		ND (0.2)	ND (1)	964	8.3
C-R22A-D	2/21/2017		ND (0.2)	ND (1)	--	8.3
C-R22A-D	5/10/2017		ND (0.2)	ND (1)	--	8.3
C-R22A-D	8/16/2017		ND (0.2)	ND (1)	1,030	8.0
C-R22A-D	11/15/2017		ND (0.2)	ND (1)	989	8.2
C-R22A-S	1/24/2017		ND (0.2)	ND (1)	962	8.2
C-R22A-S	2/21/2017		ND (0.2)	ND (1)	--	8.4
C-R22A-S	5/10/2017		ND (0.2)	ND (1)	--	8.3
C-R22A-S	8/16/2017		ND (0.2)	ND (1)	1,030	8.1
C-R22A-S	11/15/2017		ND (0.2)	ND (1)	989	8.2
C-R27-D	1/24/2017		ND (0.2)	ND (1)	965	8.3
C-R27-D	2/21/2017		ND (0.2)	ND (1)	--	8.4
C-R27-D	5/10/2017		ND (0.2)	ND (1)	--	8.3
C-R27-D	8/16/2017		ND (0.2)	ND (1)	1,020	8.1
C-R27-D	11/15/2017		ND (0.2)	ND (1)	990	8.2
C-R27-S	1/24/2017		ND (0.2)	ND (1)	965	8.3
C-R27-S	2/21/2017		ND (0.2)	ND (1)	--	8.4
C-R27-S	5/10/2017		ND (0.2)	ND (1)	--	8.3
C-R27-S	8/16/2017		ND (0.2)	ND (1)	1,020	8.1
C-R27-S	11/15/2017		ND (0.2)	ND (1)	990	8.2
C-TAZ-D	1/24/2017		ND (0.2)	ND (1)	971	8.3
C-TAZ-D	1/24/2017	FD	ND (0.2)	ND (1)	--	8.3
C-TAZ-D	2/21/2017		ND (0.2)	ND (1)	--	8.4

Table 3-4**Surface Water Sampling Results, January 2017 through December 2017**

*Fourth Quarter 2017 and Annual 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*
C-TAZ-D	5/10/2017		ND (0.2)	ND (1)	--	8.3
C-TAZ-D	8/16/2017		ND (0.2)	ND (1)	1,020	8.1
C-TAZ-D	11/15/2017		ND (0.2)	ND (1)	984	8.3
C-TAZ-S	1/24/2017		ND (0.2)	ND (1)	969	8.3
C-TAZ-S	2/21/2017		ND (0.2)	ND (1)	--	8.4
C-TAZ-S	5/10/2017		ND (0.2)	ND (1)	--	8.3
C-TAZ-S	5/10/2017	FD	ND (0.2)	ND (1)	--	8.3
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
C-TAZ-S	11/15/2017		ND (0.2)	ND (1)	987	8.3
Shoreline Samples						
R-19	1/25/2017		ND (0.2)	ND (1)	985	8.2
R-19	2/22/2017		ND (0.2)	ND (1)	--	8.3
R-19	5/10/2017		ND (0.2)	ND (1)	--	8.2
R-19	8/17/2017		ND (0.2)	ND (1)	1,020	8.2
R-19	11/16/2017		ND (0.2)	ND (1)	987	8.3
R-28	1/24/2017		ND (0.2)	ND (1)	983	8.3
R-28	2/21/2017		ND (0.2)	ND (1)	--	8.4
R-28	5/11/2017		ND (0.2)	ND (1)	--	8.3
R-28	8/16/2017		ND (0.2)	ND (1)	1,030	8.2
R-28	11/15/2017		ND (0.2)	ND (1)	990	8.2
R63	1/24/2017		ND (0.2)	ND (1)	989	8.3
R63	2/21/2017		ND (0.2)	ND (1)	--	8.3
R63	5/10/2017		ND (0.2)	ND (1)	--	8.3
R63	8/16/2017		ND (0.2)	ND (1)	1,030	8.0
R63	11/15/2017		ND (0.2)	ND (1)	990	8.3
RRB	1/25/2017		ND (0.2)	ND (1)	973	8.2
RRB	2/22/2017		ND (0.2)	ND (1)	--	8.3
RRB	5/11/2017		ND (0.2)	ND (1)	--	8.3
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
RRB	11/16/2017		ND (0.2)	ND (1)	989	8.3
SW1	1/24/2017		ND (0.2)	ND (1)	874	8.0
SW1	2/21/2017		ND (0.2)	ND (1)	--	7.7
SW1	5/10/2017		ND (0.2)	ND (1)	--	7.5
SW1	8/16/2017		ND (0.2)	ND (1)	1,100	8.0
SW1	11/15/2017		ND (0.2)	ND (1)	1,060	7.7
SW2	1/24/2017		ND (0.2)	ND (1)	1,070	7.3
SW2	1/24/2017	FD	ND (0.2)	ND (1)	--	7.3
SW2	2/21/2017		ND (0.2)	ND (1)	--	7.3
SW2	5/10/2017		ND (0.2)	ND (1)	--	7.6
SW2	8/16/2017		ND (0.2)	ND (1)	1,050	7.9
SW2	11/15/2017		ND (0.2)	ND (1)	997	7.8

Notes:

* Lab pH Values were all J flagged by the lab for being out of holding time.

Table 3-4**Surface Water Sampling Results, January 2017 through December 2017**

*Fourth Quarter 2017 and Annual 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*
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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 3-5

COPCs, In Situ Byproducts, and Geochemical Indicator Parameters in Surface Water Samples, January 2017 through December 2017

Fourth Quarter 2017 and Annual 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 (µg/L)	Selenium, Dissolved (µg/L)	Total Suspended Solids (mg/L)	
In-channel locations											
C-BNS	1/24/2017	2.2	130	240	ND (20)	ND (0.5)	5.3	0.4	1.7	ND (10)	
C-BNS	2/21/2017	2.2	120	53	43	ND (0.5)	5.4	0.45	1.7	ND (10)	
C-BNS	5/10/2017	2.1	120	53	ND (20)	ND (0.5)	5.1	0.44	1.6	ND (10)	
C-BNS	8/16/2017	2.2	110	62	32	ND (0.5)	4.7	0.4	1.4	ND (10)	
C-BNS	11/15/2017	2.4	120	56	22	ND (0.5)	4.8	0.32	1.6	ND (10)	
C-CON-D	1/25/2017	2.2	130	63	ND (20)	ND (0.5)	5.4	0.39	1.6	ND (10)	
C-CON-D	2/22/2017	2.2	130	29	ND (20)	ND (0.5)	5.4	0.44	1.6	ND (10)	
C-CON-D	5/11/2017	2.2	120	ND (20)	ND (20)	ND (0.5)	5.4	0.46	1.5	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-D	11/16/2017	2.2	120 J	55 J	ND (20)	ND (0.5)	4.7	0.32	1.3	ND (10)	
C-CON-S	1/25/2017	2.2	120	58	ND (20)	ND (0.5)	5.1	0.4	1.5	ND (10)	
C-CON-S	2/22/2017	2.1	130	23	ND (20)	ND (0.5)	5.4	0.44	1.6	ND (10)	
C-CON-S	5/11/2017	2.1	110	ND (20)	44	ND (0.5)	5.2	0.47	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-CON-S	11/16/2017	2.4	120	45	ND (20)	ND (0.5)	5	0.33	1.5	ND (10)	
C-I-3-D	1/24/2017	2.2	120	220	ND (20 J)	0.83	5.6	0.42	1.7	ND (10)	
C-I-3-D	1/24/2017	FD	2.2	120	260	50 J	0.7	0.42	1.5	ND (10)	
C-I-3-D	2/21/2017	2.2	120	51	ND (20)	ND (0.5)	5.3	0.46	1.7	ND (10)	
C-I-3-D	5/10/2017	2	110	53	ND (20)	ND (0.5)	4.9	0.47	1.5	ND (10)	
C-I-3-D	5/10/2017	FD	1.9	110	51	ND (20)	ND (0.5)	4.8	0.52	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-D	11/15/2017	2.3	120	83	30	ND (0.5)	4.9	0.31	1.6	ND (10)	
C-I-3-S	1/24/2017	2.2	120	210	33	0.61	5.2	0.41	1.6	ND (10)	
C-I-3-S	2/21/2017	2.3	130	49	ND (20)	ND (0.5)	5.5	0.48	1.9	ND (10)	
C-I-3-S	5/10/2017	2	110	32	ND (20)	ND (0.5)	5	0.52	1.7	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-I-3-S	11/15/2017	2.3	120	42	ND (20)	ND (0.5)	4.9	0.31	1.6	ND (10)	
C-MAR-D	1/25/2017	2.1	130	560	ND (20)	43	5.3	0.38	1.4	ND (10)	
C-MAR-D	2/22/2017	3	210	1,600	230	440	7	0.23	0.98	39	
C-MAR-D	5/11/2017	2.1	140	6,900	51	120	6.5	0.14	0.92	320	
C-MAR-D	8/17/2017	2.2	110	440	ND (20)	3.7	4.6	0.43	1.5	13	
C-MAR-D	11/16/2017	2.3	120	560	42	8.1	5.1	0.32	1.5	18	
C-MAR-S	1/25/2017	2	130	890	22	69	5.5	0.4	1.7	41	
C-MAR-S	2/22/2017	2.1	230	3,100	ND (20)	520	7.7	0.12	0.64	87	
C-MAR-S	2/22/2017	FD	2.2	210	3,000	ND (20)	460	0.14	0.7	85	
C-MAR-S	5/11/2017	2.1	140	2,600	ND (20)	120	6.6	0.14	0.83	68	
C-MAR-S	8/17/2017	2.2	110	380	ND (20)	5.5	4.4	0.4	1.5	14	
C-MAR-S	11/16/2017	2.2	120	700	62	9.2	5	0.32	1.6	25	

Table 3-5

COPCs, In Situ Byproducts, and Geochemical Indicator Parameters in Surface Water Samples, January 2017 through December 2017

Fourth Quarter 2017 and Annual 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 (µg/L)	Selenium, Dissolved (µg/L)	Total Suspended Solids (mg/L)
C-NR1-D	1/25/2017	2.2	120	75	ND (20)	ND (0.5)	5.2	0.43	1.5	ND (10)
C-NR1-D	2/22/2017	2.1	130	33	ND (20)	ND (0.5)	5.3	0.47	1.5	ND (10)
C-NR1-D	5/11/2017	2.2	120	23	ND (20)	ND (0.5)	5.2	0.43	1.6	ND (10)
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-D	11/16/2017	2.2	120	47	26	ND (0.5)	4.8	0.3	1.5	ND (10)
C-NR1-S	1/25/2017	2.2	120	100	ND (20)	ND (0.5)	5.2	0.42	1.7	ND (10)
C-NR1-S	2/22/2017	2.3	130	54	ND (20)	ND (0.5)	5.4	0.41	1.7	ND (10)
C-NR1-S	5/11/2017	2	110	ND (20)	ND (20)	ND (0.5)	5	0.44	1.4	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-NR1-S	11/16/2017	2.3	120	61	ND (20)	ND (0.5)	5	0.56	1.7	ND (10)
C-NR3-D	1/25/2017	2.3	130	77	ND (20)	ND (0.5)	5.5	0.41	1.6	ND (10)
C-NR3-D	2/22/2017	2.1	130	52	ND (20)	0.56	5.4	0.44	1.5	ND (10)
C-NR3-D	5/11/2017	2.1	120	24	ND (20)	ND (0.5)	5.3	0.43	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-D	11/16/2017	2.2	120	49	50	ND (0.5)	5	0.31	1.5	ND (10)
C-NR3-S	1/25/2017	2.1	120	58	ND (20)	ND (0.5)	5.1	0.39	1.7	ND (10)
C-NR3-S	1/25/2017 FD	2.3	130	60	ND (20)	ND (0.5)	5.4	0.39	1.7	ND (10)
C-NR3-S	2/22/2017	2.2	120	34	ND (20)	0.63	5.2	0.46	1.7	ND (10)
C-NR3-S	5/11/2017	2.1	110	ND (20)	ND (20)	ND (0.5)	5	0.45	1.6	ND (10)
C-NR3-S	5/11/2017 FD	2.1	120	22	ND (20)	ND (0.5)	5.2	0.43	1.4	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-NR3-S	11/16/2017	2.3	120	38	34	ND (0.5)	4.9	0.32	1.4	ND (10)
C-NR4-D	1/25/2017	2.2	120	52	ND (20)	ND (0.5)	5.3	0.41	1.7	ND (10)
C-NR4-D	2/22/2017	2.2	130	24	ND (20)	0.75	5.5	0.43	1.6	ND (10)
C-NR4-D	5/11/2017	2.3	120	ND (20)	ND (20)	ND (0.5)	5.1	0.46	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-D	11/16/2017	2.3	120	31	ND (20)	ND (0.5)	5.1	0.29	1.6	ND (10)
C-NR4-S	1/25/2017	2.1	120	45	ND (20)	ND (0.5)	5.1	0.41	1.6	ND (10)
C-NR4-S	2/22/2017	2.2	130	27	31	0.72	5.4	0.45	1.6	ND (10)
C-NR4-S	5/11/2017	2	110	ND (20)	ND (20)	ND (0.5)	5.1	0.45	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-NR4-S	11/16/2017	2.4	130	54	40	ND (0.5)	4.8	0.35	1.6	ND (10)
C-R22A-D	1/24/2017	2.1	120	150	62	1.7	5	0.41	1.5	ND (10)
C-R22A-D	2/21/2017	2.3	130	53	ND (20)	ND (0.5)	5.6	0.5	1.6	ND (10)
C-R22A-D	5/10/2017	2.1	110	43	34	ND (0.5)	4.9	0.46	1.6	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-D	11/15/2017	2.3	120	86 J	27	ND (0.5)	5	0.33	1.6	ND (10)
C-R22A-S	1/24/2017	2.1	120	160	ND (20)	0.79	5	0.4	1.4	ND (10)
C-R22A-S	2/21/2017	2.2	120	120	ND (20)	0.89	5.3	0.48	1.7	ND (10)

Table 3-5

COPCs, In Situ Byproducts, and Geochemical Indicator Parameters in Surface Water Samples, January 2017 through December 2017

Fourth Quarter 2017 and Annual 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 (µg/L)	Selenium, Dissolved (µg/L)	Total Suspended Solids (mg/L)
C-R22A-S	5/10/2017	2	110	36	ND (20)	ND (0.5)	4.9	0.46	1.5	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-R22A-S	11/15/2017	2.4	120	49	21	ND (0.5)	5	0.32	1.7	ND (10)
C-R27-D	1/24/2017	2.2	120	250	68	2.2	5.2	0.4	1.6	ND (10)
C-R27-D	2/21/2017	2.2	120	100	78	ND (0.5)	5.4	0.45	1.7	ND (10)
C-R27-D	5/10/2017	2	110	39	ND (20)	ND (0.5)	4.9	0.48	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-D	11/15/2017	2.3	120	27	26	ND (0.5)	4.9	0.33	1.6	ND (10)
C-R27-S	1/24/2017	2.1	130	210	ND (20)	ND (0.5)	5.5	0.38	1.5	ND (10)
C-R27-S	2/21/2017	2.1	120	66	ND (20)	ND (0.5)	5.2	0.47	1.7	ND (10)
C-R27-S	5/10/2017	1.9	110	27	ND (20)	ND (0.5)	4.9	0.51	1.2	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-R27-S	11/15/2017	2.3	120	31	ND (20)	ND (0.5)	4.9	0.34	1.6	ND (10)
C-TAZ-D	1/24/2017	2.2	130	120	ND (20)	0.56	5.3	0.41	1.5	ND (10)
C-TAZ-D	1/24/2017	FD	2.2	130	100	ND (0.5)	5.4	0.39	1.6	ND (10)
C-TAZ-D	2/21/2017	2.1	120	68	ND (20)	ND (0.5)	5	0.48	1.7	ND (10)
C-TAZ-D	5/10/2017	1.9	110	46	ND (20)	ND (0.5)	4.9	0.47	1.4	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-D	11/15/2017	2.4	120	32	ND (20)	ND (0.5)	5	0.34	1.6	ND (10)
C-TAZ-S	1/24/2017	2.1	120	110	ND (20)	ND (0.5)	5.1	0.39	1.5	ND (10)
C-TAZ-S	2/21/2017	2.1	120	55	ND (20)	ND (0.5)	5.3	0.46	1.7	ND (10)
C-TAZ-S	5/10/2017	2.1	110	40	26	ND (0.5)	4.9	0.58 J	1.3	ND (10)
C-TAZ-S	5/10/2017	FD	2.1	120	33	ND (20)	5.1	0.45 J	1.3	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 (0.5)	4.7	0.4	1.4	ND (10)
C-TAZ-S	11/15/2017	2.3	120	39	36	ND (0.5)	4.9	0.32	1.5	ND (10)
Shoreline Samples										
R-19	1/25/2017	2.2	130	36	ND (20)	0.6	5.2	0.39	1.7	ND (10)
R-19	2/22/2017	2.2	130	66	ND (20)	1.8	5.8	0.44	1.6	ND (10)
R-19	5/10/2017	2.1	110	68	ND (20)	ND (0.5)	5	0.45	1.7	ND (10)
R-19	8/17/2017	2.2	110	120	ND (20)	ND (0.5)	4.5	0.4	1.5	ND (10)
R-19	11/16/2017	2.3	120	55	21	ND (0.5)	4.6	0.29	1.6	ND (10)
R-28	1/24/2017	2.2	130	140	ND (20)	0.78	5.4	0.38	1.6	ND (10)
R-28	2/21/2017	2.2	130	94	28	0.89	5.4	0.46	1.8	ND (10)
R-28	5/11/2017	2.1	120	82	ND (20)	ND (0.5)	5.2	0.42	1.4	ND (10)
R-28	8/16/2017	2.2	120	93	ND (20)	ND (0.5)	4.8	0.39	1.5	ND (10)
R-28	11/15/2017	2.3	120	34	ND (20)	ND (0.5)	4.8	0.32	1.7	ND (10)
R63	1/24/2017	2.1	120	120	ND (20)	1.4	5.3	0.38	1.7	ND (10)
R63	2/21/2017	2.1	120	83	25	0.64	5.3	0.47	1.6	ND (10)
R63	5/10/2017	2.1	120	31	57	ND (0.5)	5	0.49	1.7	ND (10)

Table 3-5

COPCs, In Situ Byproducts, and Geochemical Indicator Parameters in Surface Water Samples, January 2017 through December 2017*Fourth Quarter 2017 and Annual 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 (µg/L)	Selenium, Dissolved (µg/L)	Total Suspended Solids (mg/L)
R63	8/16/2017	2.1	110	100	ND (20)	3.8	4.4	0.4	1.4	ND (10)
R63	11/15/2017	2.3	120	30	25	ND (0.5)	4.9	0.33	1.6	ND (10)
RRB	1/25/2017	2.4	130	38	ND (20)	0.57	5.5	0.4	1.6	ND (10)
RRB	2/22/2017	2.2	130	140	ND (20)	2.7	5.5	0.43	1.6	ND (10)
RRB	5/11/2017	2.2	120	21	ND (20)	1.6	5.4	0.43	1.6	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)
RRB	11/16/2017	2.3	120	79	25	ND (0.5)	4.6	0.31	1.5	ND (10)

Notes:

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

COPC = constituent of potential concern (molybdenum, selenium, and nitrate).

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

mg/L = milligrams per liter.

ND = not detected at listed reporting limit.

TSS = total suspended solids.

ug/L = micrograms per liter.

USEPA = United States Environmental Protection Agency.

Geochemical indicator parameters (TSS and alkalinity).

In situ byproducts (arsenic, iron and manganese).

USEPA Methods:

Alkalinity - SM2320B.

Metals - SW6010B/SW6020A.

Nitrate - SM4500NO3.

Total Suspended Solids - SM2540D.

Table 4-1**Pumping Rate and Extracted Volume for IM System, Fourth Quarter 2017 and Annual 2017***Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide**Groundwater and Surface Water Monitoring Report,**PG&E Topock Compressor Station, Needles, California*

Extraction Well ID	November 2017		December 2017		Fourth Quarter 2017		Annual 2017	
	Average Pumping Rate ^a (gpm)	Volume Pumped (gal)	Average Pumping Rate ^a (gpm)	Volume Pumped (gal)	Average Pumping Rate ^a (gpm)	Volume Pumped (gal)	Average Pumping Rate ^a (gpm)	Volume Pumped (gal)
TW-02S	0.00	0	0.01	581	0.01	581	0.00	581
TW-02D	0.00	0	0.00	188	0.00	188	0.00	221
TW-03D	131.91	5,698,421	132.35	5,907,921	132.13	11,606,343	122.75	64,555,358
PE-01	0.01	532	0.01	618	0.01	1,150	6.62	3,448,874
TOTAL	131.9	5,698,953	132.4	5,909,308	132.1	11,608,261	129.4	68,005,033

Chromium Removed This Quarter (kg) 37.5

Chromium Removed This Year (kg) 139

Chromium Removed Project to Date (kg) 4130

Chromium Removed This Quarter (lb) 82.7

Chromium Removed This Year (lb) 306

Chromium Removed Project to Date (lb) 9100

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 from October 1, 2017 through December 31, 2017. On July 23, 2010 DTSC approved a revised reporting schedule for this report that included a revised IM-3 sample collection period from October 1, 2017 through December 31, 2017.

Table 4-2

Average Hydraulic Gradients Measured at Well Pairs, Fourth Quarter 2017

*Fourth Quarter and Annual 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	November	0.0036	NA	no
	December	0.0034	NA	no
<u>Northern Gradient Pair</u> MW-31-135 / MW-33-150	November	0.0027	30	no
	December	0.0025	31	no
<u>Central Gradient Pair</u> (used when PE-01 is run for gradient control) ^d MW-45-095 ^e / MW-34-100	November	--	30	no
	December	--	31	no
<u>Central Gradient Pair</u> (used when PE-01 is <u>not</u> run for gradient control) ^d MW-20-130 ^e / MW-34-100	November	0.0044	30	no
	December	0.0043	31	no
<u>Southern Gradient Pair</u> (used when PE-01 is run for gradient control) ^d MW-45-095 ^e / MW-27-085	November	--	30	no
	December	--	31	no
<u>Southern Gradient Pair</u> (used when PE-01 is <u>not</u> run for gradient control) ^d MW-20-130 ^e / MW-27-085	November	0.0036	30	no
	December	0.0035	31	no

Notes:

NA = Not Applicable

-- = Monthly gradient not applicable for gradient compliance

^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 4-3**Predicted and Actual Monthly Average Davis Dam Discharge and Colorado River Elevation at I-3***Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and**Sitewide Groundwater and Surface Water Monitoring Report,**PG&E Topock Compressor Station, Needles, California*

Month	Davis Dam Release			Colorado River Elevation at I-3		
	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 4-3**Predicted and Actual Monthly Average Davis Dam Discharge and Colorado River Elevation at I-3**

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

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

NOTES:

cfs = cubic feet per second

ft amsl = feet above mean sea level.

INC = incomplete data set for Colorado River elevation at I-3

NA = difference in predicted and actual river elevation not available due to incomplete data set

Projected river level for each month in the past is calculated based on the preceding months USBR projections of Davis Dam release and stage in Lake Havasu.

These data are reported monthly by the US Department of Interior, at <http://www.usbr.gov/lc/region/g4000/24mo.pdf>.

The difference in I-3 elevation is the difference between the I-3 elevation predicted and the actual elevation measured at I-3.

The source of this difference is differences between BOR projections and actual dam releases/Havasu reservoir levels, rather than the multiple regression error.

TABLE 5-1

Summary of Pumping Rate and Extracted Volume for 2017 Reporting Period
Fourth Quarter 2017 and Annual Interim Measures Performance
Monitoring and Site-wide Groundwater and Surface Water Monitoring Report,
PG&E Topock Compressor Station, Needles, California

Reporting Period	Target Pump Rate (gpm)	Actual Monthly Pump Rate (gpm)	Individual Extraction Well Operations				Total Volume (gallons)
			TW-2S (gallons)	TW-2D (gallons)	TW-3D (gallons)	PE-1 (gallons)	
Jan-17	135	130.6	--	--	5,416,573	411,245	5,827,818
Feb-17	135	131.4	--	--	4,438,816	860,252	5,299,068
Mar-17	135	131.4	--	33	4,855,462	1,008,638	5,864,133
Apr-17	135	115.3	--	--	4,810,219	170,338	4,980,557
May-17	135	136.5	--	--	5,697,408	395,040	6,092,448
Jun-17	135	130.9	--	--	5,621,099	33,125	5,654,224
Jul-17	135	132.9	--	--	5,837,836	94,336	5,932,172
Aug-17	135	118.2	--	--	4,816,052	458,790	5,274,842
Sep-17	135	131.0	--	--	5,643,708	14,788	5,658,496
Oct-17	135	130.2	--	--	5,811,842	1,172	5,813,015
Nov-17	135	131.9	--	--	5,698,421	532	5,698,953
Dec-17	135	132.4	581	188	5,907,921	618	5,909,308
Totals for 2017 Annual Period		129.4	581	221	64,555,358	3,448,874	68,005,033

Notes:

gpm: gallons per minute

The target pumping rate of 135 gpm, excluding periods of planned and unplanned downtime, was maintained by pumping from extraction wells TW-3D and PE-1 during the 2017 reporting period.

Extraction wells TW-2S and TW-2D were only used for interim service or to support field operations.

DTSC approved new gradient pairs August 18, 2017, which allowed extraction to primarily occur from TW-3D.

Table 5-2

Analytical Results for Extraction Wells, January 2017 through December 2017

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

Location ID	Sample Date	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)	Total Dissolved Solids (mg/L)	Lab pH*
PE-01	1/4/2017	ND (0.2)	ND (1)	2,600	7.6
PE-01	2/7/2017	1.9	1.8	2,700	7.6
PE-01	2/7/2017	1.9	1.9	2,600	7.6
PE-01	3/8/2017	1.7	2.1	2,600	7.6
PE-01	4/25/2017	0.53	ND (1)	2,400	7.5
PE-01	5/4/2017	ND (0.2)	ND (1)	2,300	7.4
PE-01	6/7/2017	ND (0.2)	ND (1)	2,600	7.6
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
PE-01	11/2/2017	0.52	ND (1)	2,800	7.4
PE-01	12/7/2017	ND (0.2)	ND (1)	2,600	7.4
TW-02D	3/8/2017	0.44	110	3,500	7.2
TW-02D	4/28/2017	530	540	4,300	7.3
TW-02D	4/28/2017	520	530	4,300	6.9
TW-02D	10/24/2017	200	190	2,200	--
TW-02D	12/7/2017	110	93	3,300	--
TW-02S	12/7/2017	250	260	1,300	--
TW-03D	1/4/2017	620	620	4,400	7.3
TW-03D	2/7/2017	600	630	4,700	7.3
TW-03D	3/8/2017	560	630	4,600	7.4
TW-03D	3/8/2017	570	580	4,600	7.4
TW-03D	4/25/2017	560	570	4,500	7.3
TW-03D	5/4/2017	550	540	4,400	7.3
TW-03D	6/7/2017	550	550	4,400	7.5
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
TW-03D	11/2/2017	550	570	4,400	7.2
TW-03D	12/7/2017	550	570	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.

mg/L = milligrams per liter.

ND = Not detected.

USEPA = United States Environmental Protection Agency

µg/L = micrograms per liter.

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

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

TABLE 5-3

Calculated Hydraulic Gradients for Well Pairs by Month for 2017 Reporting Period
*Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and
 Site-wide Groundwater and Surface Water Monitoring Report,
 PG&E Topock Compressor Station, Needles, California*

Reporting Period 2017	Mean Landward Hydraulic Gradient (ft/ft) ^a			
	Overall Average ^(b)	Northern Gradient Pair ^(c) MW-31-135 / MW-33-150	Central Gradient Pair MW-45-095 ^d / MW-34-100	Southern Gradient Pair MW-45-095 ^d / MW-27-085
January	0.0063	0.0025	0.0127	0.0038
February	0.0112	0.0025	0.0234	0.0234
March	0.0119	0.0027	0.0247	0.0082
April	0.0048	0.0027	0.0090	0.0026
May	0.0049	0.0030	0.0088	0.0030
June	0.0035	0.0030	0.0061	0.0015
July	0.0039	0.0030	0.0068	0.0019
August	0.0064	0.0024	0.0128	0.0041
September ^e	0.0035	0.0027	0.0043 ^e	0.0035 ^e
October ^e	0.0035	0.0028	0.0043 ^e	0.0035 ^e
November ^e	0.0036	0.0027	0.0044 ^e	0.0036 ^e
December ^e	0.0034	0.0025	0.0043 ^e	0.0035 ^e

Notes:

^a For Interim measures pumping, the target landward gradient for the selected well pairs is 0.001 ft/ft

^b Overall average gradients are calculated using all available data.

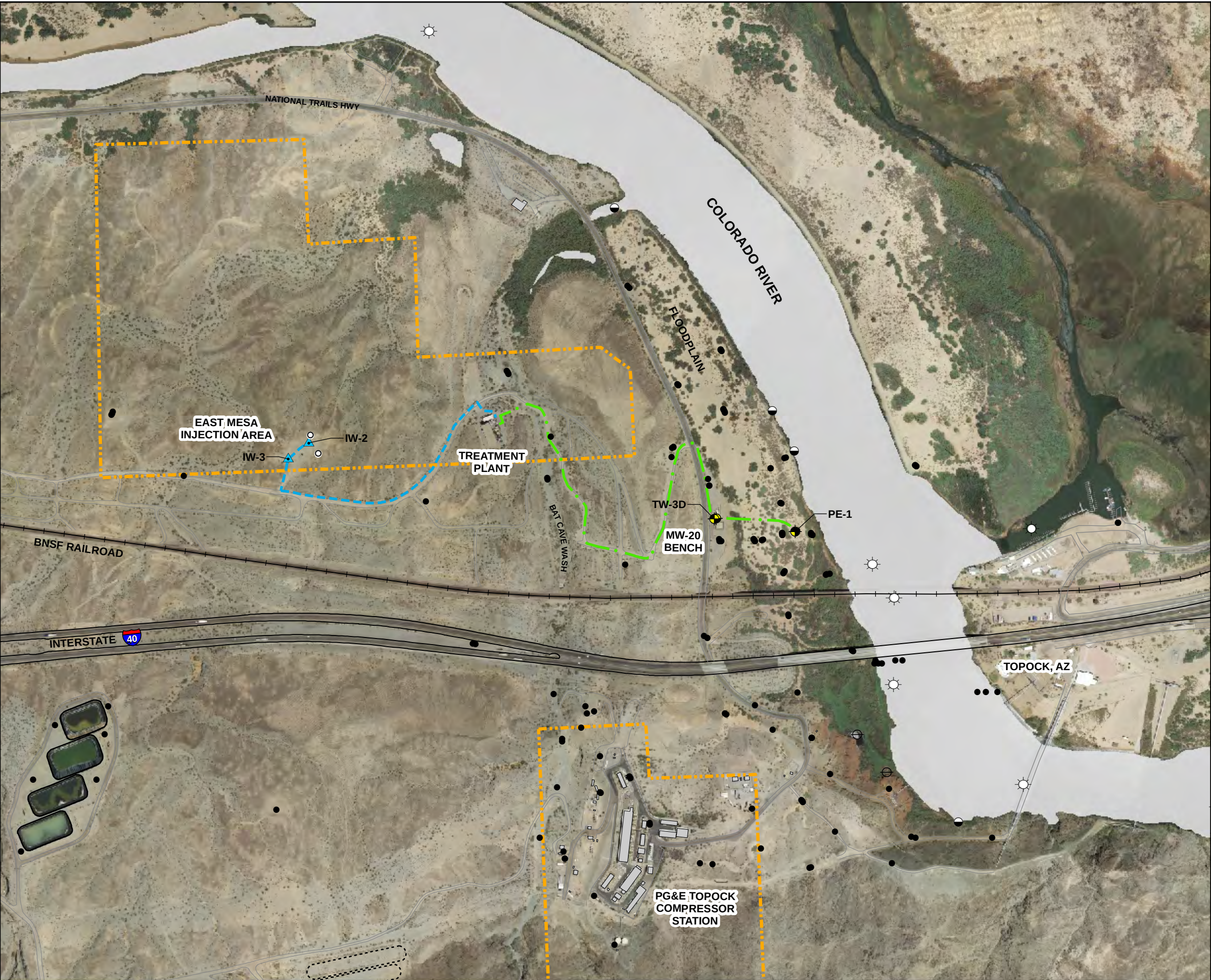
^c Refer to Figure 1-4 for location of well pairs and Tables E-1 and E-2 for number of days in reporting period.
 ft/ft = feet/foot

^d MW-45-095 also referred to as MW-45-095a.

^e MW-20-130/MW-34-100 used as the Central Gradient Pair and MW-20-130/MW-27-085 used as the Southern Gradient Pair when PE-01 is not run for gradient control

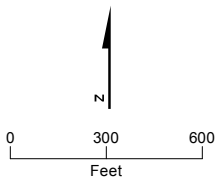
FIGURES





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

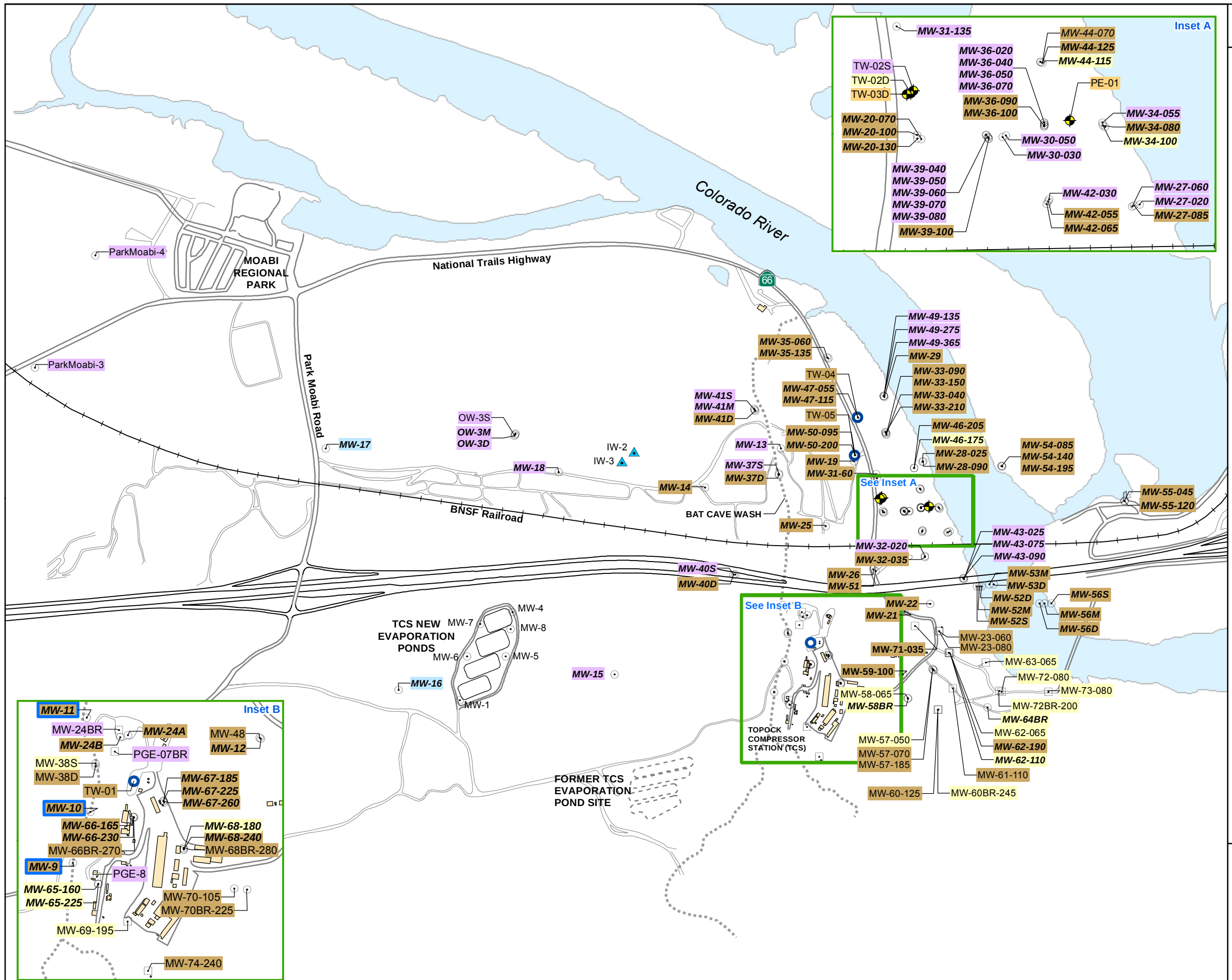


Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, NRCAN, METI, IPC, TomTom

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

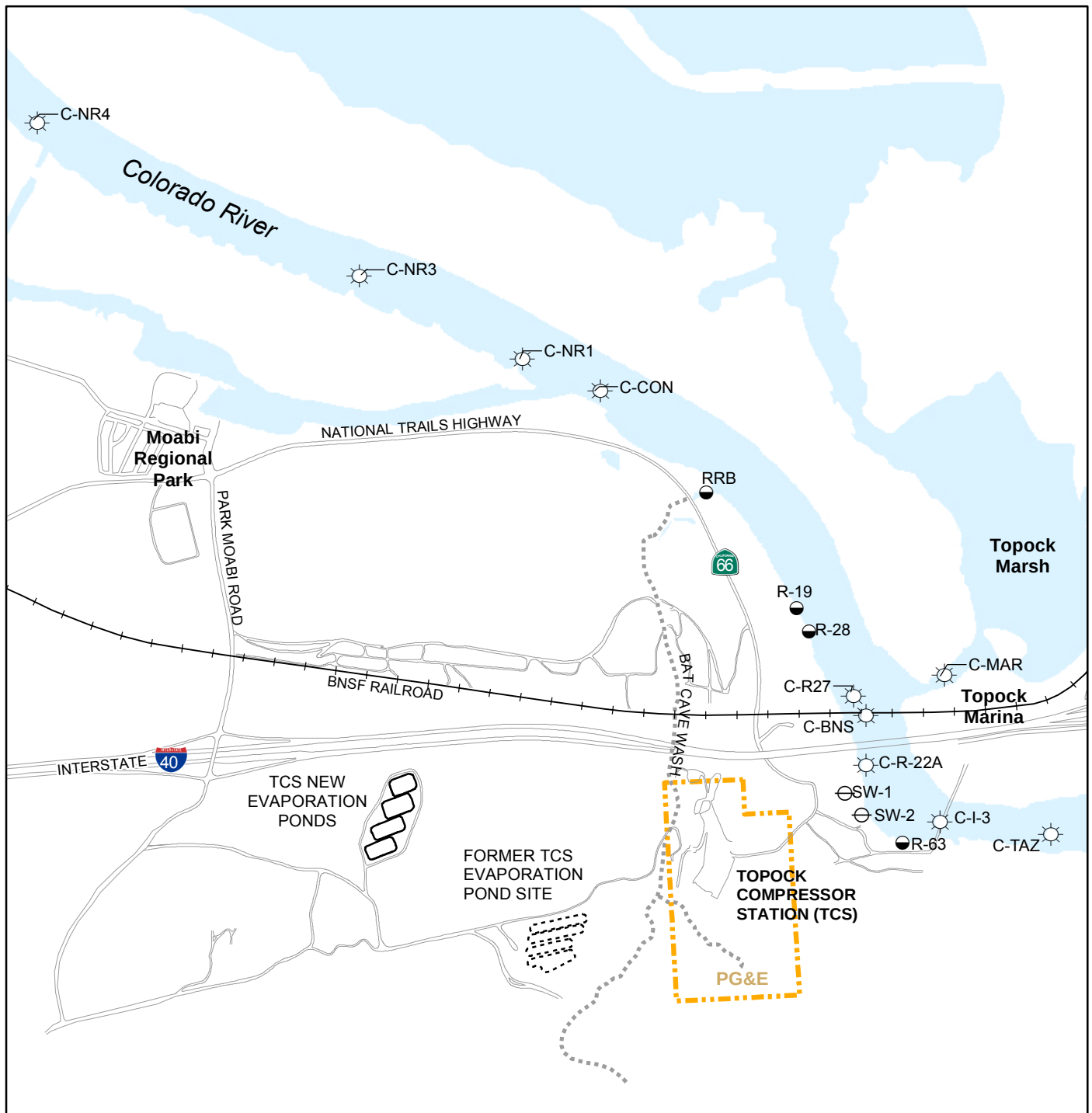
FOURTH QUARTER 2017 AND ANNUAL INTERIM
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MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

Created by: **CRITIGEN**



**FIGURE 1-2
MONITORING LOCATIONS AND
SAMPLING FREQUENCY FOR GMP**

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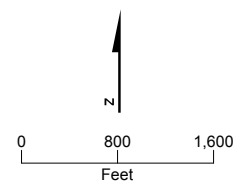


LEGEND

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

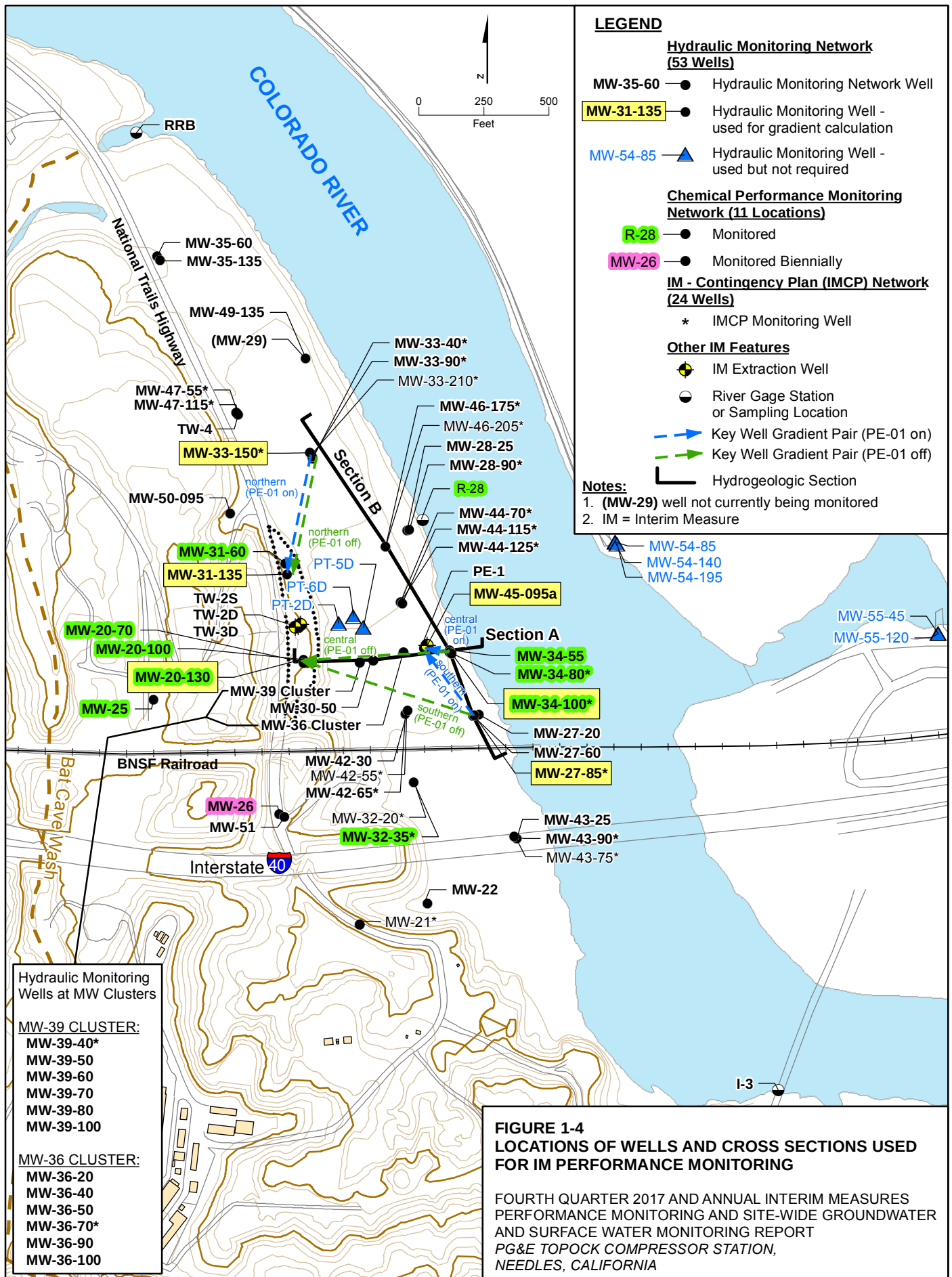
Notes:

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**

FOURTH QUARTER 2017 AND ANNUAL INTERIM
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SITE-WIDE GROUNDWATER AND SURFACE WATER
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LEGEND

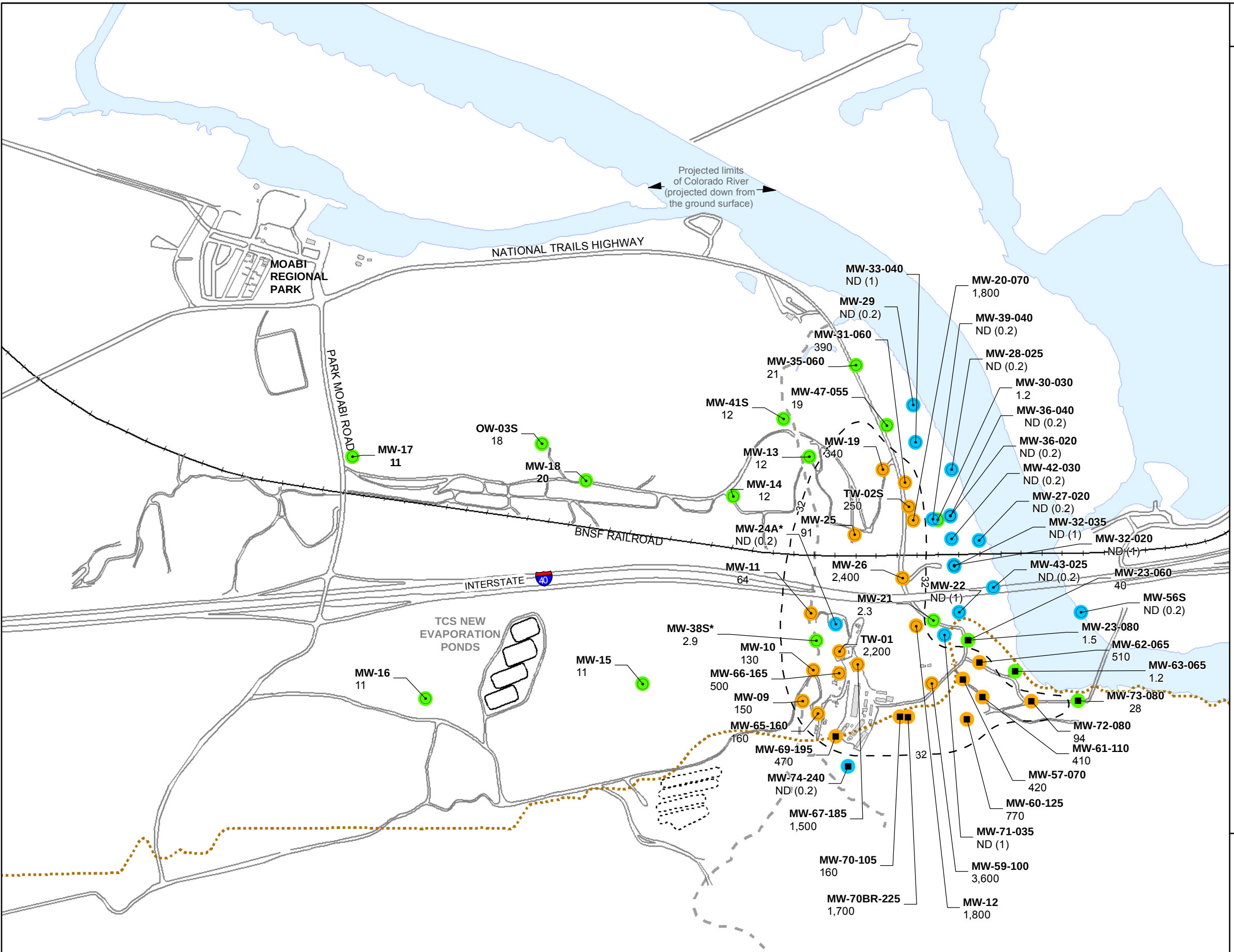
- Alluvial Aquifer well sampled during sampling event
- Bedrock well sampled during sampling event

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:

- "ND" = Cr(VI) not detected at listed reporting limit.
- "J" = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
- µg/L = micrograms per liter
- Cr(VI) = Hexavalent Chromium
- TCS = Topock Compressor Station
- * = Wells with sampled values < 32 µg/L shown within footprint of 32 µg/L boundary.
- Results plotted are maximum concentration from primary and duplicate samples, see Table 3-1 for complete results.
- The 32 µg/L line for Cr(VI) is estimated based on available groundwater sampling, hydrogeologic and geochemical data.
- 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.

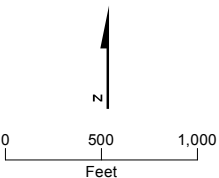


FIGURE 3-1a
Cr(VI) SAMPLING RESULTS, SHALLOW
WELLS IN ALLUVIAL AQUIFER AND
BEDROCK, FOURTH QUARTER 2017

FOURTH QUARTER 2017 AND ANNUAL INTERIM
MEASURES PERFORMANCE MONITORING AND
SITE-WIDE GROUNDWATER AND SURFACE WATER
MONITORING REPORT
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NEEDLES, CALIFORNIA

LEGEND

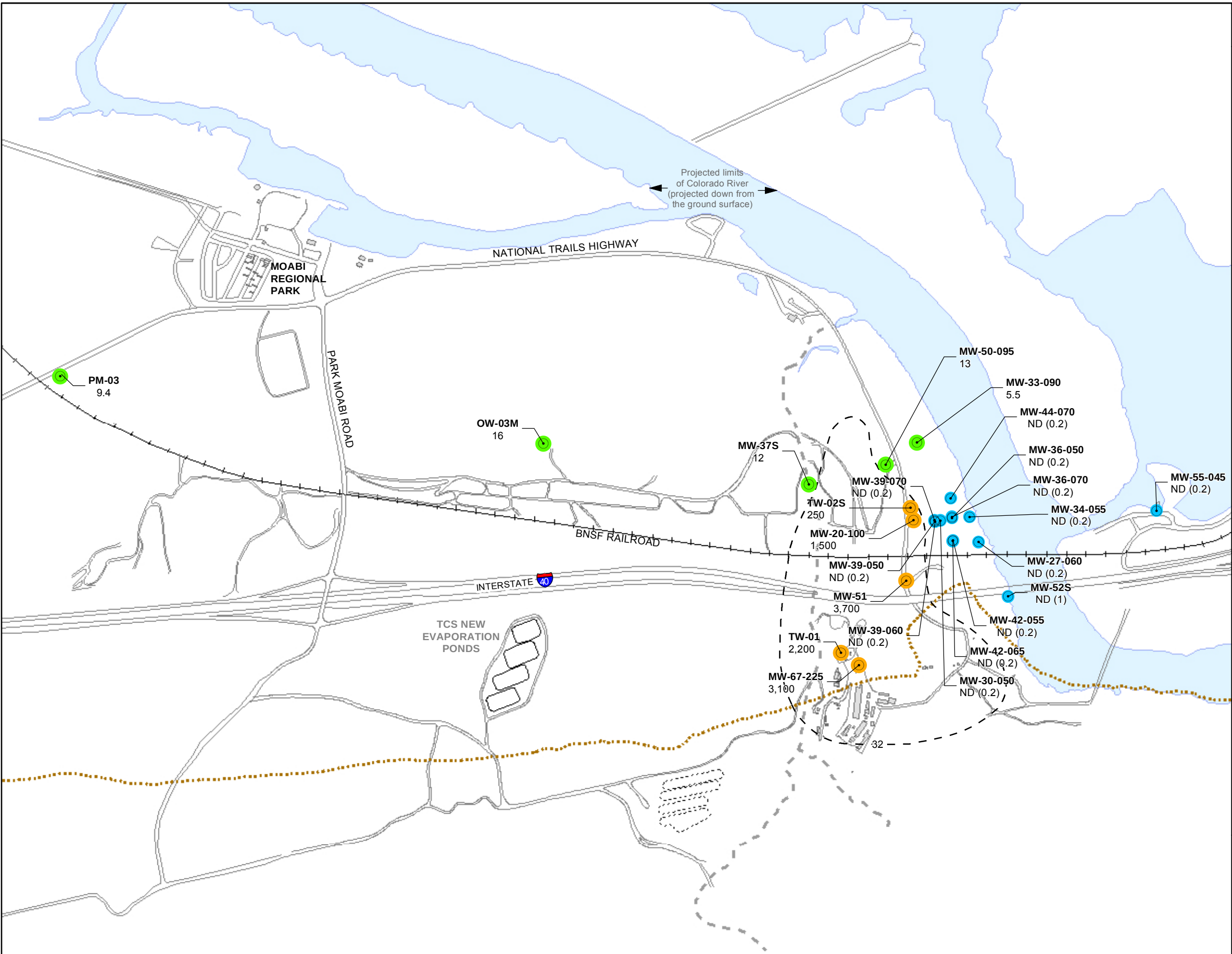
- Alluvial Aquifer well sampled during sampling event

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 "mid-depth" wells with Cr(VI) concentrations ≥ 32 µg/L

Approximate bedrock contact at 425 feet above mean sea level.



MW-20-100 1,400 Sampling Location Groundwater Concentration (µg/L)

Notes:

- "ND" = Cr(VI) not detected at listed reporting limit.
- µg/L = micrograms per liter
- Cr(VI) = Hexavalent Chromium
- Results plotted are maximum concentration from primary and duplicate samples, see Table 3-1 for complete results.
- 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.
- TCS = Topock Compressor Station
- The 32 µg/L line for Cr(VI) is estimated based on available groundwater sampling, hydrogeologic and geochemical data.

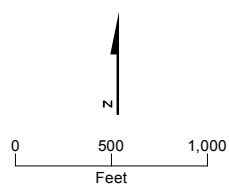


FIGURE 3-1b
Cr(VI) SAMPLING RESULTS, MID-DEPTH
WELLS IN ALLUVIAL AQUIFER AND BEDROCK,
FOURTH QUARTER 2017

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MEASURES PERFORMANCE MONITORING AND
SITE-WIDE GROUNDWATER AND SURFACE WATER
MONITORING REPORT
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NEEDLES, CALIFORNIA

- 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:

- "ND" = Cr(VI) not detected at listed reporting limit.
- µg/L = micrograms per liter
- Cr(VI) = Hexavalent Chromium
- * = Wells with sampled values < 32 µg/L shown within footprint of 32 µg/L boundary.
- Results plotted are maximum concentration from primary and duplicate samples, see Table 3-1 for complete results.
- 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.
- 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.
- TCS = Topock Compressor Station

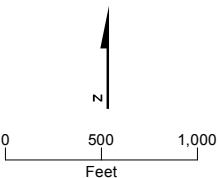
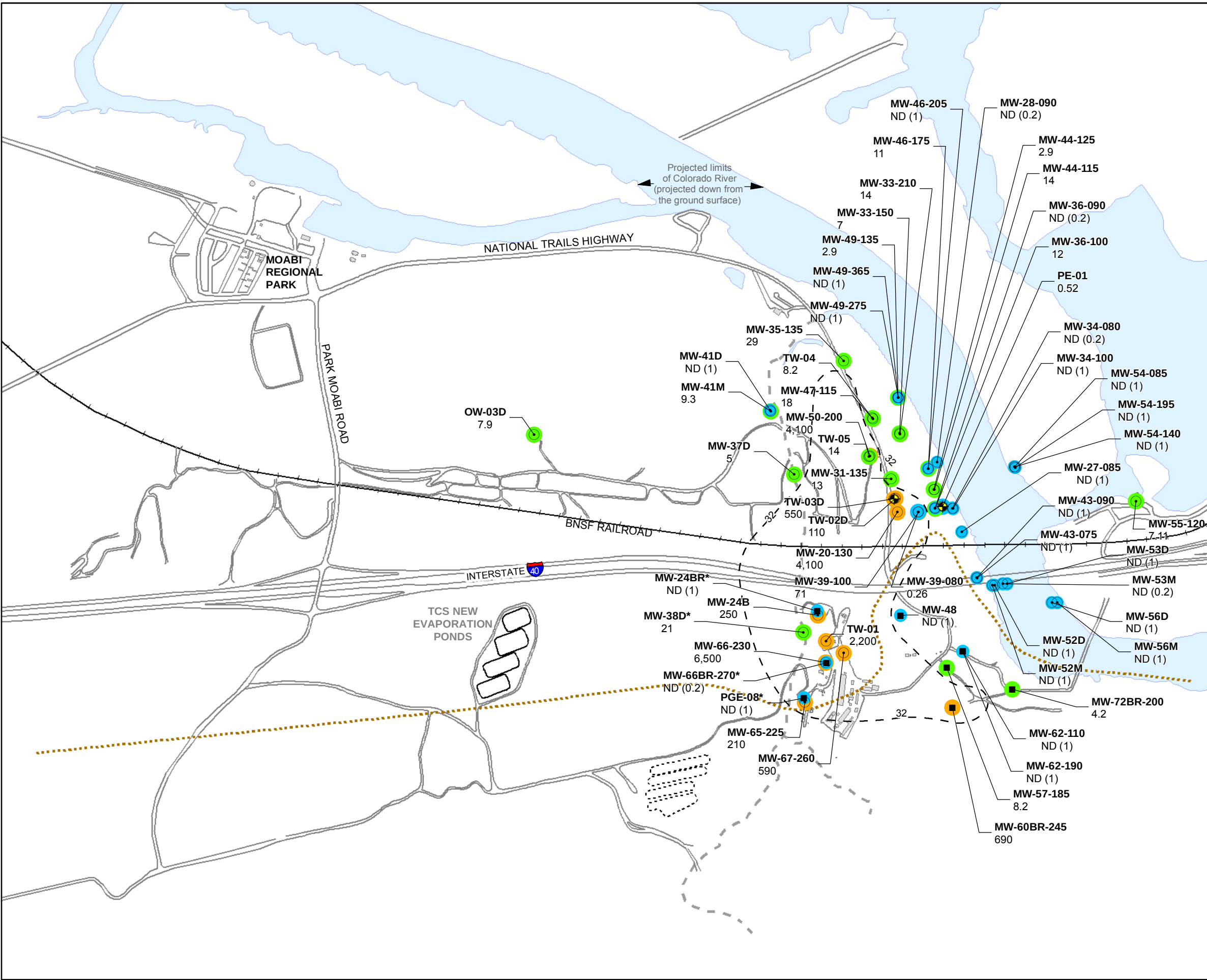
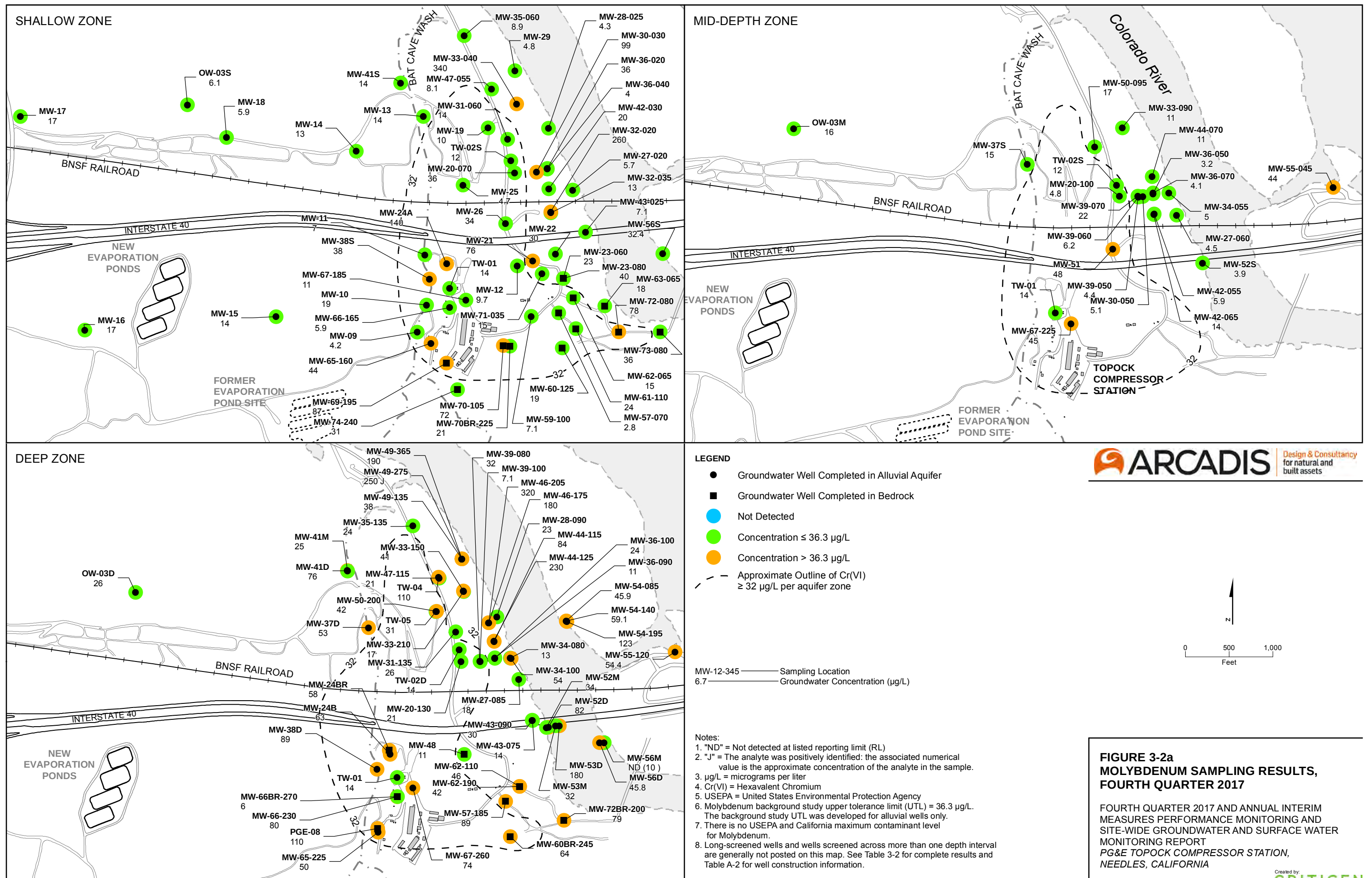
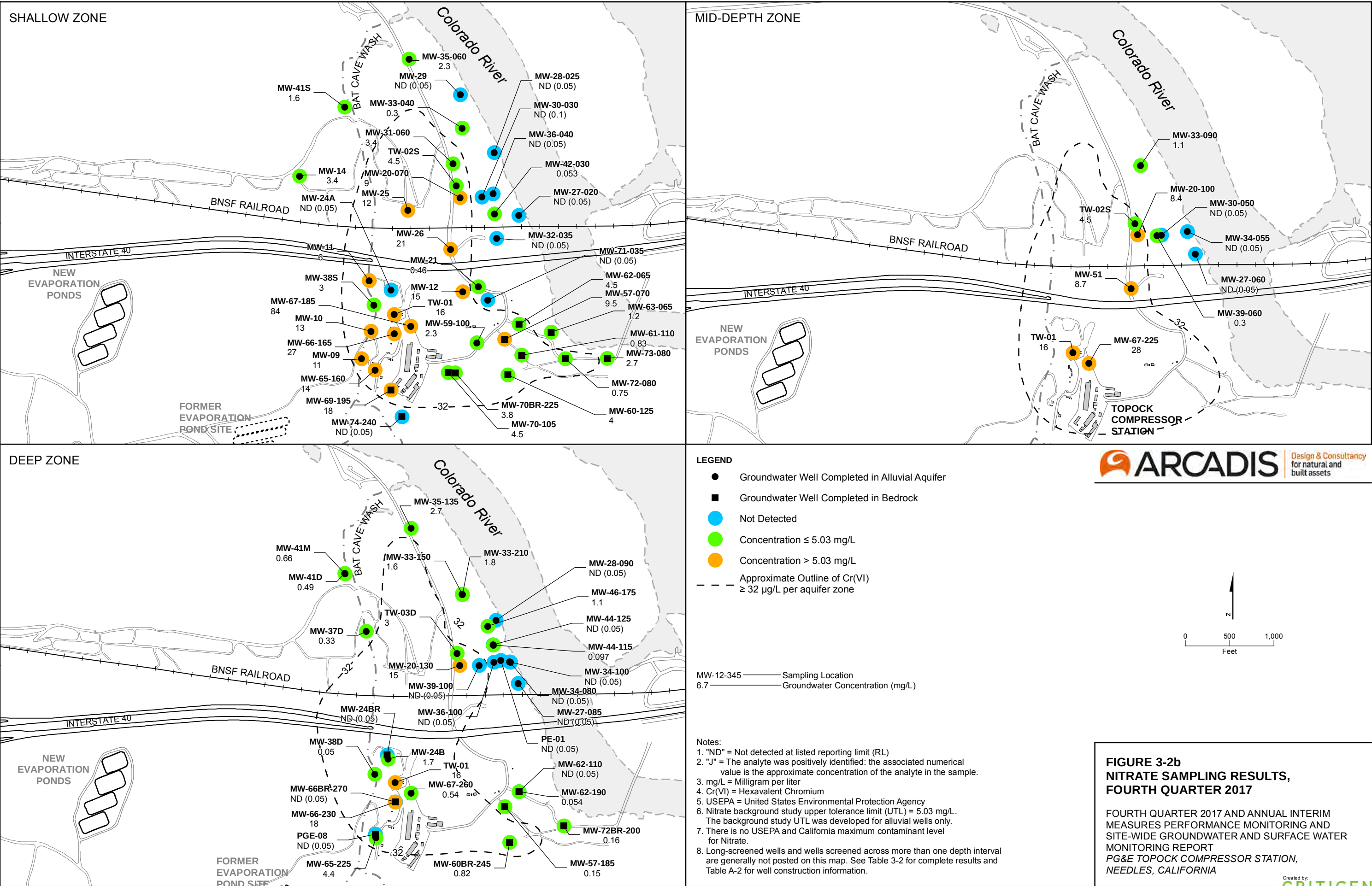


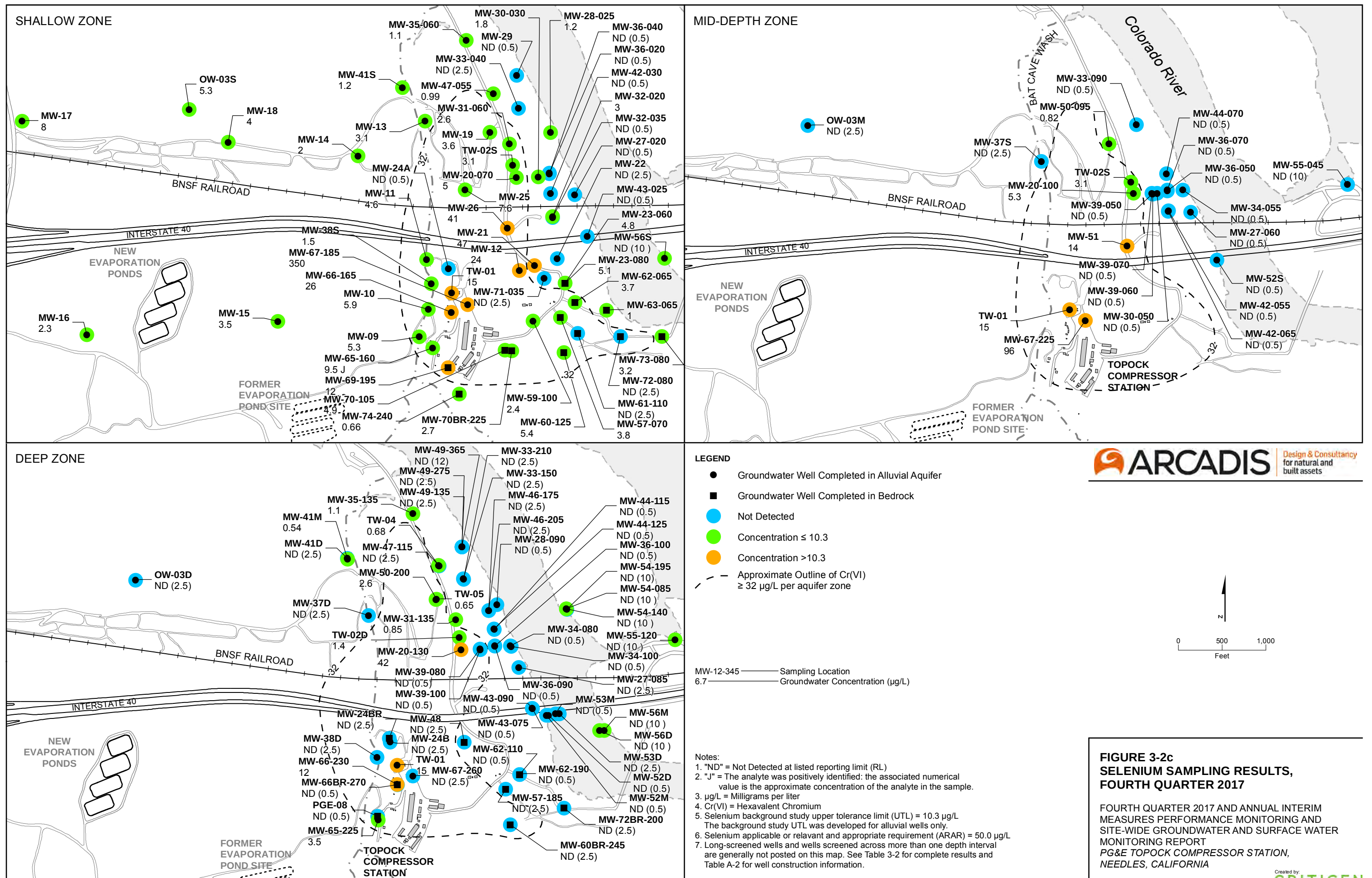
FIGURE 3-1c
Cr(VI) SAMPLING RESULTS, DEEP WELLS
IN ALLUVIAL AQUIFER AND BEDROCK,
FOURTH QUARTER 2017

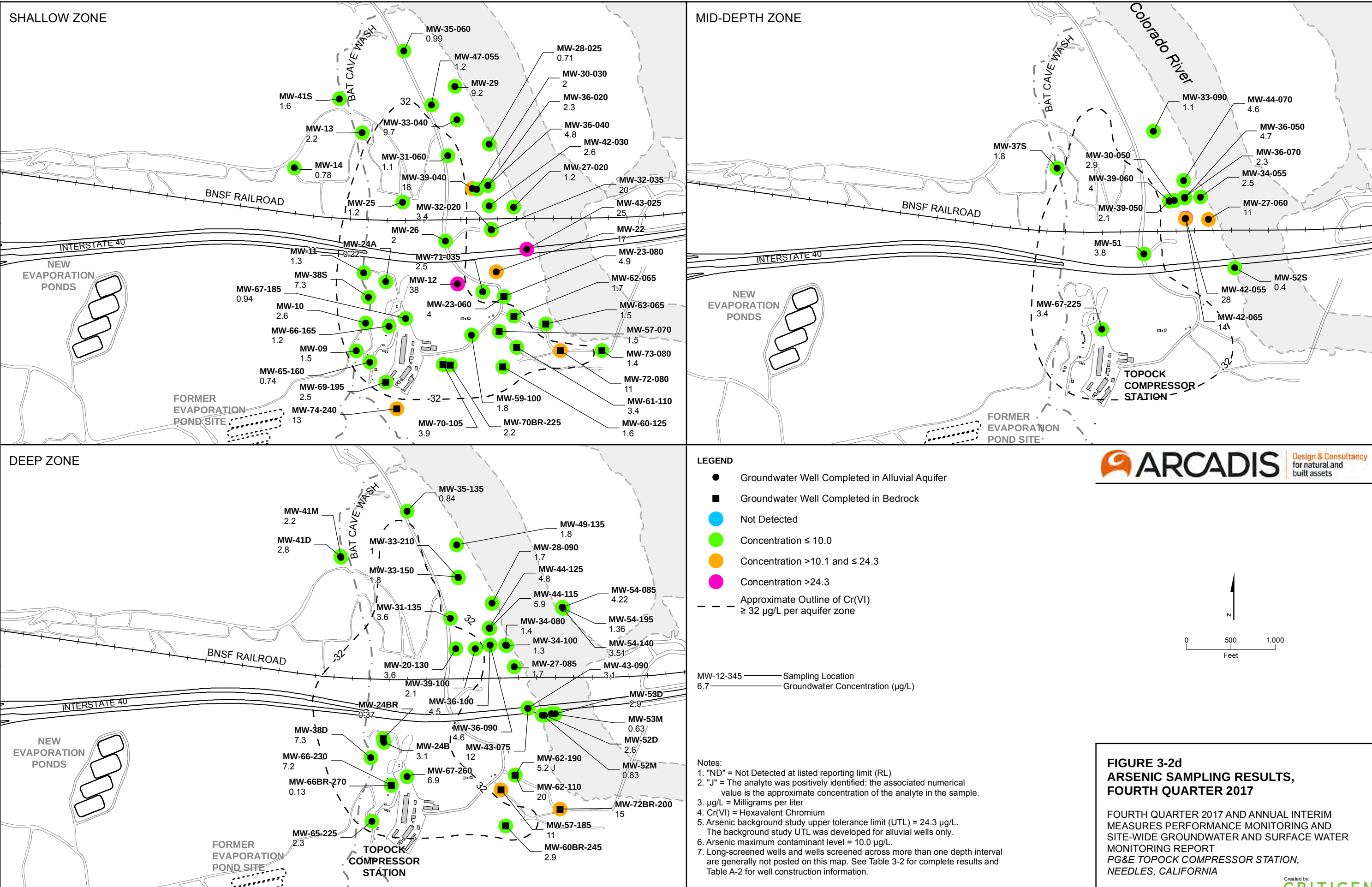
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MEASURES PERFORMANCE MONITORING AND
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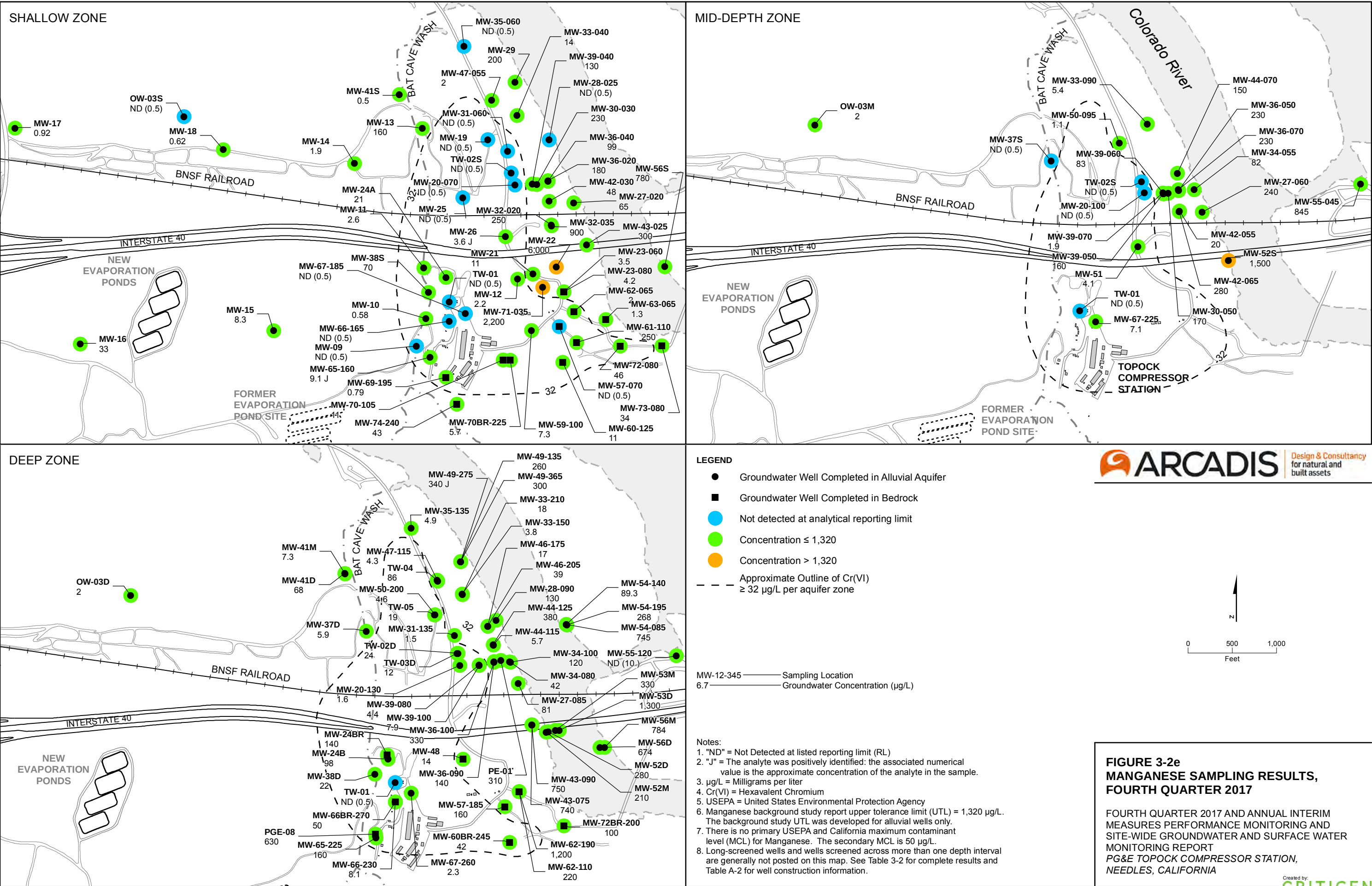


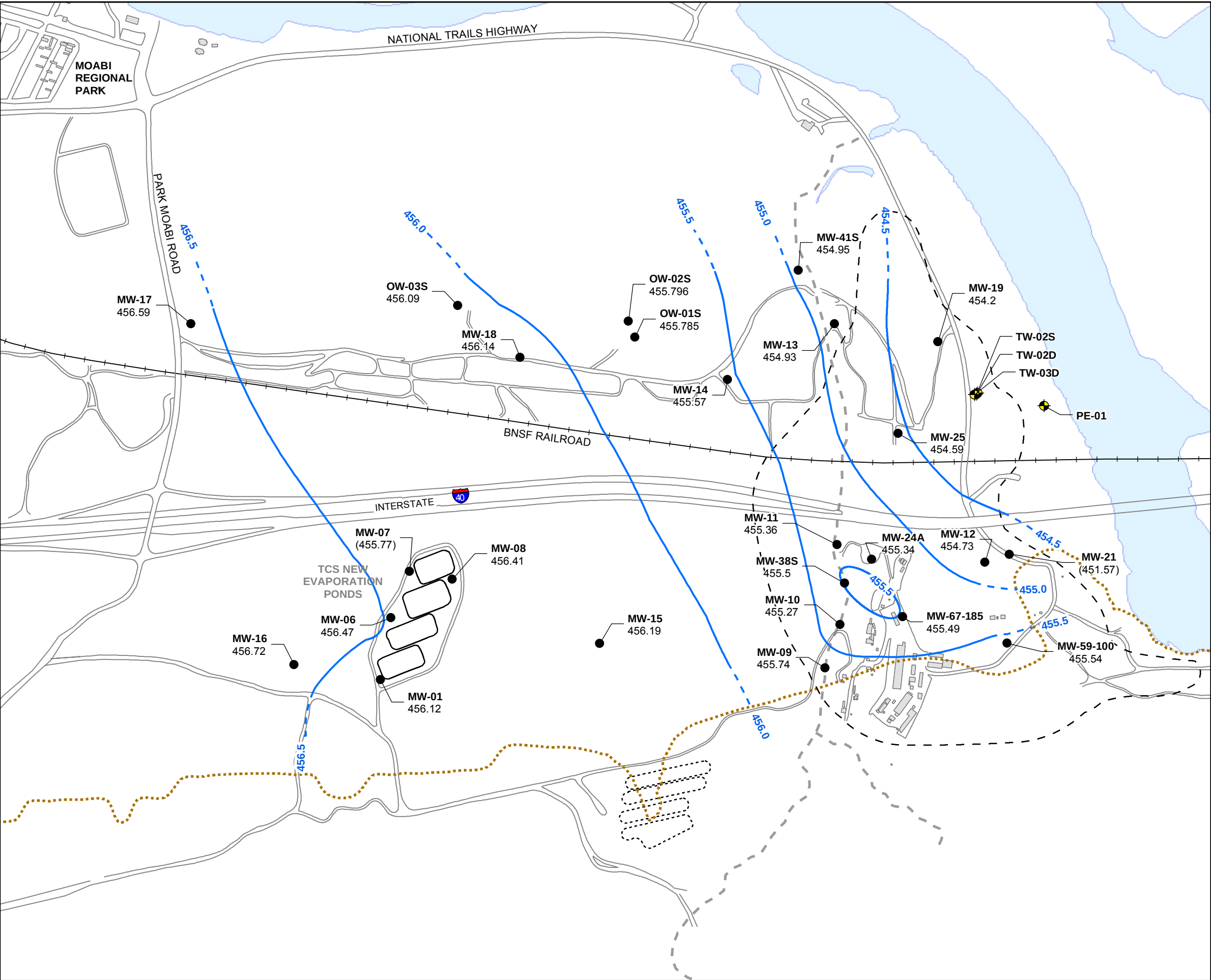












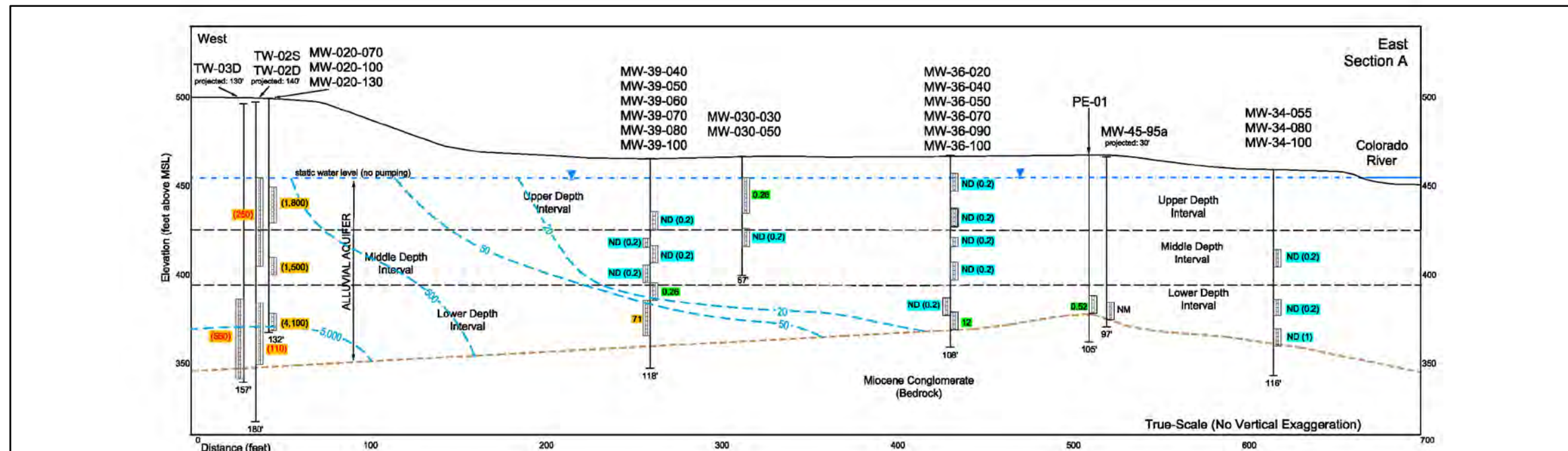
- LEGEND**
- Alluvial Aquifer well sampled during sampling event
 - ⬮ Extraction Well
(TW-03D and PE-01 are primary extraction wells;
TW-02S and TW-02D are backup extraction wells)
 - Groundwater Elevation Contour 0.5 ft,
dashed where inferred
 - - - Approximate outline of monitoring wells in Alluvial Aquifer
and Bedrock with Cr(VI) concentrations ≥ 32 µg/L
 - ⋯ Approximate bedrock contact at 455 ft AMSL

MW-14 — Sampling Location
455.51 — Groundwater Elevation (ft AMSL)
(454.26) — Groundwater Elevation not used in contouring (ft AMSL)

- Notes:**
1. Water level contours for the floodplain area are presented in IM Performance Monitoring Reports.
 2. Extraction wells TW-03D and PE-01 are pumping from lower portion of the aquifer.
 3. Gradients shown on this figure show transient conditions in the aquifer at the time of measurement and may not reflect the expected average groundwater flow directions.
 4. AMSL = Above Mean Sea Level
 5. ft = Feet

**FIGURE 3-3
GROUNDWATER ELEVATION MAP
SHALLOW ZONE OF THE ALLUVIAL AQUIFER
(WATER TABLE), DECEMBER 13, 2017**

FOURTH QUARTER 2017 AND ANNUAL INTERIM
MEASURES PERFORMANCE MONITORING AND
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NEEDLES, CALIFORNIA

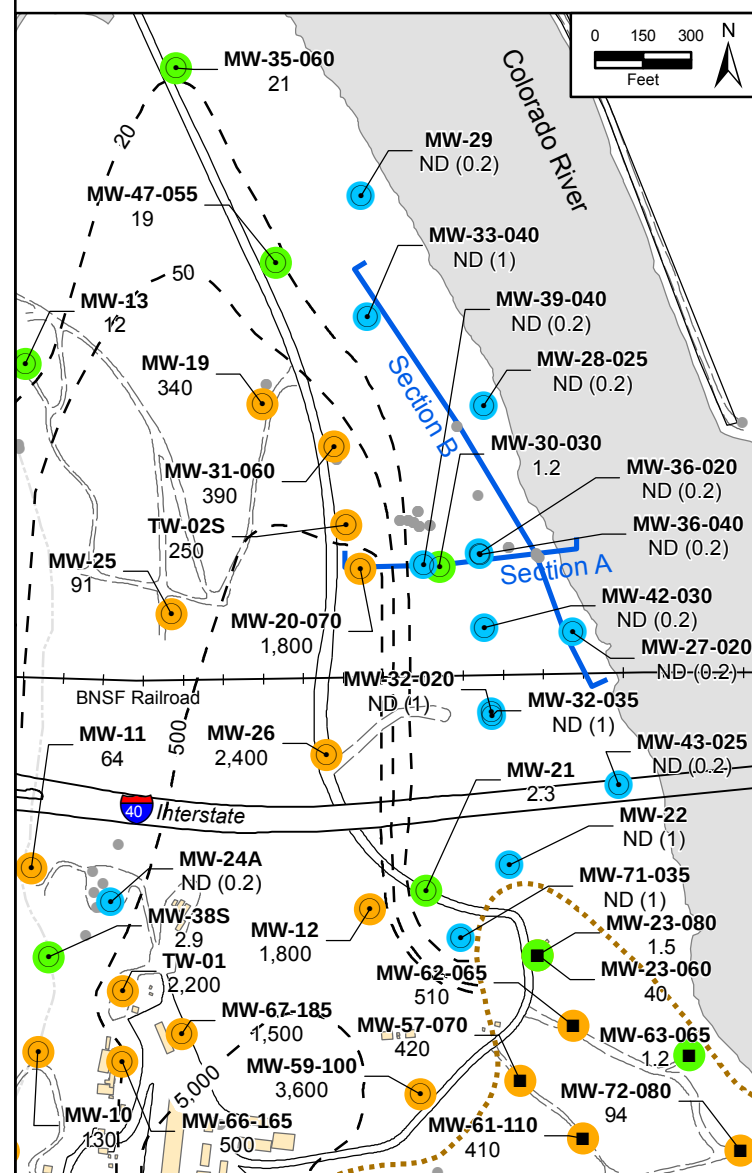


LEGEND

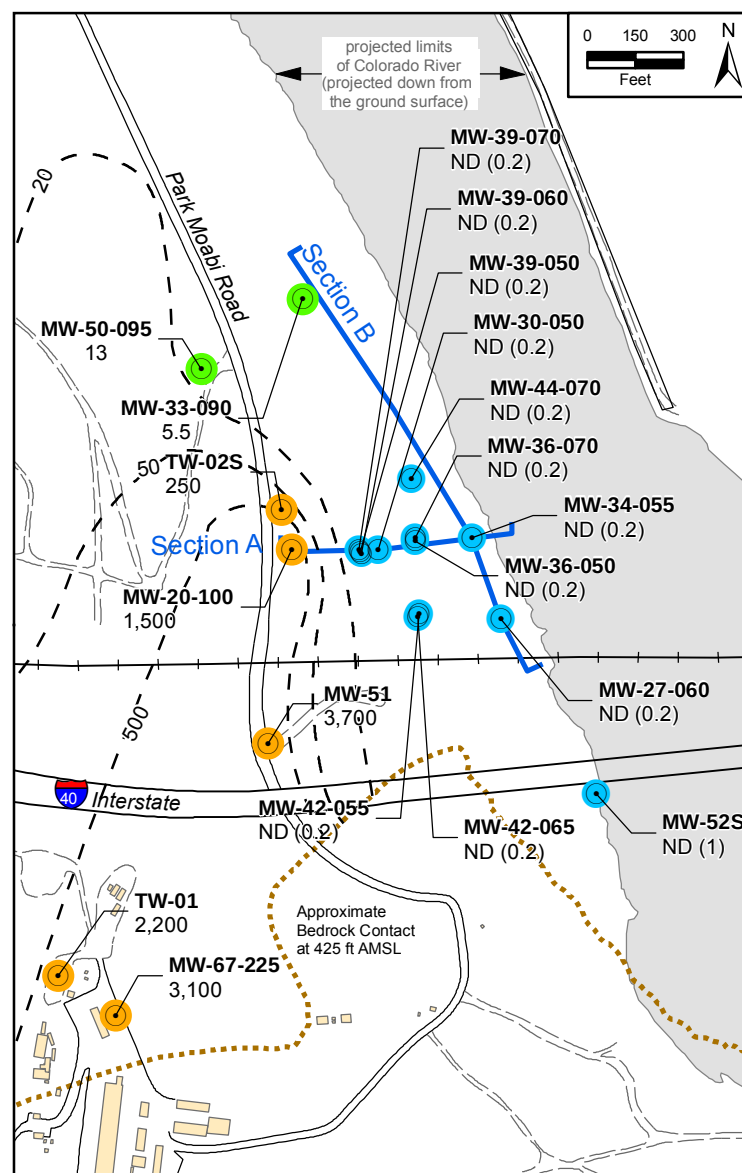
- Alluvial Aquifer well sampled during sampling event
- Bedrock well sampled during sampling event
- ⬇ Extraction well sampled during sampling event
- Well not sampled during sampling event

Cr(VI) Concentrations

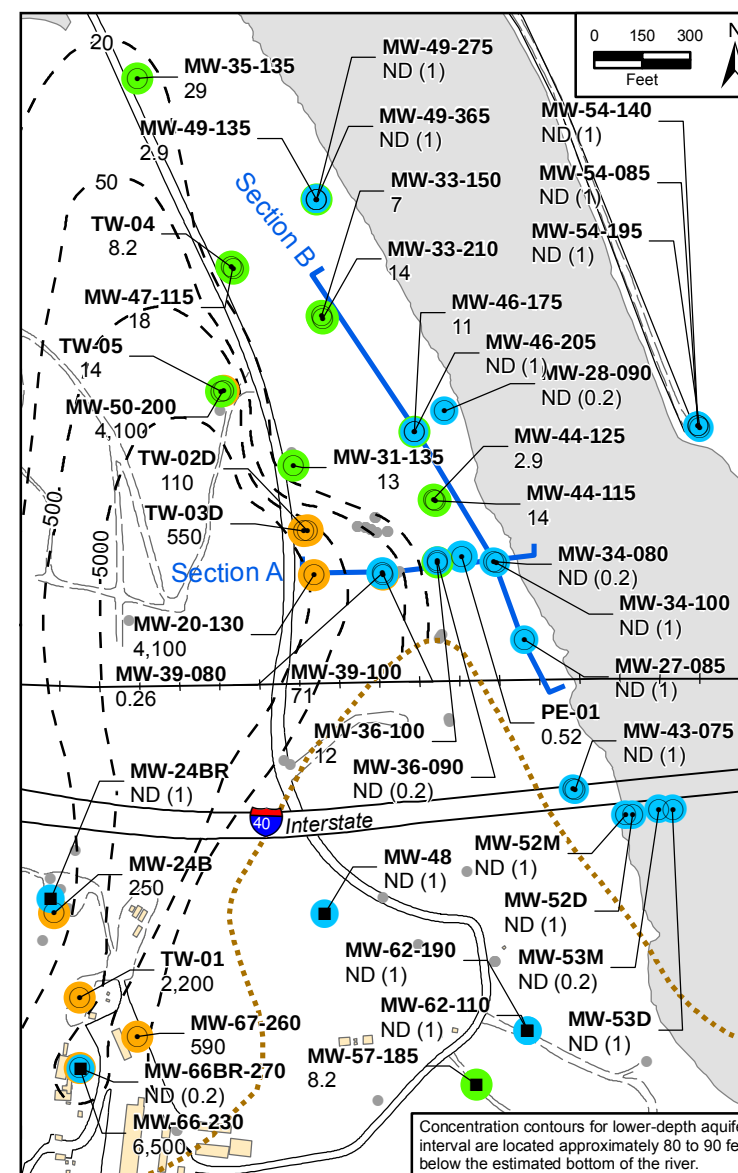
- Not detected at analytical reporting limit
- Concentration between reporting limit and 32 µg/L
- Concentration ≥ 32 µg/L
- - - Inferred Cr(VI) concentration contour within Alluvial Aquifer depth interval
- - - Approximate bedrock contact (per depth interval)
- Hydrogeologic Section



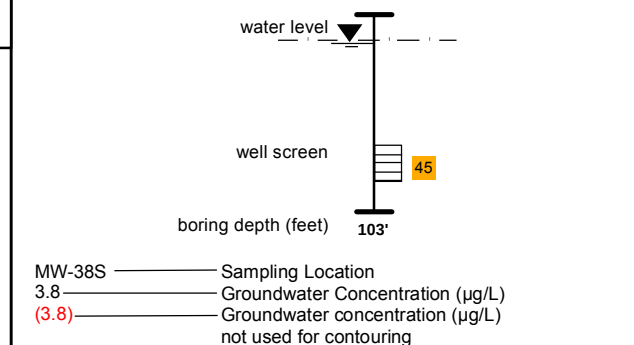
Shallow Wells (Upper Depth Interval)



Mid-Depth Wells (Middle-Depth Interval)



Deep Wells (Lower Depth Interval)

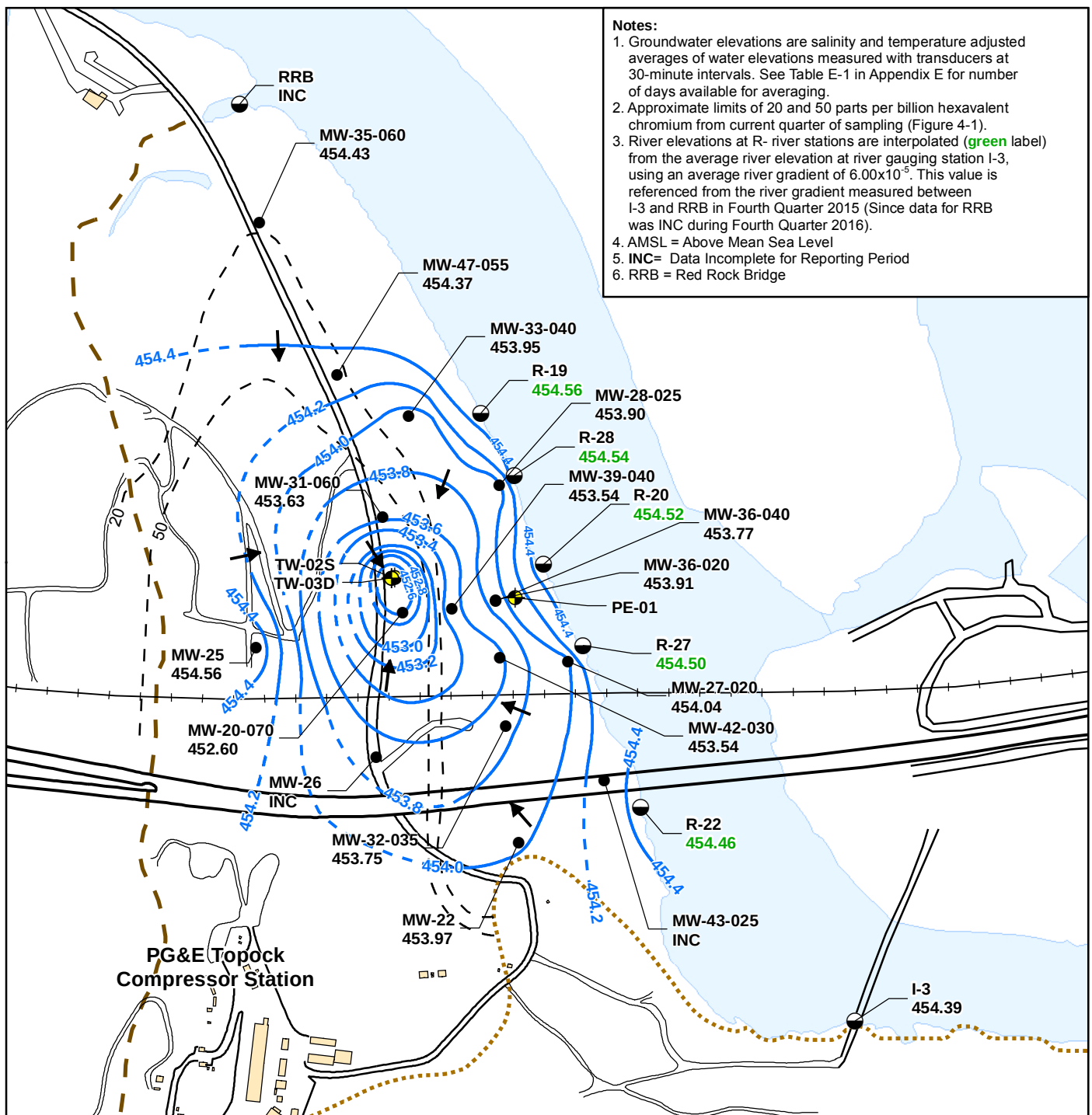


- MW-38S — Sampling Location
3.8 — Groundwater Concentration (µg/L)
(3.8) — Groundwater concentration (µg/L) not used for contouring
- Notes:**
- "ND" = Cr(VI) not detected at listed reporting limit.
 - "J" = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
 - "*" = Deep interval "ND" samples screened vertically above detect sample.
 - µg/L = micrograms per liter
 - Cr(VI) = Hexavalent Chromium
 - 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 µg/L in the floodplain portion of the Alluvial Aquifer.
 - 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.
 - 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.
 - 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,
FOURTH QUARTER 2017**

FOURTH QUARTER 2017 AND ANNUAL INTERIM
MEASURES PERFORMANCE MONITORING AND
SITE-WIDE GROUNDWATER AND SURFACE WATER
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- Notes:**
1. Groundwater elevations are salinity and temperature adjusted averages of water elevations measured with transducers at 30-minute intervals. See Table E-1 in Appendix E for number of days available for averaging.
 2. Approximate limits of 20 and 50 parts per billion hexavalent chromium from current quarter of sampling (Figure 4-1).
 3. River elevations at R- river stations are interpolated (green label) from the average river elevation at river gauging station I-3, using an average river gradient of 6.00×10^{-5} . This value is referenced from the river gradient measured between I-3 and RRB in Fourth Quarter 2015 (Since data for RRB was INC during Fourth Quarter 2016).
 4. AMSL = Above Mean Sea Level
 5. INC= Data Incomplete for Reporting Period
 6. RRB = Red Rock Bridge

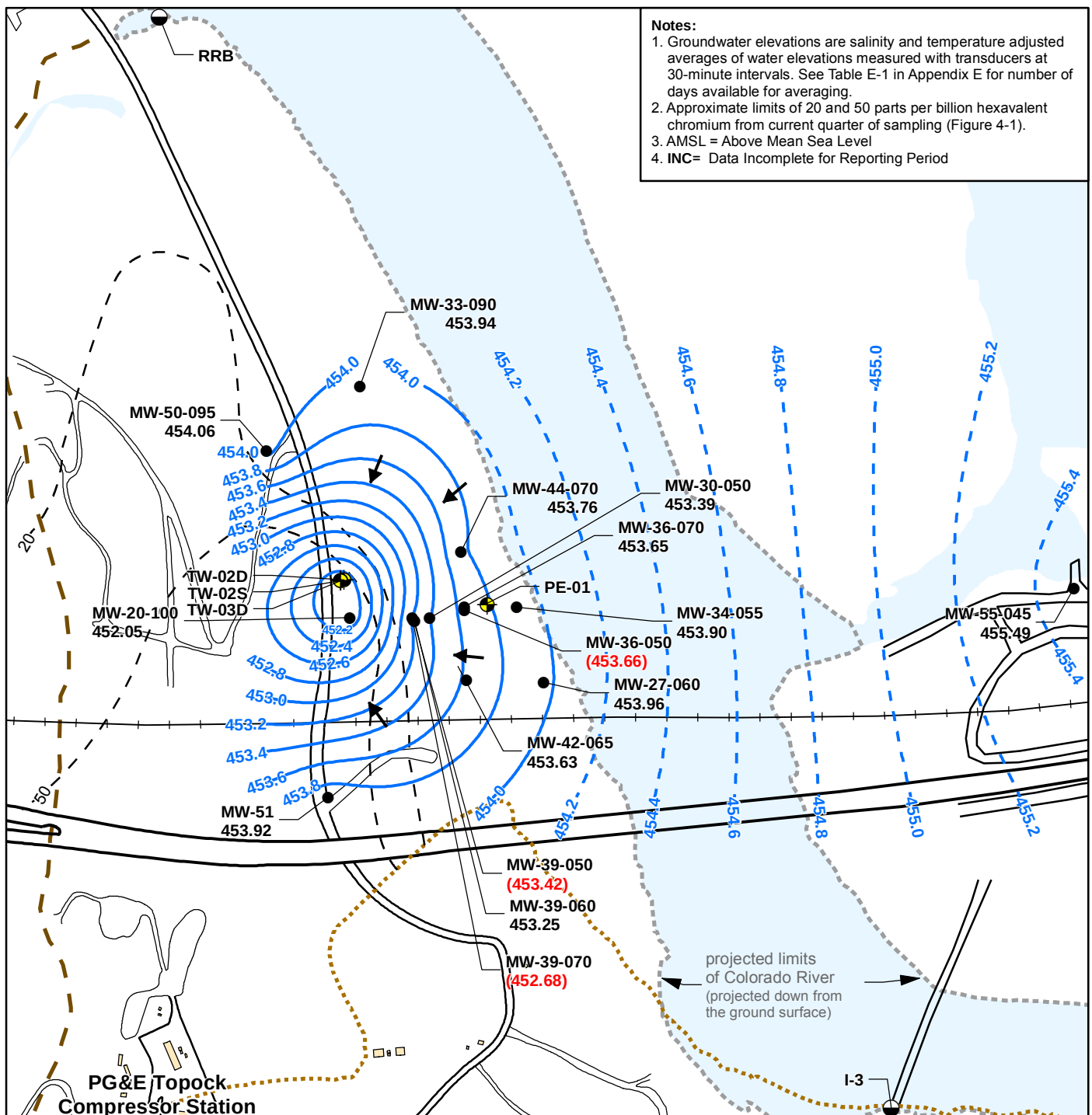
LEGEND

- Monitoring Well
- River Station
- ⊕ Extraction Well
- Bedrock Contact at 455 ft AMSL Elevation
- Interpreted Groundwater Flow Direction
- Groundwater Elevation Contour 0.2 ft (dashed where inferred)
- - Inferred Cr(VI) Concentration Contour (see note 2)

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

FIGURE 4-3a
AVERAGE GROUNDWATER ELEVATIONS
IN SHALLOW WELLS AND RIVER
ELEVATIONS, FOURTH QUARTER 2017

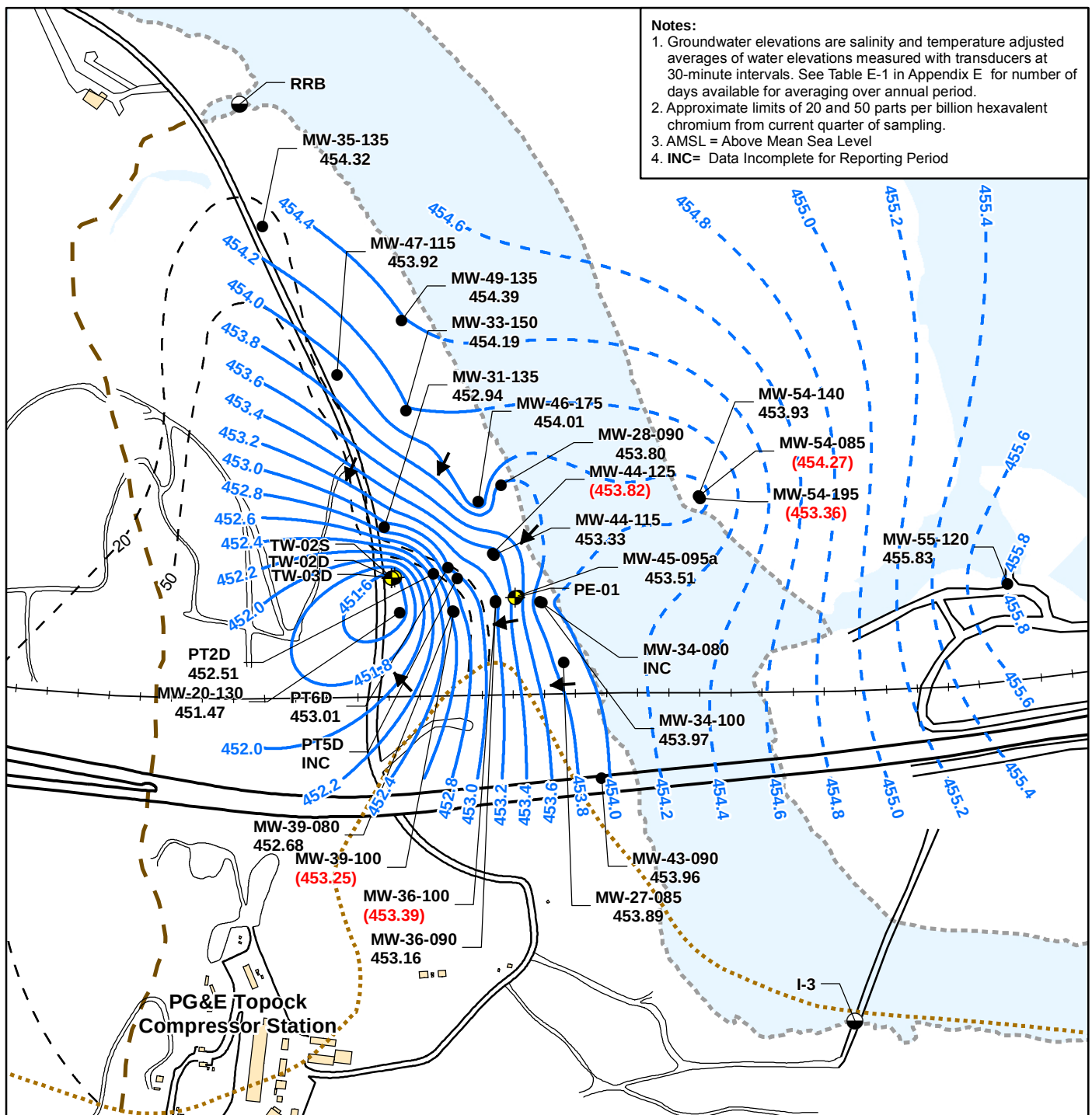
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MEASURES PERFORMANCE MONITORING AND
SITE-WIDE GROUNDWATER AND SURFACE WATER
MONITORING REPORT
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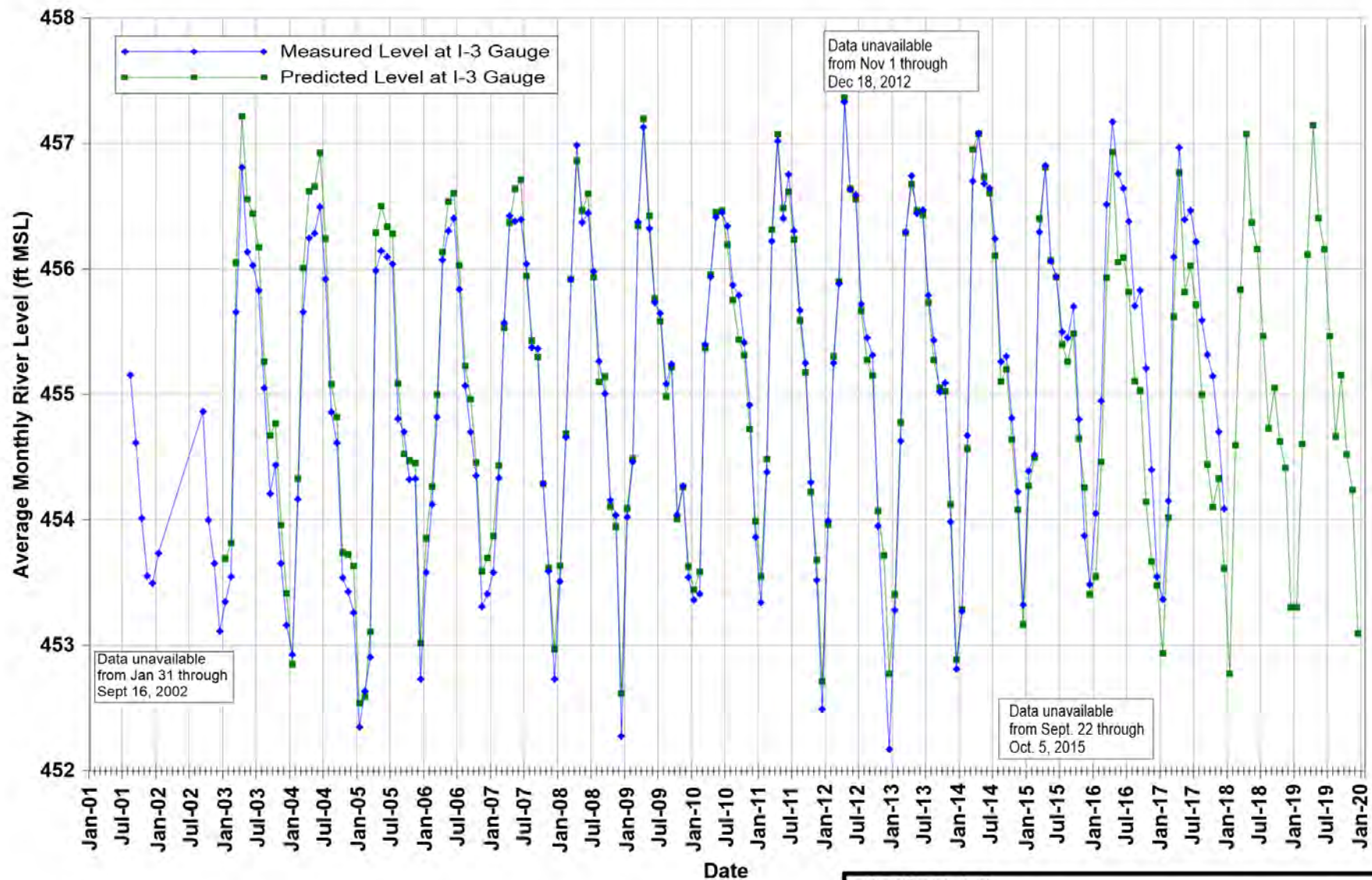


**FIGURE 4-3b
AVERAGE GROUNDWATER ELEVATIONS
IN MID-DEPTH WELLS, FOURTH QUARTER 2017**

FOURTH QUARTER 2017 AND ANNUAL INTERIM
MEASURES PERFORMANCE MONITORING AND
SITE-WIDE GROUNDWATER AND SURFACE WATER
MONITORING REPORT,
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NEEDLES, CALIFORNIA

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





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 January 2018 USBR projections. 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

USBR = United States Bureau of Reclamation

FIGURE 4-5 PAST AND PREDICTED FUTURE RIVER LEVELS AT TOPOCK COMPRESSOR STATION

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

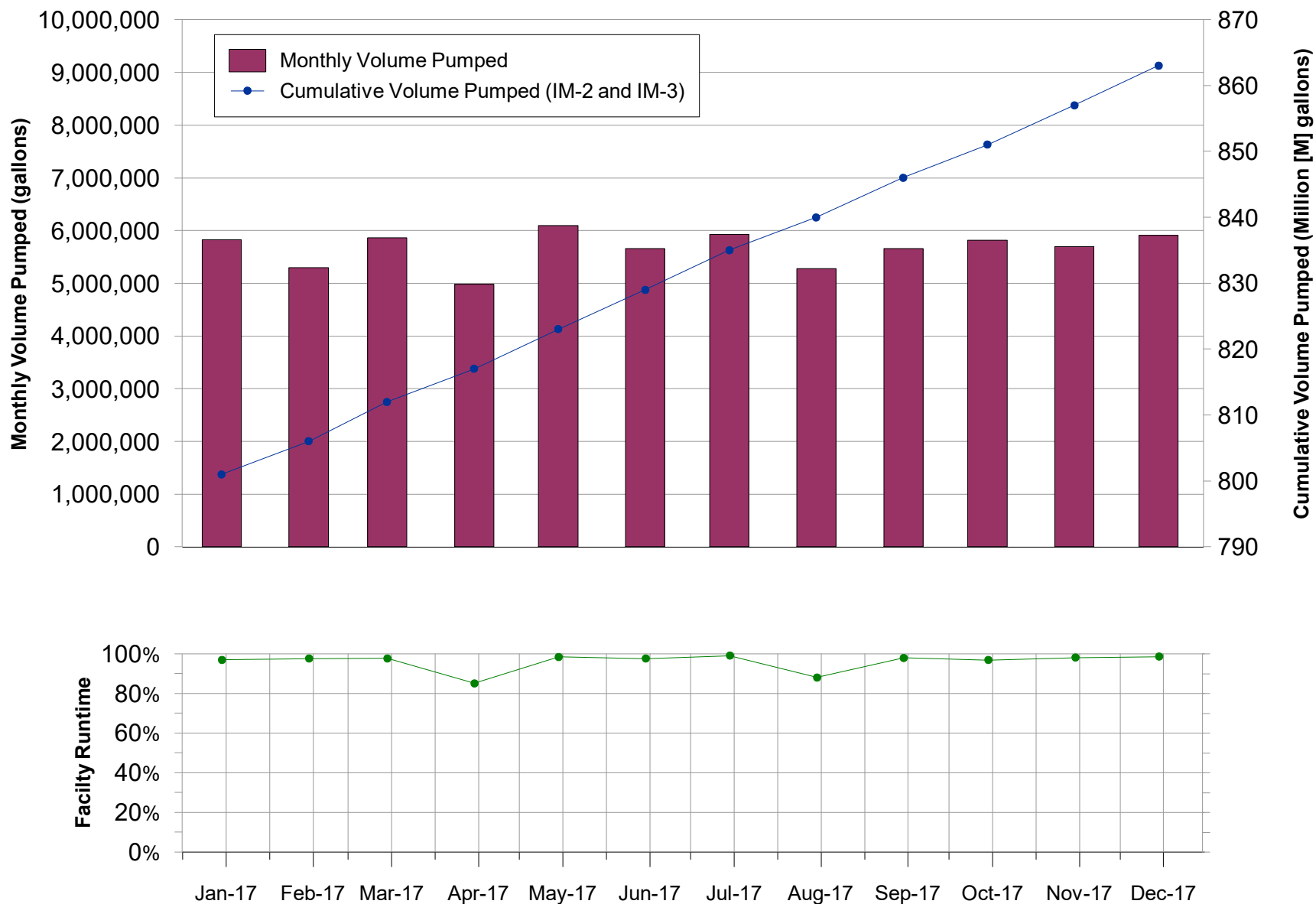
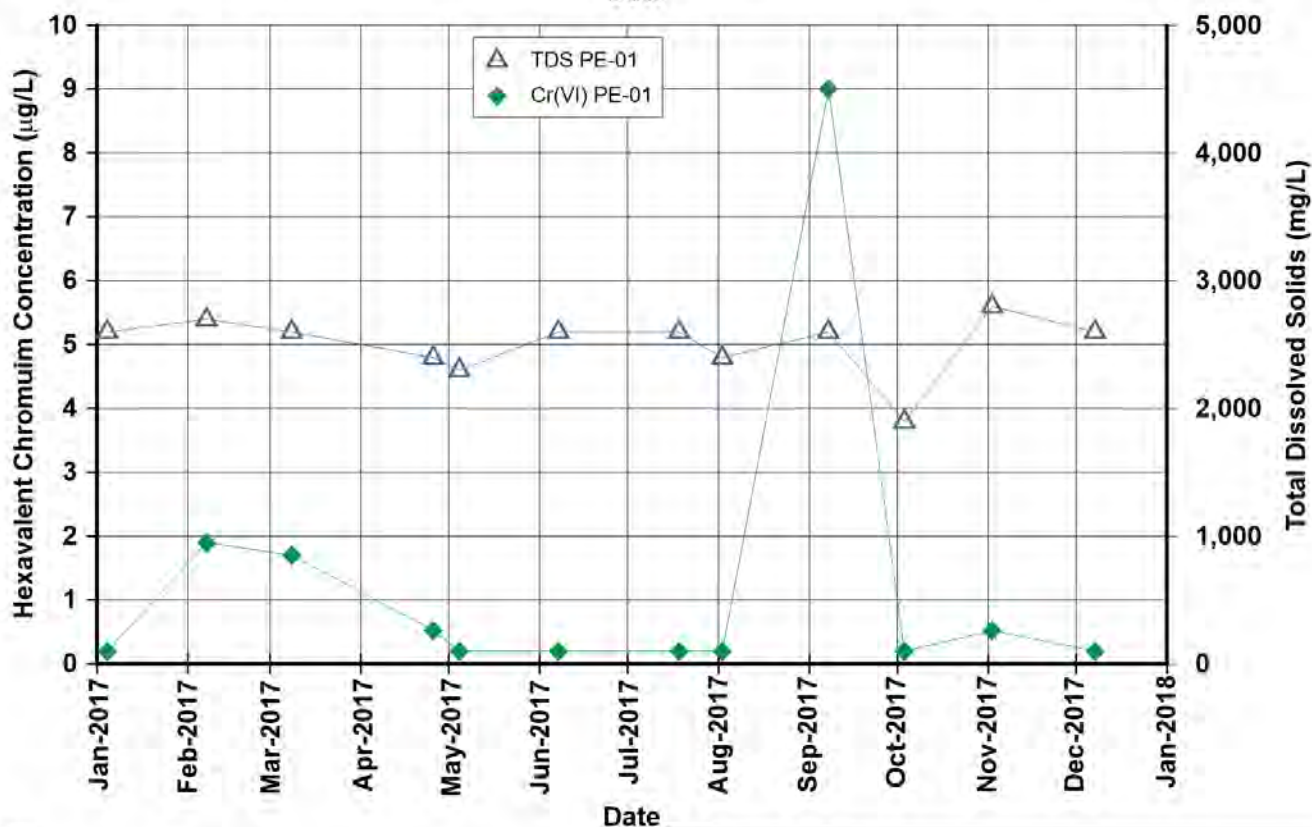
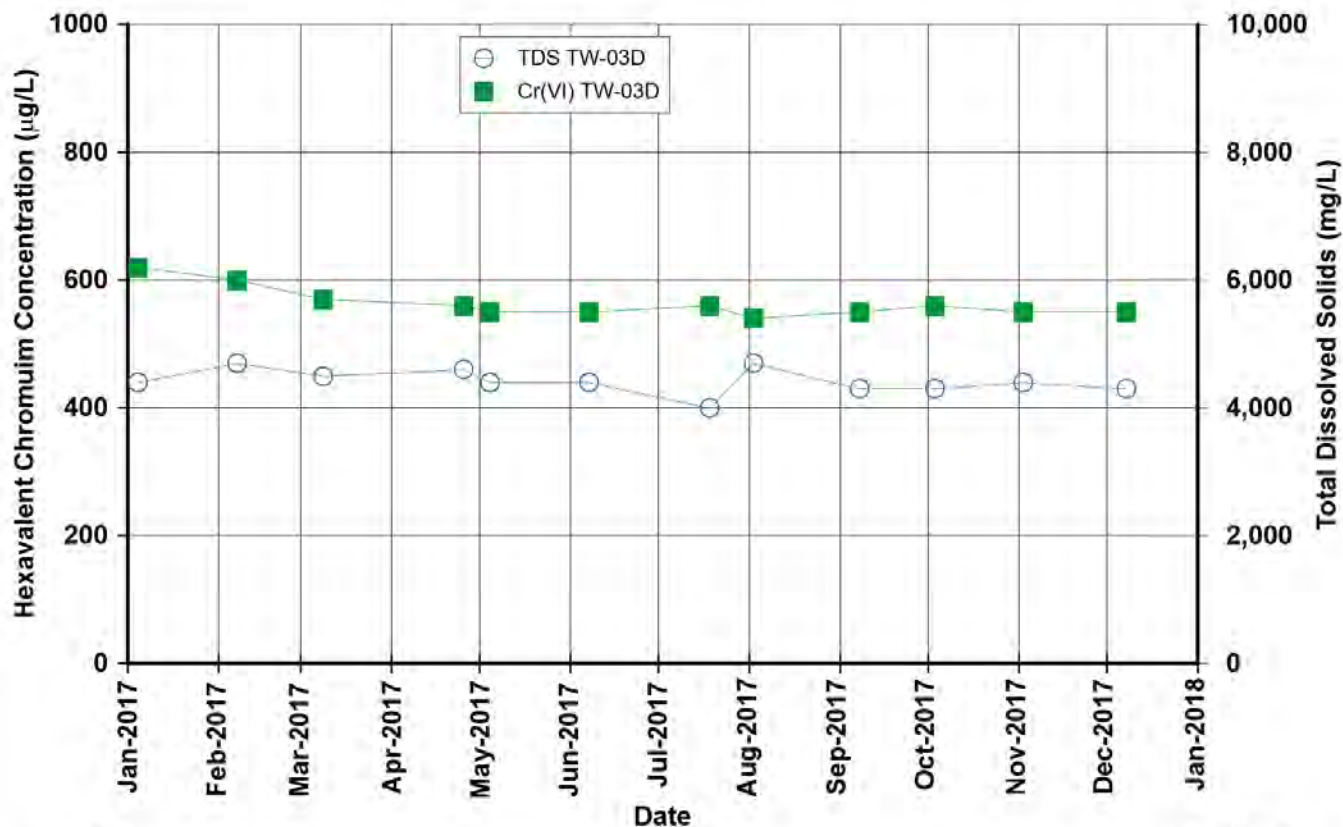


FIGURE 5-1
MONTHLY COMBINED PUMPING VOLUMES AND
PERCENT UPTIME, 2017 REPORTING PERIOD
FOURTH QUARTER 2017 AND ANNUAL INTERIM MEASURES
PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER
AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA



Notes:

Cr(VI) = hexavalent chromium
 gpm = gallons per minute.
 µg/L = micrograms per liter.
 mg/L = milligrams per liter.
 TDS = total dissolved solids

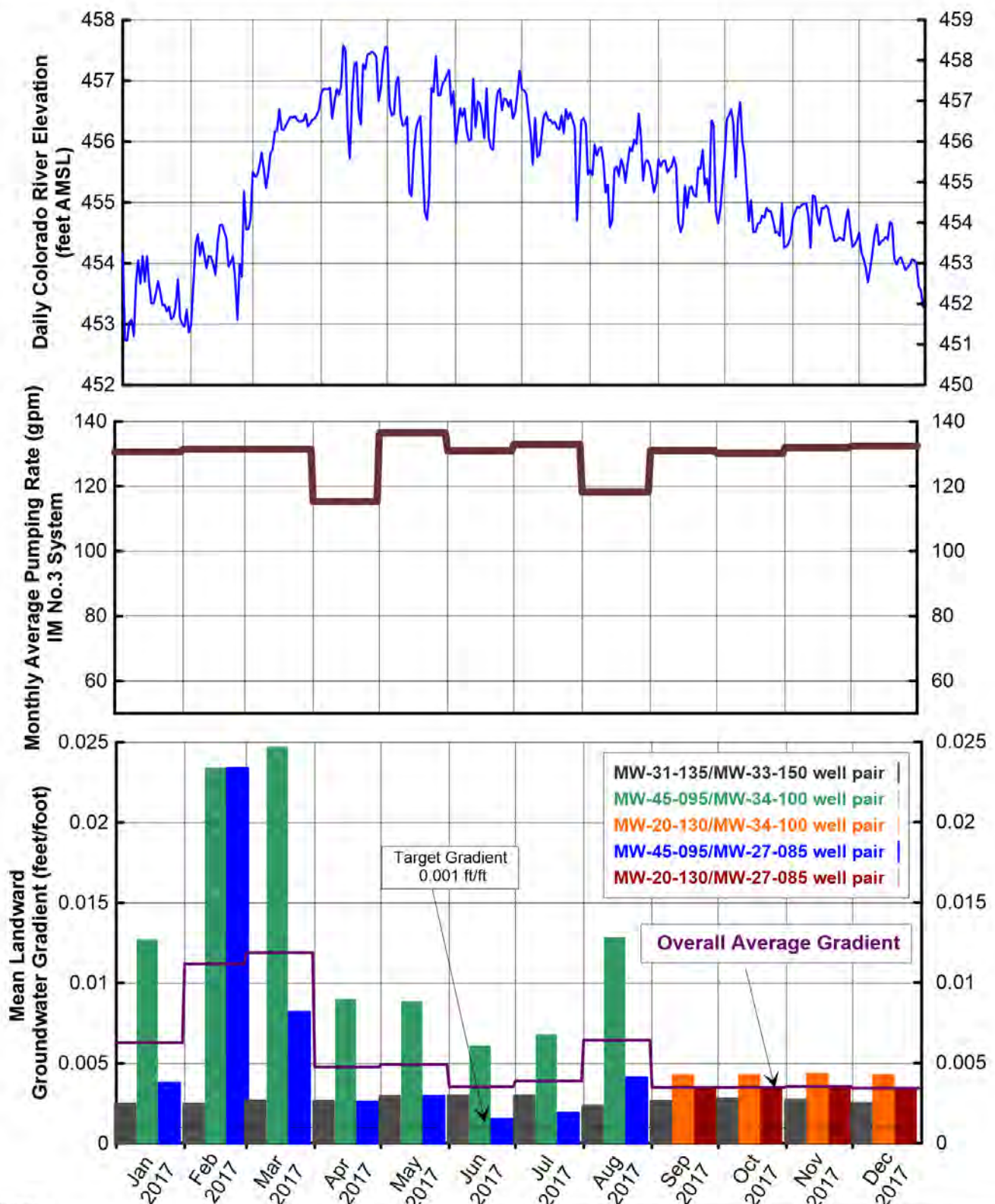
TW-3D pumping began on 20-Dec-05.
 PE-1 pumping began on 26-Jan-06.

For average pumping information see Table 5-1.

FIGURE 5-2
Cr(VI) AND TOTAL DISSOLVED SOLIDS
CONCENTRATIONS IN EXTRACTION WELLS
TW-03D AND PE-01, 2017 REPORTING PERIOD

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





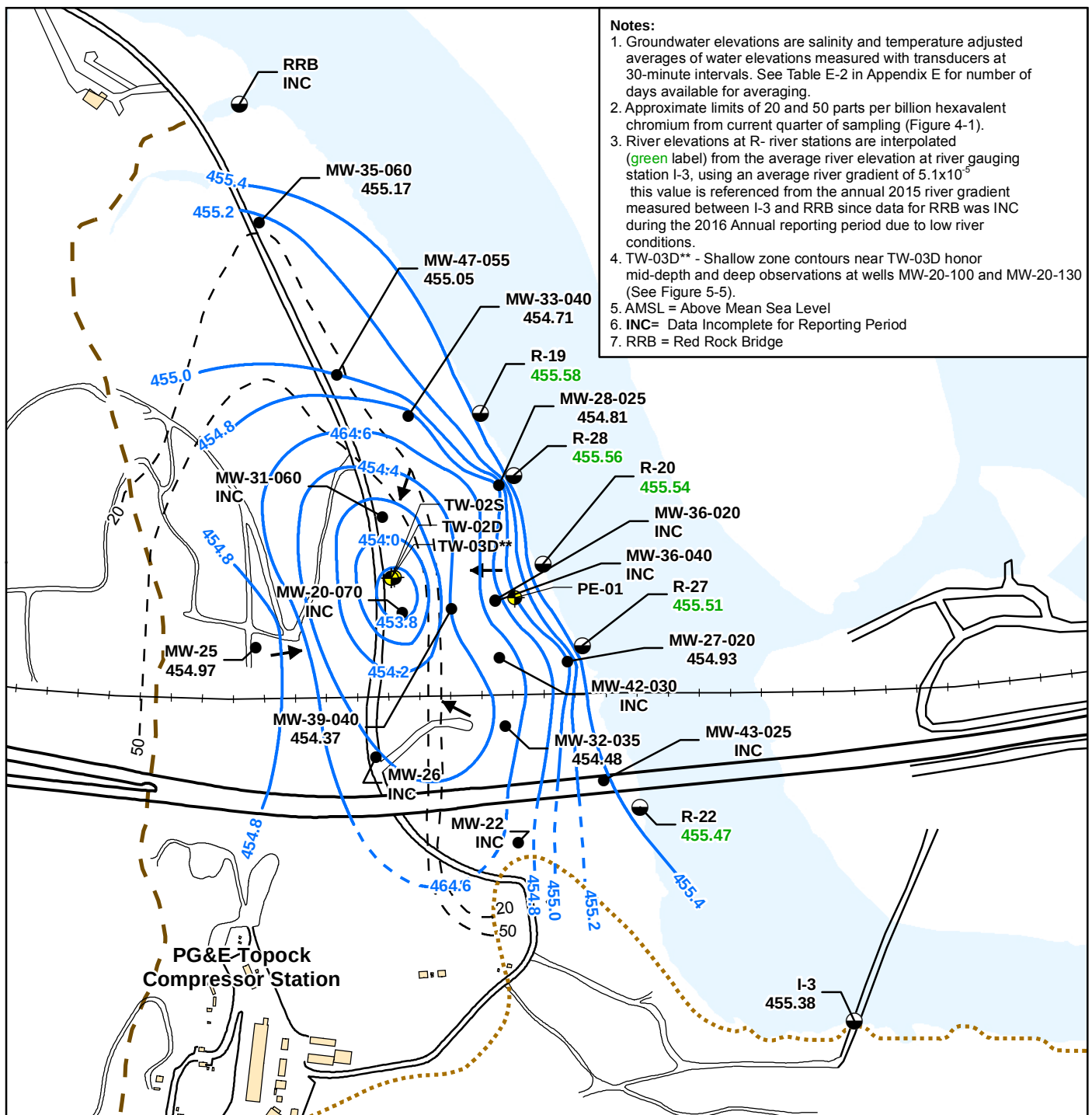
Notes:

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 4-2 and Section 4.5 for discussion of gradient data.
5. Beginning August 2017, MW-20-130 approved for gradient compliance (instead of MW-45-095) at central and southern well pairs during months when PE-01 is not run for gradient control.
6. AMSL = above mean sea level.
7. gpm = gallons per minute

**FIGURE 5-3
MEASURED HYDRAULIC GRADIENTS,
RIVER ELEVATION, AND PUMPING RATE,
2017 REPORTING PERIOD**

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





LEGEND

- Monitoring Well
- River Station
- ⬮ Extraction Well
(TW-03D and PE-01 are primary extraction wells;
TW-02S and TW-02D are backup extraction wells)
- 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)

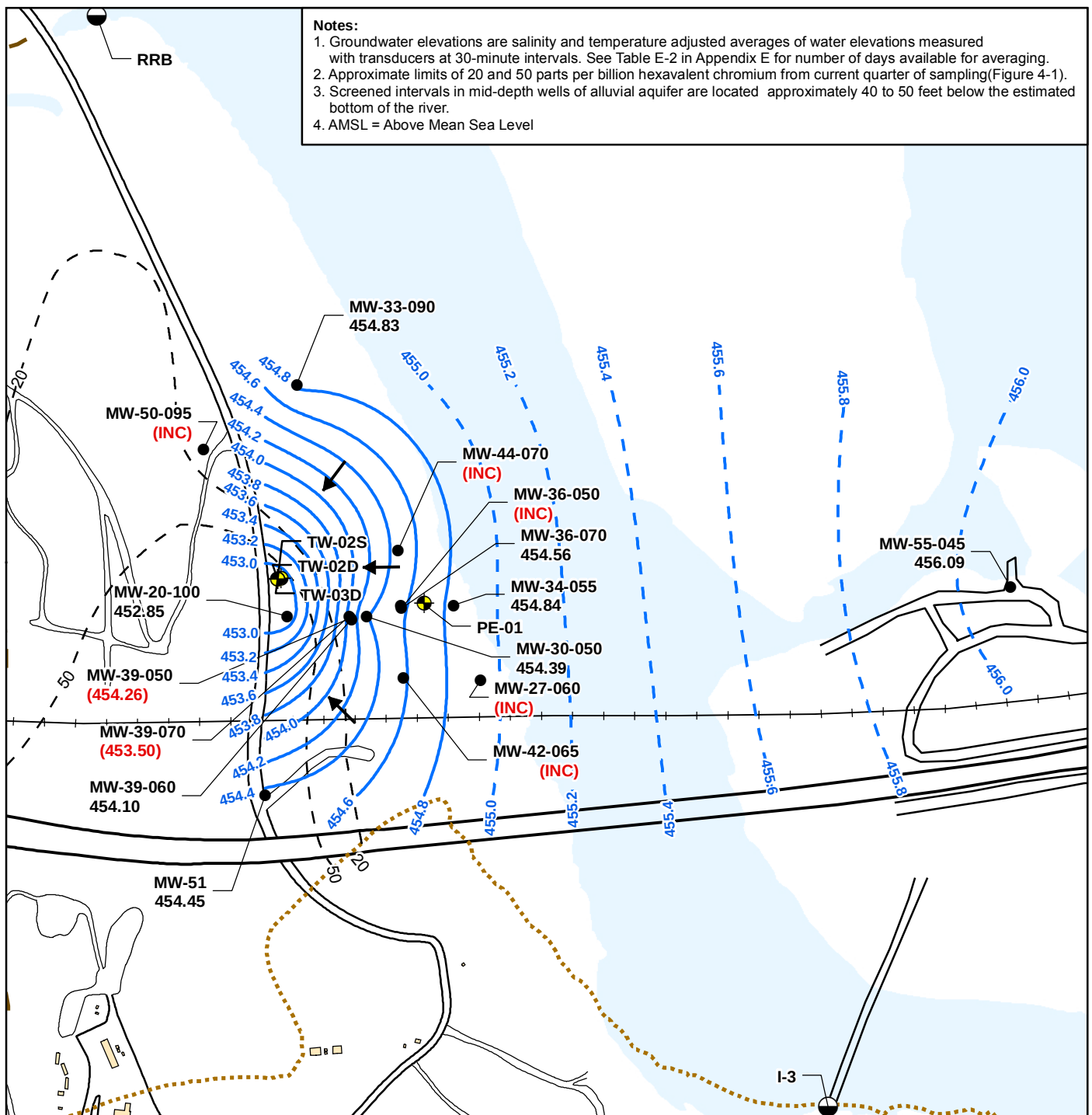
MW-20-070 — Gauging Location
453.70 — Average Groundwater Elevation (ft AMSL)
(455.15) — Elevation in Red Parentheses Are Not Used in Contouring.
R-27 — River Station (see note 3)
453.69 — River Elevation (ft AMSL) Interpolated Average

0 300 600
Feet



FIGURE 5-4a
AVERAGE GROUNDWATER ELEVATIONS
IN SHALLOW WELLS AND RIVER
ELEVATIONS, 2017 REPORTING PERIOD

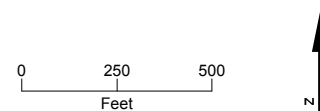
FOURTH QUARTER 2017 AND ANNUAL INTERIM
 MEASURES PERFORMANCE MONITORING AND
 SITE-WIDE GROUNDWATER AND SURFACE WATER
 MONITORING REPORT
 PG&E TOPOCK COMPRESSOR STATION,
 NEEDLES, CALIFORNIA



LEGEND

- Monitoring Well
- River Station
- Extraction Well
(TW-03D and PE-01 are primary extraction wells;
TW-02S and TW-02D are backup extraction wells)
- Bedrock Contact at 425 ft AMSL elevation
- ➔ Interpreted Groundwater Flow Direction
- Groundwater Elevation Contour 0.2 ft
(dashed where inferred)
- - - Inferred Cr(VI) Concentration Contour (see note 2)

MW-36-070 — Gauging Location
454.80 — Average Groundwater Elevation (ft AMSL)
(454.95) — Elevations in red parentheses not used for contouring

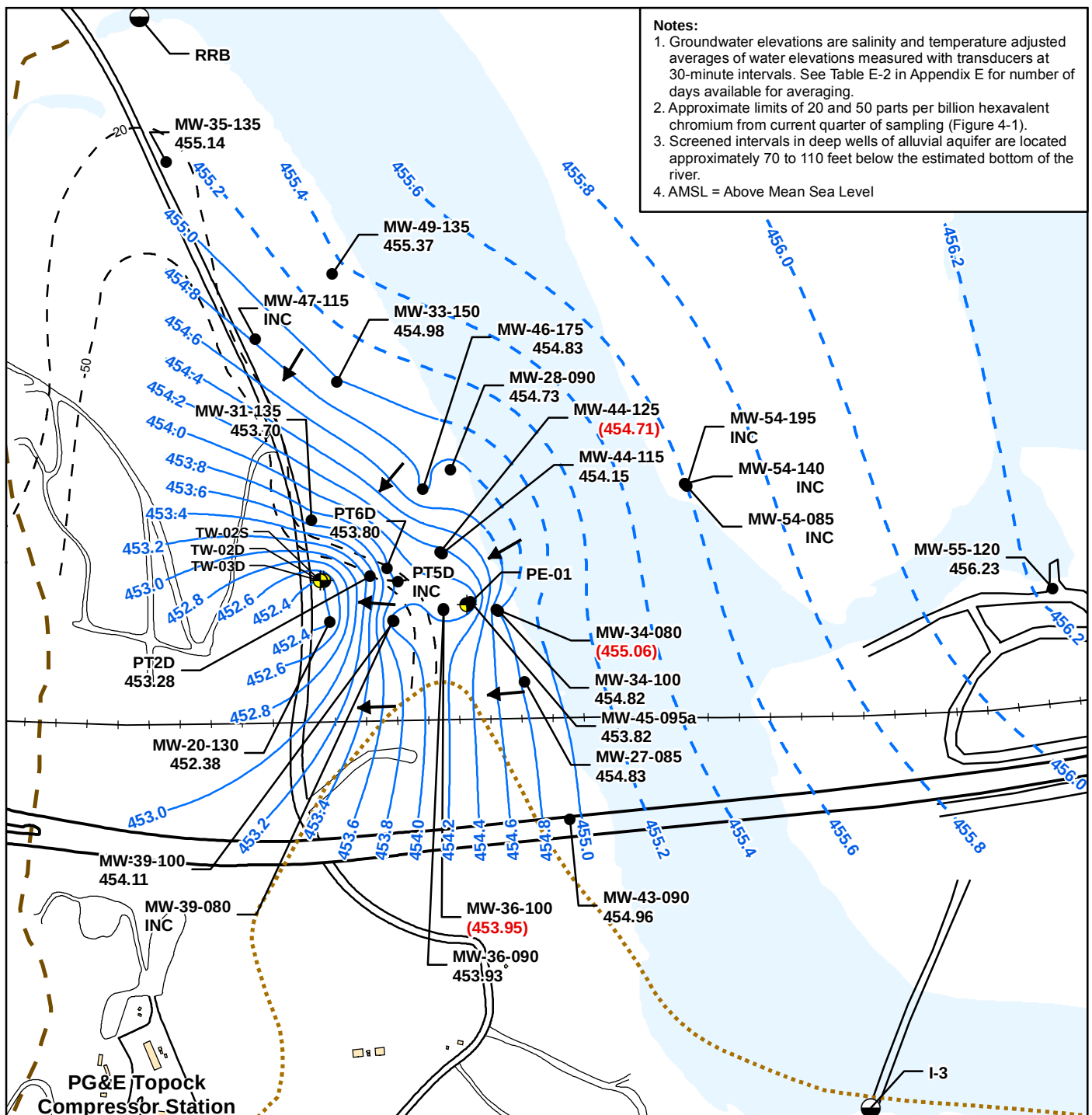


**FIGURE 5-4b
AVERAGE GROUNDWATER ELEVATIONS
IN MID-DEPTH WELLS, 2017 REPORTING PERIOD**

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

Created by:

CRITIGEN



- Notes:**
1. Groundwater elevations are salinity and temperature adjusted averages of water elevations measured with transducers at 30-minute intervals. See Table E-2 in Appendix E for number of days available for averaging.
 2. Approximate limits of 20 and 50 parts per billion hexavalent chromium from current quarter of sampling (Figure 4-1).
 3. Screened intervals in deep wells of alluvial aquifer are located approximately 70 to 110 feet below the estimated bottom of the river.
 4. AMSL = Above Mean Sea Level

LEGEND

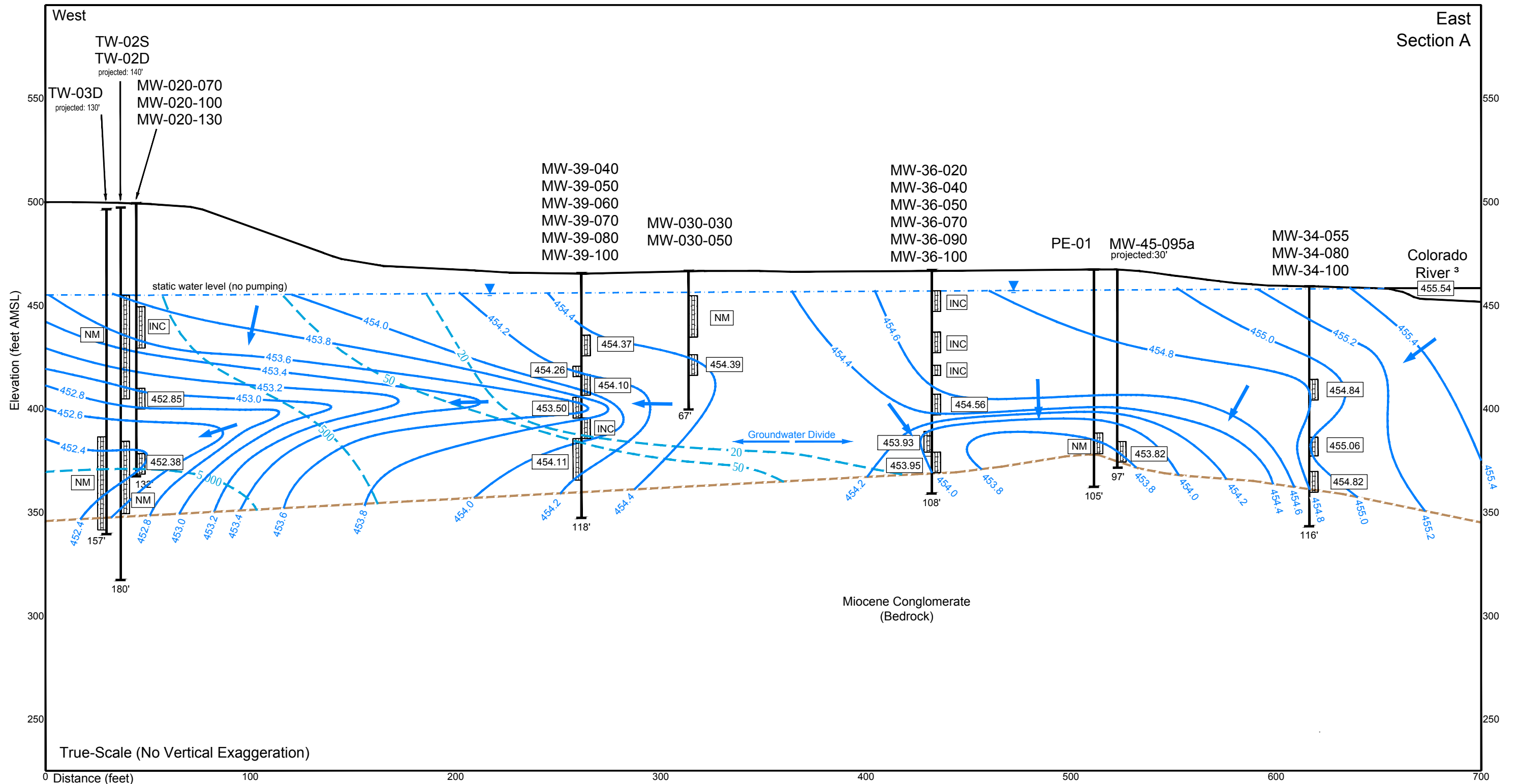
- Monitoring Well
- River Station
- Extraction Well
(TW-03D and PE-01 are primary extraction wells;
TW-02S and TW-02D are backup extraction wells)
- Bedrock Contact at 395 ft AMSL elevation
- Interpreted Groundwater Flow Direction
- Groundwater Elevation Contour 0.2 ft
(dashed where inferred)
- - - Inferred Cr(VI) Concentration Contour (see note 2)

MW-34-100 — Gauging Location
454.99 — Average Groundwater Elevation (ft AMSL)
(455.22) — Elevation in red parentheses not used for contouring

FIGURE 5-4c
AVERAGE GROUNDWATER ELEVATIONS
IN DEEP WELLS, 2017 REPORTING PERIOD

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

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- Notes:**
- Results show average groundwater elevations for 2017 measured with transducers at 30-minute intervals.
 - Colorado River elevation shown as interpolated annual average from R-20 gauge.

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

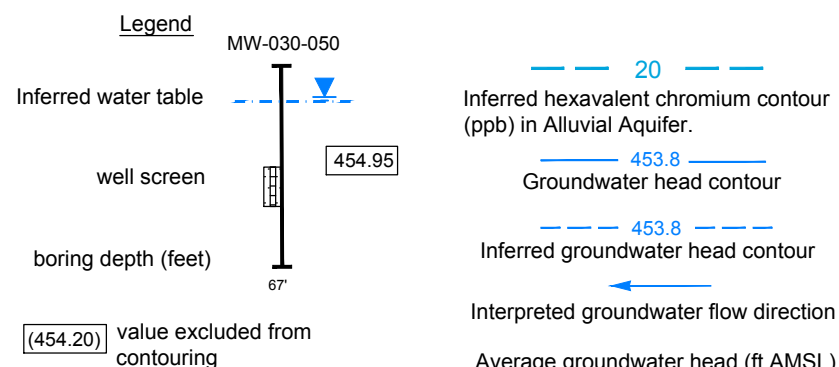
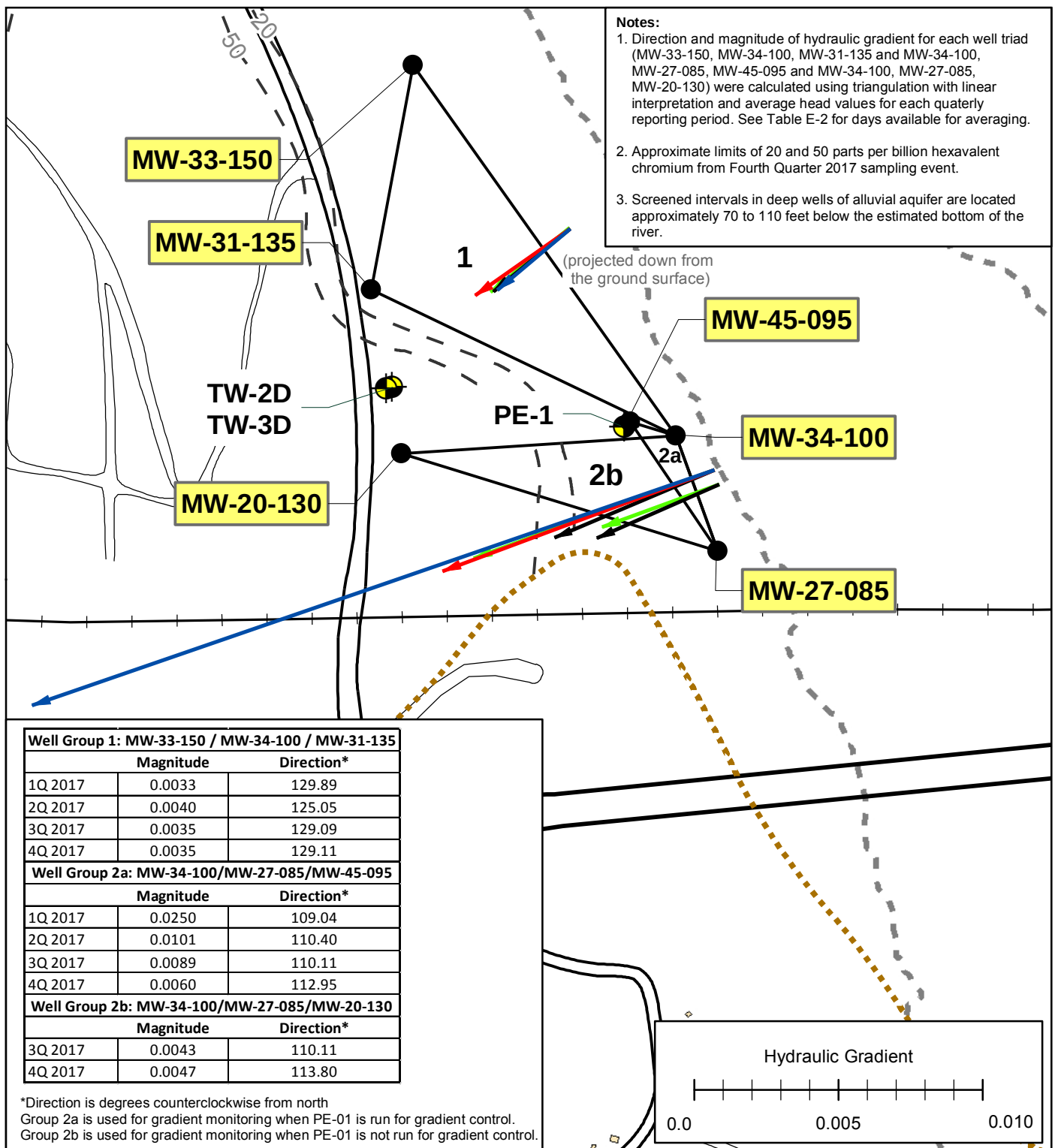


FIGURE 5-5
AVERAGE GROUNDWATER ELEVATIONS FOR WELLS IN FLOODPLAIN
CROSS-SECTION A, 2017 REPORTING PERIOD
FOURTH QUARTER 2017 AND ANNUAL INTERIM MEASURES
PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER
AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA





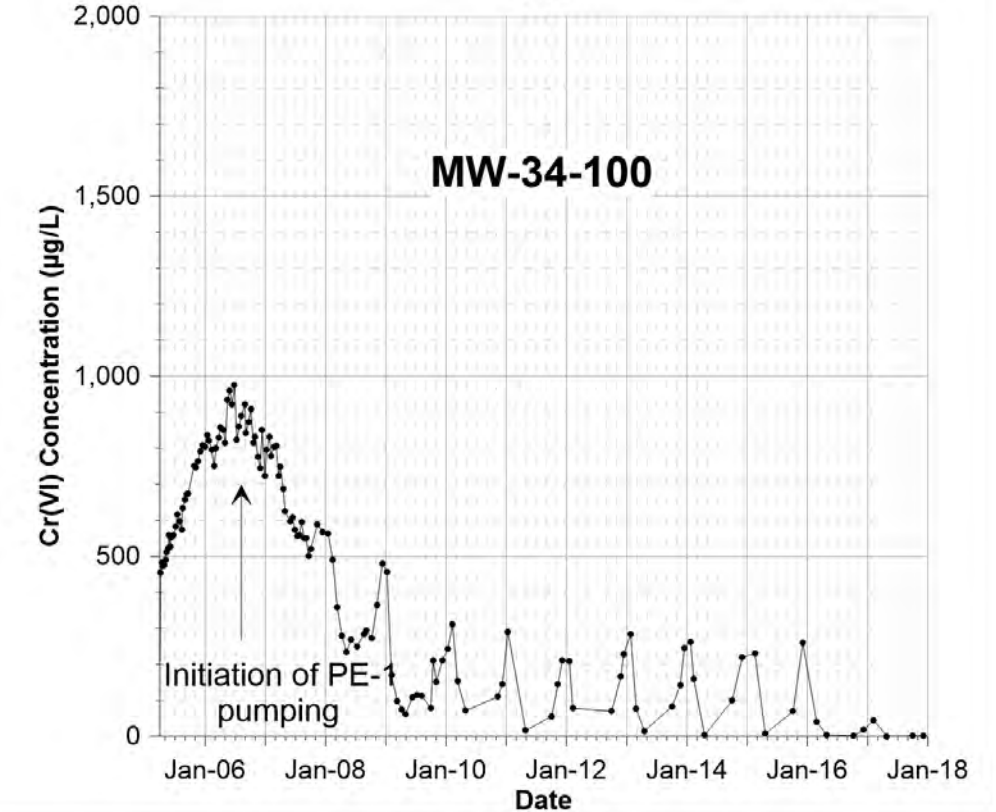
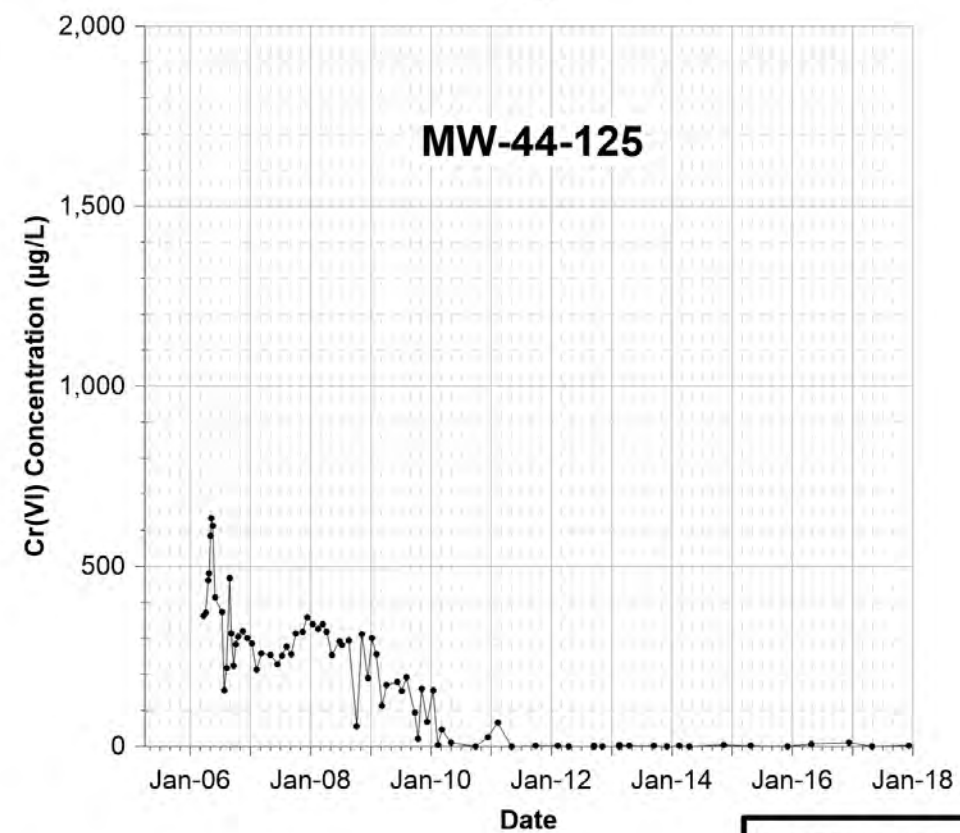
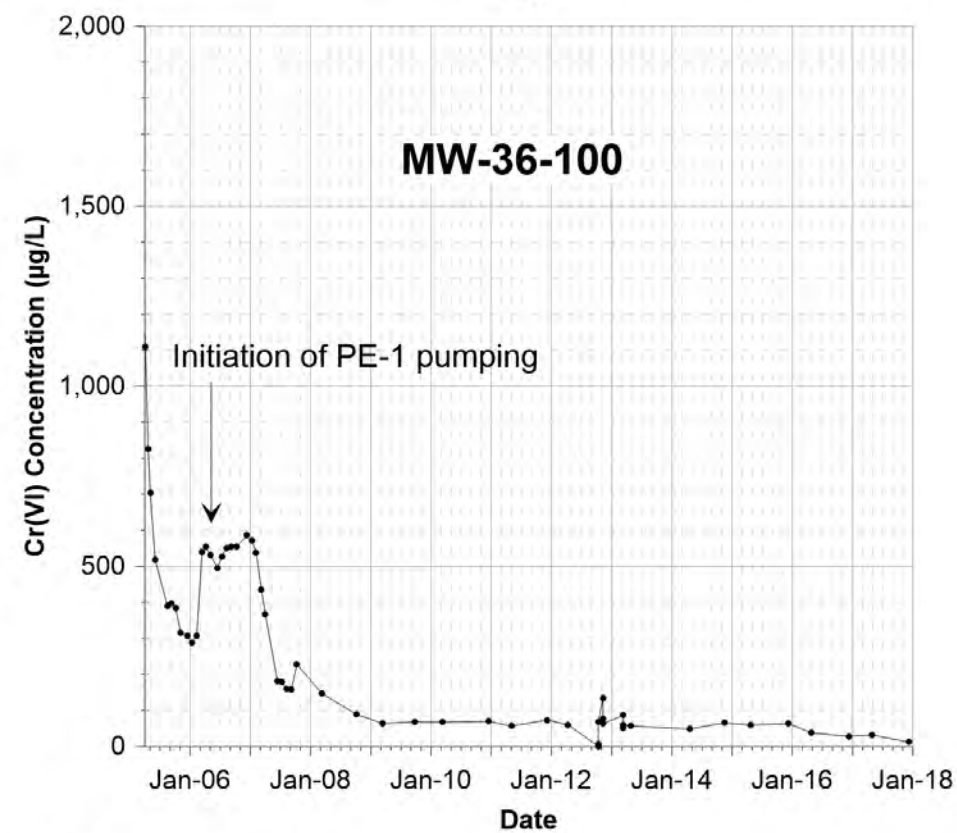
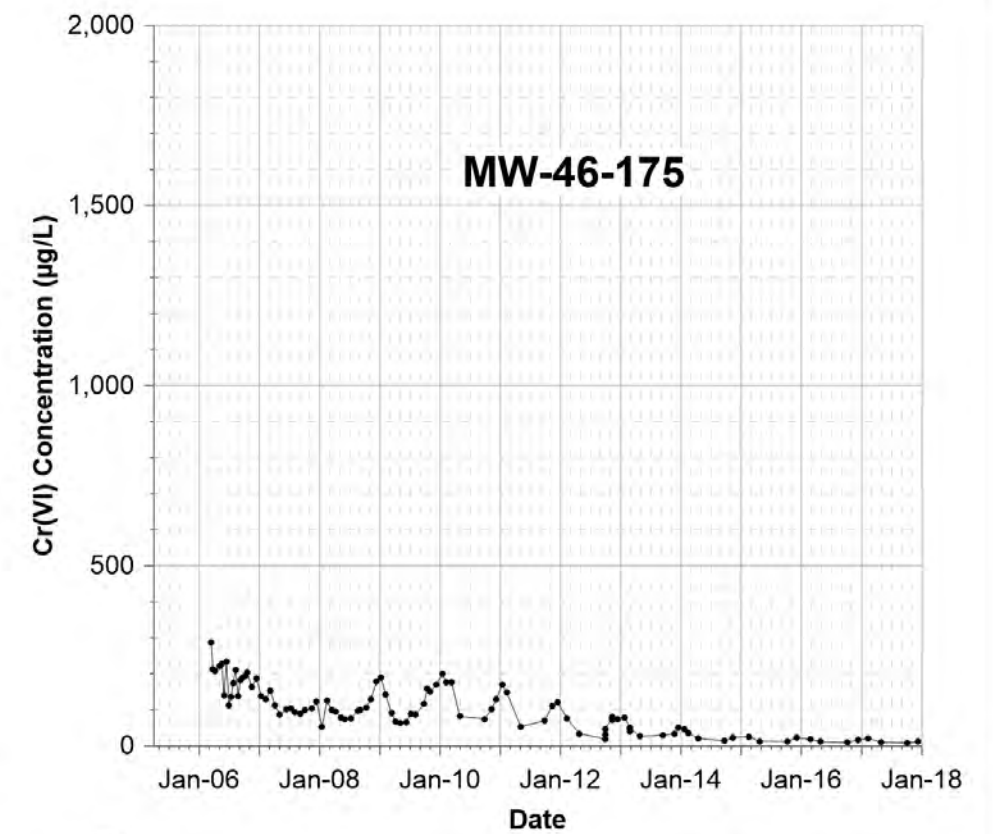
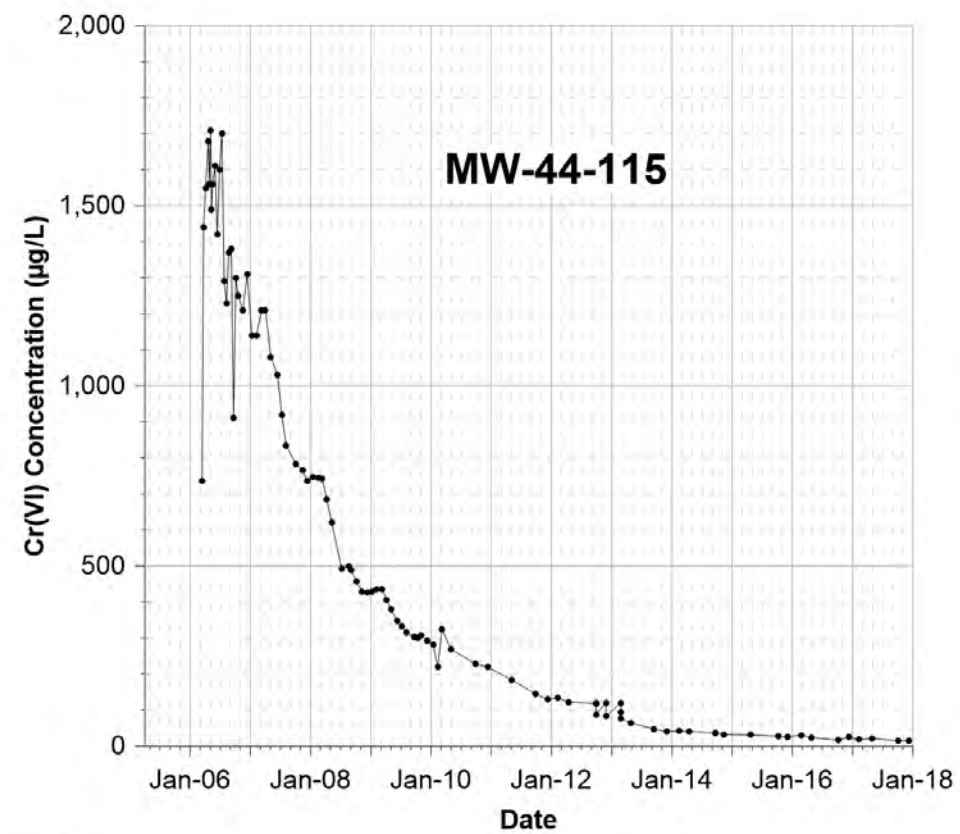
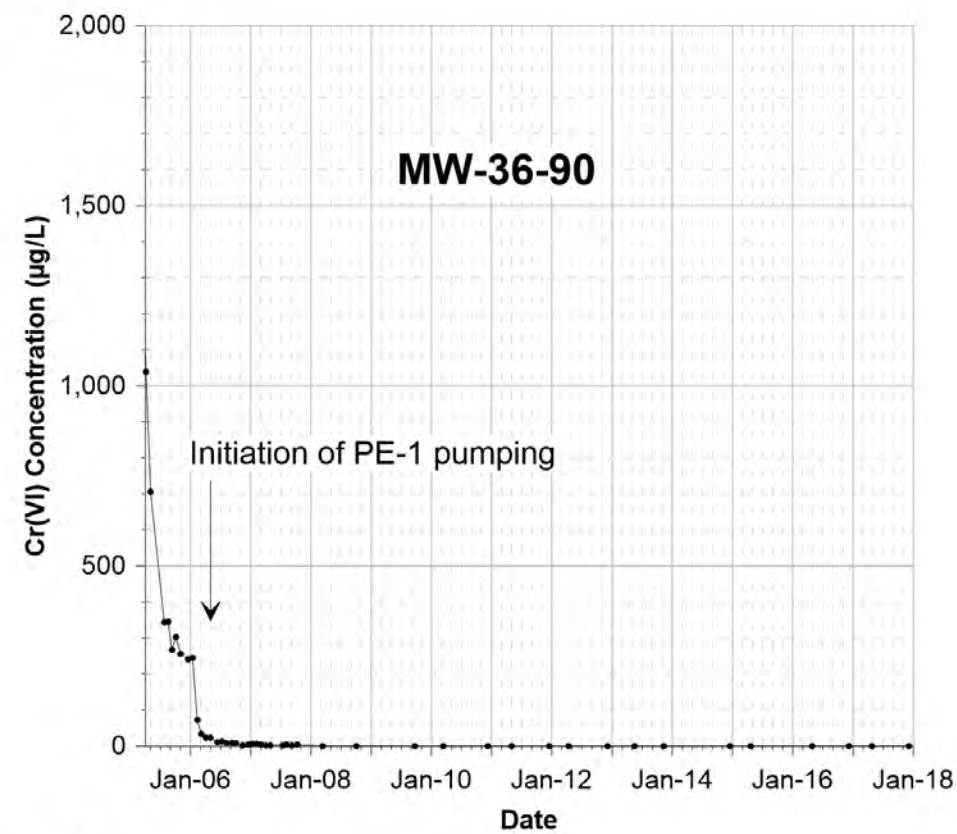
LEGEND

Calculated Average Gradients Magnitude and Direction

- First Quarter 2017
- Second Quarter 2017
- Third Quarter 2017
- Fourth Quarter 2017
- ⋯ Approximate bedrock contact at 395 feet above mean sea level.

FIGURE 5-6
MAGNITUDE AND DIRECTION OF HYDRAULIC GRADIENTS IN LOWER DEPTH INTERVAL DURING 2017 ANNUAL PERIOD

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

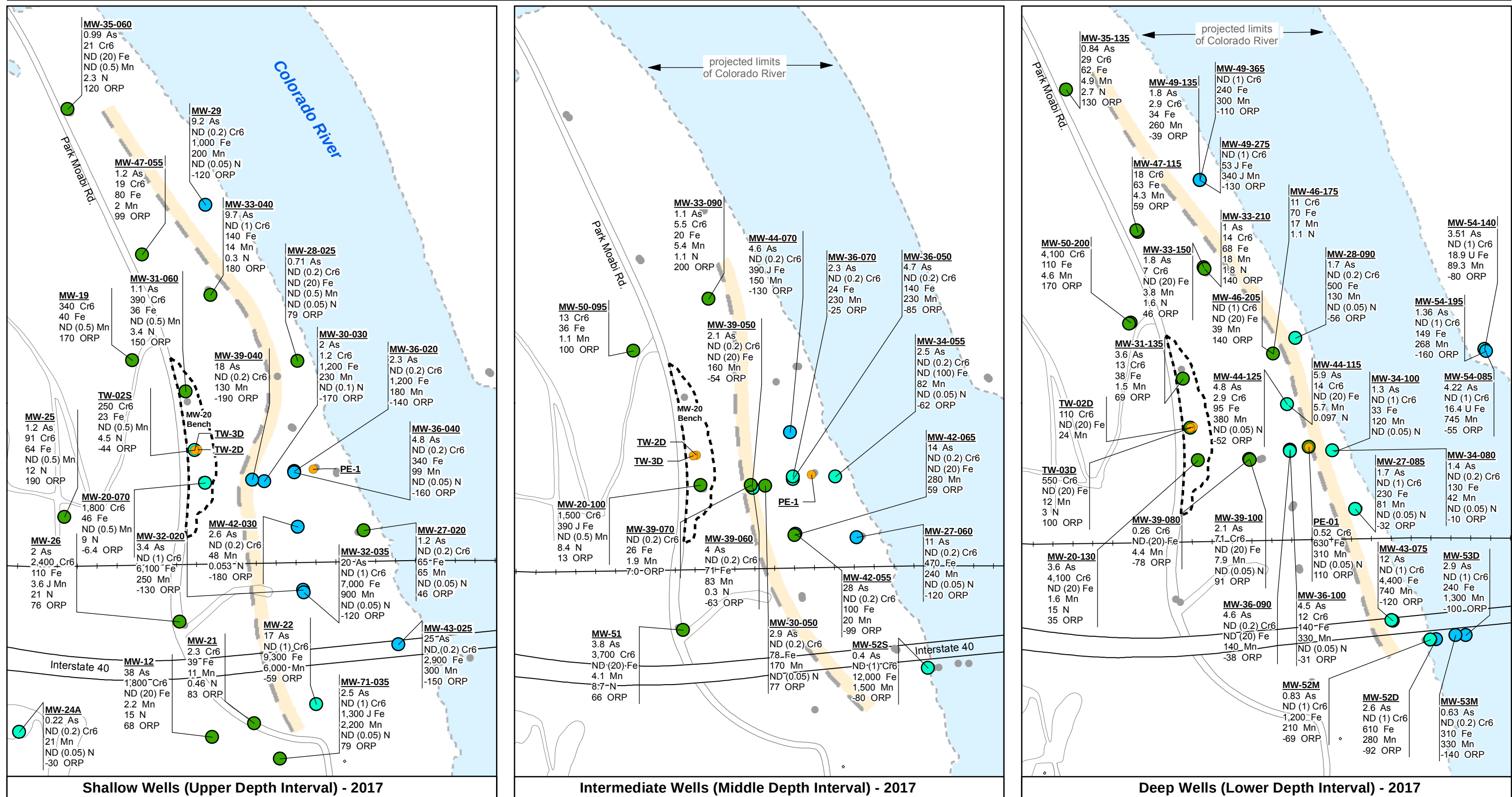


Notes:

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 5-7
Cr(VI) CONCENTRATION TRENDS IN SELECTED PERFORMANCE
MONITORING WELLS, APRIL 2005 THROUGH DECEMBER 2017
 FOURTH QUARTER 2017 AND ANNUAL INTERIM MEASURES PERFORMANCE MONITORING
 AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
 PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA





LEGEND

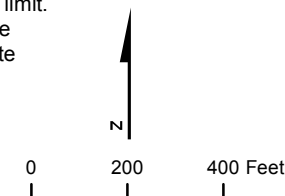
- Approximate limit of reducing groundwater based upon a combination of redox indicator parameters and historical data trends
- Groundwater ORP < -90mV
- Groundwater -90 mV < ORP < 1 mV
- Groundwater ORP > 1 mV
- IM3 Extraction Wells (TW-2S, TW-2D, TW-3D, and PE-1)

Groundwater Results, Fourth Quarter 2016

As - Arsenic, micrograms per liter (µg/L)
 Cr6 - Hexavalent chromium, micrograms per liter (µg/L)
 Fe - Iron
 Mn - Manganese, millivolts (mV)
 N - Nitrate/Nitrite, micrograms per liter (µg/L), micrograms per liter (µg/L)
 ORP - Oxidation reduction potential, milligrams per liter (mg/L)

Notes:

- "ND" = Cr(VI) not detected at listed reporting limit.
- "J" = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.



**FIGURE 5-8
DISTRIBUTION OF CR(VI), GEOCHEMICAL INDICATOR
PARAMETERS, AND IN SITU BYPRODUCTS IN FLOODPLAIN
WELLS**

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

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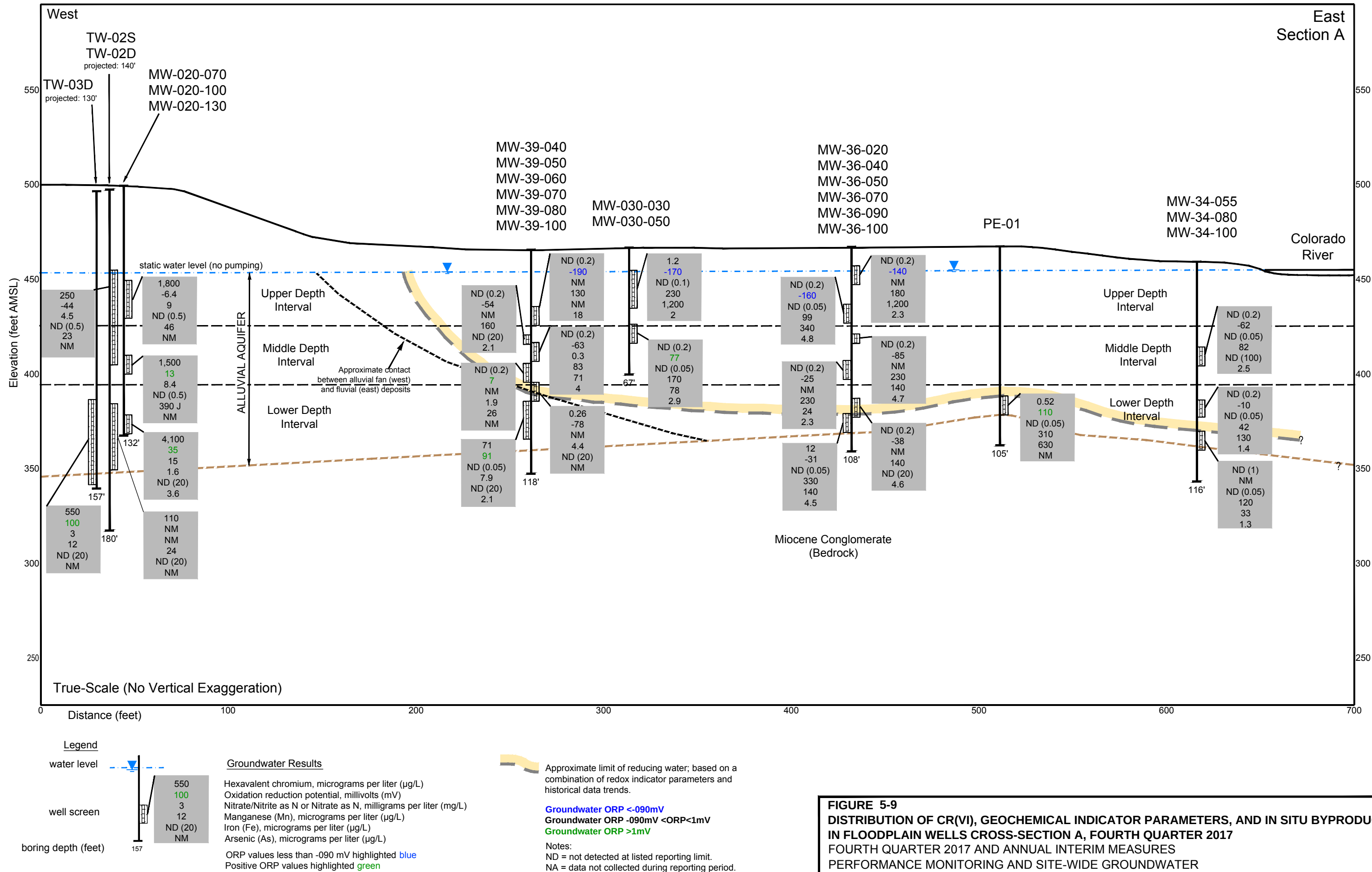


FIGURE 5-9
DISTRIBUTION OF CR(VI), GEOCHEMICAL INDICATOR PARAMETERS, AND IN SITU BYPRODUCTS
IN FLOODPLAIN WELLS CROSS-SECTION A, FOURTH QUARTER 2017
FOURTH QUARTER 2017 AND ANNUAL INTERIM MEASURES
PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER
AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA



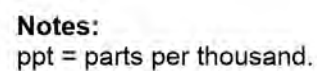


FIGURE 5-10
STABLE ISOTOPES OF OXYGEN AND DEUTERIUM,
FOURTH QUARTER 2017
FOURTH QUARTER 2017 AND ANNUAL INTERIM MEASURES
PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER
AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA



APPENDIX A

Well Inspections and Construction Information



TABLE A-1

Well Construction and Sampling Summary, Fourth Quarter 2017
 Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide
 Groundwater and Surface Water Monitoring Report,
 PG&E Topock Compressor Station, Needles, California

		Measuring Point Elevation Interval (ft amsl)	Measuring Point Screen Elevation Interval (ft amsl)	Well Screen Lithology	Well Casing (inches)	Initial Depth			
Well ID	Site Area					Well Depth (ft bgs)	to Water (ft btoc)	Sampling System	Remarks
GMP MONITORING WELLS									
MW-9	Bat Cave Wash	536.56	77 - 87	Alluvial	4 in PVC	89.4	80.30	Minimal Drawdown	
MW-10	Bat Cave Wash	530.65	74 - 94	Alluvial	4 in PVC	96.9	74.90	Minimal Drawdown	
MW-11	Bat Cave Wash	522.54	62.5 - 82.5	Alluvial	4 in PVC	86.1	66.73	Minimal Drawdown	
MW-12	East of Station	484.01	27.5 - 47.5	Alluvial	4 in PVC	50.4	28.91	Minimal Drawdown	
MW-13	Bat Cave Wash	488.64	28.5 - 48.5	Alluvial	4 in PVC	52.0	32.41	Minimal Drawdown	
MW-14	East Mesa	570.99	111 - 131	Alluvial	4 in PVC	133.8	115.11	Minimal Drawdown	
MW-15	East of New	641.52	180.5 -	Alluvial	4 in PVC	203.0	184.78	Minimal Drawdown	
MW-16	Near New Ponds	657.31	198 - 218	Alluvial	4 in PVC	218.1	200.05	Minimal Drawdown	
MW-17	West of Mesa	589.96	130 - 150	Alluvial	4 in PVC	153.6	132.92	Minimal Drawdown	
MW-18	West Mesa	545.32	85 - 105	Alluvial	4 in PVC	106.7	88.96	Minimal Drawdown	
MW-19	Route 66	499.92	46 - 66	Alluvial	4 in PVC	65.8	45.54	Minimal Drawdown	
MW-20-70	MW-20 bench	500.07	50 - 70	Alluvial	4 in PVC	69.6	47.50	Minimal Drawdown	
MW-20-100	MW-20 bench	500.58	89.5 - 99.5	Alluvial	4 in PVC	101.4	48.40	Minimal Drawdown	
MW-20-130	MW-20 bench	500.66	121 - 131	Alluvial	4 in PVC	132.3	49.20	Minimal Drawdown	
MW-21	Route 66	505.55	39 - 59	Alluvial	4 in PVC	58.5	50.49	Minimal Drawdown	low recharge well; typically purges dry at 1 casing volume
MW-22	Floodplain	460.72	5.5 - 10.5	Fluvial	2 in PVC	12.4	7.00	Minimal Drawdown	
MW-23-060	East Ravine	504.08	50 - 60	Bedrock	2 in Sch 40 PVC	60.2	49.00	Three Volume	
MW-23-080	East Ravine	504.13	75 - 80	Bedrock	2 in Sch 40 PVC	80.8	51.00	Three Volume	
MW-24A	MW-24 Bench	567.16	104 - 124	Alluvial	4 in PVC	127.5	111.30	Minimal Drawdown	
MW-24B	MW-24 Bench	564.76	193 - 213	Alluvial	4 in PVC	214.8	109.60	Minimal Drawdown	
MW-24BR	MW-24 Bench	563.95	378 - 437	Bedrock	4 in PVC	441.0	108.20	Fixed Volume	low recharge well; typically purges dry at 1 casing volume
MW-25	Near Bat Cave	542.90	84.5 - 104.5	Alluvial	4 in PVC	106.5	87.91	Minimal Drawdown	
MW-26	Route 66	502.22	51.5 - 71.5	Alluvial	2 in PVC	70.1	48.00	Minimal Drawdown	
MW-27-20	Floodplain	460.56	7 - 17	Fluvial	2 in PVC	14.4	6.20	Minimal Drawdown	
MW-27-60	Floodplain	461.49	47.3 - 57.3	Fluvial	2 in PVC	59.0	7.20	Minimal Drawdown	
MW-27-85	Floodplain	460.99	77.5 - 87.5	Fluvial	2 in PVC	80.0	6.70	Minimal Drawdown	
MW-28-25	Floodplain	466.77	13 - 23	Fluvial	2 in PVC	21.1	12.50	Minimal Drawdown	
MW-28-90	Floodplain	467.53	70 - 90	Fluvial	2 in PVC	98.4	12.70	Minimal Drawdown	
MW-29	Floodplain	485.21	29.5 - 39.5	Fluvial	2 in PVC	41.5	30.20	Minimal Drawdown	
MW-30-30	Floodplain	468.12	12 - 32	Fluvial	2 in PVC	26.9	14.00	Minimal Drawdown	

TABLE A-1

Well Construction and Sampling Summary, Fourth Quarter 2017

Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide

Groundwater and Surface Water Monitoring Report,

PG&E Topock Compressor Station, Needles, California

Well ID	Site Area	Measuring Point Elevation	Measuring Point Screen Elevation	Well Screen Lithology	Well Casing (inches)	Initial Depth			
		Interval (ft amsl)	Interval (ft amsl)			Well Depth (ft bgs)	to Water (ft btoc)	Sampling System	Remarks
GMP MONITORING WELLS									
MW-30-50	Floodplain	468.81	40 - 50	Fluvial	4 in PVC	52.6	14.80	Minimal Drawdown	
MW-31-60	MW-20 Bench	496.81	41.5 - 61.5	Alluvial	4 in PVC	64.0	43.00	Minimal Drawdown	
MW-31-135	MW-20 Bench	498.11	113 - 133	Alluvial	2 in PVC	135.4	46.00	Minimal Drawdown	
MW-32-20	Floodplain	461.51	10 - 20	Fluvial	2 in PVC	19.6	7.50	Minimal Drawdown	
MW-32-35	Floodplain	461.63	27.5 - 35	Fluvial	4 in PVC	37.2	7.80	Minimal Drawdown	
MW-33-40	Floodplain	487.38	29 - 39	Fluvial	2 in PVC	41.8	33.40	Minimal Drawdown	
MW-33-90	Floodplain	487.55	69 - 89	Alluvial	4 in PVC	88.3	33.50	Minimal Drawdown	
MW-33-150	Floodplain	487.77	132 - 152	Alluvial	2 in PVC	155.4	34.00	Minimal Drawdown*	
MW-33-210	Floodplain	487.25	190 - 210	Alluvial	2 in PVC	223.0	33.70	Minimal Drawdown	
MW-34-55	Floodplain	460.95	45 - 55	Fluvial	4 in PVC	56.6	7.10	Minimal Drawdown	
MW-34-80	Floodplain	461.20	73 - 83	Fluvial	4 in PVC	84.3	7.50	Minimal Drawdown	
MW-34-100	Floodplain	460.97	89.5 - 99.5	Fluvial	2 in PVC	117.0	7.60	Minimal Drawdown	
MW-35-60	Route 66	484.33	41 - 61	Alluvial	2 in PVC	56.8	29.60	Minimal Drawdown	
MW-35-135	Route 66	484.24	116 - 136	Alluvial	2 in PVC	158.7	29.30	Minimal Drawdown	
MW-36-20	Floodplain	469.33	10 - 20	Fluvial	1 in PVC	20.3	16.20	Minimal Drawdown	
MW-36-40	Floodplain	469.59	30 - 40	Fluvial	1 in PVC	40.3	15.60	Minimal Drawdown	
MW-36-50	Floodplain	469.62	46 - 51	Fluvial	1 in PVC	108.0	15.40	Minimal Drawdown	
MW-36-70	Floodplain	469.27	60 - 70	Fluvial	1 in PVC	70.3	15.50	Minimal Drawdown	
MW-36-90	Floodplain	469.64	80 - 90	Fluvial	1 in PVC	90.3	13.80	Minimal Drawdown	
MW-36-100	Floodplain	469.65	88 - 98	Fluvial	2 in PVC	108.0	16.20	Minimal Drawdown	
MW-37D	Bat Cave Wash	486.19	180 - 200	Alluvial	2 in PVC	226.7	31.50	Minimal Drawdown	
MW-37S	Bat Cave Wash	485.97	64 - 84	Alluvial	2 in PVC	85.0	31.00	Minimal Drawdown	
MW-38D	Bat Cave Wash	525.31	163 - 183	Alluvial	2 in PVC	190.9	70.40	Minimal Drawdown	
MW-38S	Bat Cave Wash	526.59	75 - 95	Alluvial	2 in PVC	98.1	70.63	Minimal Drawdown	
MW-39-40	Floodplain	468.02	30 - 40	Fluvial	1 in PVC	42.1	15.00	Minimal Drawdown	
MW-39-50	Floodplain	467.93	47 - 52	Fluvial	1 in PVC	54.6	15.00	Minimal Drawdown	
MW-39-60	Floodplain	468.00	49 - 59	Alluvial	1 in PVC	15.2	15.20	Minimal Drawdown	
MW-39-70	Floodplain	468.02	60 - 70	Alluvial	1 in PVC	71.7	15.60	Minimal Drawdown	
MW-39-80	Floodplain	467.92	70 - 80	Alluvial	1 in PVC	82.6	15.50	Minimal Drawdown	
MW-39-100	Floodplain	468.12	80 - 100	Alluvial	2 in PVC	117.7	15.00	Minimal Drawdown	
MW-40D	I-40 Median	566.08	240 - 260	Alluvial	2 in PVC	266.0	111.00	Minimal Drawdown	
MW-40S	I-40 Median	566.04	115 - 135	Alluvial	2 in PVC	134.0	111.39	Minimal Drawdown	
MW-41D	Bat Cave Wash	479.42	271 - 291	Alluvial	2 in PVC	311.5	24.30	Minimal Drawdown	
MW-41S	Bat Cave Wash	480.07	40 - 60	Alluvial	2 in PVC	60.0	24.93	Minimal Drawdown	

TABLE A-1

Well Construction and Sampling Summary, Fourth Quarter 2017
 Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide
 Groundwater and Surface Water Monitoring Report,
 PG&E Topock Compressor Station, Needles, California

Well ID	Site Area	Measuring Point Elevation Interval (ft amsl)	Measuring Point Screen Elevation Interval (ft amsl)	Well Screen Lithology	Well Casing (inches)	Well Depth (ft bgs)	Initial Depth to Water (ft btoc)	Sampling System	Remarks
GMP MONITORING WELLS									
MW-42-30	Floodplain	463.74	9.8 - 29.8	Fluvial	2 in Sch 40 PVC	30.1	10.40	Minimal Drawdown	
MW-42-55	Floodplain	463.85	42.5 - 52.5	Fluvial	2 in PVC	52.8	9.80	Minimal Drawdown	
MW-42-65	Floodplain	463.37	56.2 - 66.2	Fluvial	2 in PVC	80.0	9.40	Minimal Drawdown	
MW-43-25	Floodplain	462.54	15 - 25	Fluvial	2 in PVC	25.0	8.50	Minimal Drawdown	
MW-43-75	Floodplain	462.71	65 - 75	Fluvial	2 in PVC	75.0	9.00	Minimal Drawdown	
MW-43-90	Floodplain	462.76	80 - 90	Fluvial	2 in PVC	97.0	9.30	Minimal Drawdown	
MW-44-70	Floodplain	471.84	61 - 71	Fluvial	2 in PVC	70.0	18.80	Minimal Drawdown	
MW-44-115	Floodplain	471.94	105 - 115	Alluvial	2 in PVC	113.5	18.40	Minimal Drawdown	
MW-44-125	Floodplain	472.11	116 - 125	Alluvial	2 in PVC	128.8	18.10	Minimal Drawdown	
MW-45-095a	Floodplain	468.27	83 - 93	Fluvial	2 in PVC	97.0	18.30	Temp. pump	pressure transducer location
MW-46-175	Floodplain	482.16	165 - 175	Alluvial	2 in PVC	175.5	28.50	Minimal Drawdown	
MW-46-205	Floodplain	482.23	196.5 -	Alluvial	2 in PVC	206.5	28.90	Minimal Drawdown	
MW-47-55	Floodplain	484.04	45 - 55	Alluvial	2 in PVC	55.0	29.40	Minimal Drawdown	
MW-47-115	Floodplain	484.17	105 - 115	Alluvial	2 in PVC	115.0	29.80	Minimal Drawdown	
MW-48	East of Station	486.22	124 - 134	Bedrock	2 in PVC	138.0	31.20	Three Volume	low recharge well; typically purges dry at 1 casing volume
MW-49-135	Floodplain	483.97	125 - 135	Alluvial	1.5 in PVC	135.0	30.90	Minimal Drawdown	
MW-49-275	Floodplain	483.95	255 - 275	Alluvial	2 in PVC	274.7	31.10	Minimal Drawdown	
MW-49-365	Floodplain	484.01	346 - 366	Alluvial	2 in PVC	367.4	32.60	Minimal Drawdown	
MW-50-095	Route 66	496.49	85 - 95	Alluvial	2 in PVC	95.0	42.00	Minimal Drawdown	
MW-41S	Bat Cave Wash	480.07	40 - 60	Alluvial	2 in PVC	60.0	24.93	Minimal Drawdown	
MW-42-30	Floodplain	463.74	9.8 - 29.8	Fluvial	2 in Sch 40 PVC	30.1	10.40	Minimal Drawdown	
MW-42-55	Floodplain	463.85	42.5 - 52.5	Fluvial	2 in PVC	52.8	9.80	Minimal Drawdown	
MW-42-65	Floodplain	463.37	56.2 - 66.2	Fluvial	2 in PVC	80.0	9.40	Minimal Drawdown	
MW-43-25	Floodplain	462.54	15 - 25	Fluvial	2 in PVC	25.0	8.50	Minimal Drawdown	
MW-43-75	Floodplain	462.71	65 - 75	Fluvial	2 in PVC	75.0	9.00	Minimal Drawdown	
MW-43-90	Floodplain	462.76	80 - 90	Fluvial	2 in PVC	97.0	9.30	Minimal Drawdown	
MW-44-70	Floodplain	471.84	61 - 71	Fluvial	2 in PVC	70.0	18.80	Minimal Drawdown	
MW-44-115	Floodplain	471.94	105 - 115	Alluvial	2 in PVC	113.5	18.40	Minimal Drawdown	
MW-44-125	Floodplain	472.11	116 - 125	Alluvial	2 in PVC	128.8	18.10	Minimal Drawdown	
MW-45-095a	Floodplain	468.27	83 - 93	Fluvial	2 in PVC	97.0	18.30	Temp. pump	pressure transducer location
MW-46-175	Floodplain	482.16	165 - 175	Alluvial	2 in PVC	175.5	28.50	Minimal Drawdown	
MW-46-205	Floodplain	482.23	196.5 -	Alluvial	2 in PVC	206.5	28.90	Minimal Drawdown	
MW-47-55	Floodplain	484.04	45 - 55	Alluvial	2 in PVC	55.0	29.40	Minimal Drawdown	

TABLE A-1

Well Construction and Sampling Summary, Fourth Quarter 2017
 Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide
 Groundwater and Surface Water Monitoring Report,
 PG&E Topock Compressor Station, Needles, California

		Measuring Point Elevation Interval (ft amsl)	Measuring Point Screen Elevation Interval (ft amsl)	Well Screen Lithology	Well Casing (inches)	Well Depth (ft bgs)	Initial Depth to Water (ft btoc)	Sampling System	Remarks
Well ID	Site Area								
GMP MONITORING WELLS									
MW-47-115	Floodplain	484.17	105 - 115	Alluvial	2 in PVC	115.0	29.80	Minimal Drawdown	low recharge well; typically purges dry at 1 casing volume
MW-48	East of Station	486.22	124 - 134	Bedrock	2 in PVC	138.0	31.20	Three Volume	
MW-49-135	Floodplain	483.97	125 - 135	Alluvial	1.5 in PVC	135.0	30.90	Minimal Drawdown	
MW-49-275	Floodplain	483.95	255 - 275	Alluvial	2 in PVC	274.7	31.10	Minimal Drawdown	
MW-49-365	Floodplain	484.01	346 - 366	Alluvial	2 in PVC	367.4	32.60	Minimal Drawdown	
MW-50-095	Route 66	496.49	85 - 95	Alluvial	2 in PVC	95.0	42.00	Minimal Drawdown	
MW-50-200	Route 66	496.35	190 - 200	Alluvial	2 in PVC	204.5	43.10	Minimal Drawdown	
MW-51	Route 66	501.56	97 - 112	Alluvial	4 in PVC	113.3	47.50	Minimal Drawdown	
MW-52D	Floodplain	462.16	85 - 87	Fluvial	0.75 in MLABS	89.5	14.90	Fixed Volume	
MW-52M	Floodplain	462.16	66 - 68	Fluvial	0.75 in MLABS	70.5	11.30	Fixed Volume	
MW-52S	Floodplain	462.16	47 - 49	Fluvial	0.75 in MLABS	51.5	9.80	Fixed Volume	
MW-53D	Floodplain	461.32	123.5 - 125	Fluvial	0.75 in MLABS	---	14.30	Fixed Volume	
MW-53M	Floodplain	461.32	98.5 - 100	Fluvial	0.75 in MLABS	---	13.70	Fixed Volume	
MW-54-85	Arizona	466.10	77 - 87	Fluvial	2 in PVC	93.2	11.30	Minimal Drawdown	
MW-54-140	Arizona	465.98	128 - 138	Fluvial	2 in PVC	138.0	11.30	Minimal Drawdown	
MW-54-195	Arizona	466.32	185 - 195	Fluvial	2 in PVC	195.0	12.10	Minimal Drawdown	
MW-55-45	Arizona	465.84	37 - 47	Fluvial	2 in PVC	54.0	10.20	Minimal Drawdown	
MW-55-120	Arizona	465.82	108 - 118	Fluvial	2 in PVC	120.3	10.10	Minimal Drawdown	Redeveloped Q3 of 2015. Being sampled quarterly for 1 year.
MW-56D	Arizona	461.36	103.5 -	Fluvial	0.75 in MLABS	---	16.30	Fixed Volume	
MW-56M	Arizona	461.36	73.5 - 75.5	Fluvial	0.75 in MLABS	---	15.20	Fixed Volume	
MW-56S	Arizona	461.36	33.5 - 35.5	Fluvial	0.75 in MLABS	---	14.10	Fixed Volume	
MW-57-050	East Ravine	508.76	40 - 50	Bedrock	2 in Sch 40 PVC	50.0	51.60	Three Volume	
MW-57-070	East Ravine	509.37	55 - 70	Bedrock	2 in Sch 40 PVC	70.0	53.40	Three Volume	
MW-57-185	East Ravine	508.97	70 - 184	Bedrock	4 in Sch 40 PVC	184.7	52.50	Three Volume	
MW-58-065	East Ravine	523.26	54 - 64	Bedrock	2 in Sch 40 PVC	66.0	67.50	Three Volume	
MW-58BR	East Ravine	---	0 - 0	Bedrock	---	---	67.80	Minimal Drawdown	
MW-59-100	East Ravine	541.61	86 - 101	Alluvial	2 in Sch 40 PVC	101.0	85.61	Minimal Drawdown	

TABLE A-1

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 PG&E Topock Compressor Station, Needles, California

		Measuring Point Elevation Interval (ft amsl)	Measuring Point Screen Elevation Interval (ft amsl)	Well Screen Lithology	Well Casing (inches)	Initial Depth to Water (ft btoc)			
Well ID	Site Area					Well Depth (ft bgs)		Sampling System	Remarks
GMP MONITORING WELLS									
MW-60-125	East Ravine	555.47	103 - 123	Bedrock	2 in Sch 40 PVC	122.5	99.80	Three Volume	
MW-60BR-245	East Ravine	554.95	136 - 245	Bedrock	5 in	244.1	99.80	Three Volume	
MW-61-110	East Ravine	544.03	92 - 112	Bedrock	2 in Sch 40 PVC	112.5	88.60	Three Volume	
MW-62-065	East Ravine	503.56	44.5 - 64.5	Bedrock	2 in Sch 40 PVC	67.4	48.80	Three Volume	
MW-62-110	East Ravine	504.05	85 - 110	Bedrock	---	110.0	37.50	Flute	
MW-62-190	East Ravine	504.05	155 - 192	Bedrock	---	190.0	36.50	Flute	
MW-63-065	East Ravine	504.47	46 - 66	Bedrock	2 in Sch 40 PVC	65.6	50.20	Three Volume	
MW-64BR	East Ravine	575.60	2 - 258	Bedrock	3 in	260.0	120.60	Minimal Drawdown	
MW-65-160	Topock	596.59	150 - 160	Alluvial	2 in PVC	160.1	141.20	Minimal Drawdown	
MW-65-225	Topock	596.58	215 - 225	Alluvial	2 in PVC	225.1	141.20	Minimal Drawdown	
MW-66-165	Topock	586.16	142 - 162	Alluvial	2 in PVC	162.1	130.60	Minimal Drawdown	
MW-66-230	Topock	586.22	218 - 228	Alluvial	2 in PVC	228.1	131.20	Minimal Drawdown	
MW-66BR-270	Topock	586.15	248 - 271	Bedrock	5 in	270.6	153.00	Three Volume	
MW-67-185	Topock	625.91	177 - 187	Alluvial	2 in	186.7	170.03	Minimal Drawdown	
MW-67-225	Topock	625.83	210 - 225	Alluvial	2 in PVC	225.0	170.40	Minimal Drawdown	
MW-67-260	Topock	625.81	250 - 260	Alluvial	2 in PVC	260.0	170.50	Minimal Drawdown	
MW-68-180	Topock	621.17	165 - 180	Alluvial	2 in PVC	180.1	165.90	Minimal Drawdown	
MW-68-240	Topock	621.17	220 - 240	Alluvial	2 in PVC	240.1	166.10	Minimal Drawdown	
MW-68BR-280	Topock	620.64	257 - 279	Bedrock	5 in	278.2	165.30	Three Volume	
MW-69-195	Topock	631.36	176 - 196	Bedrock	2 in	195.5	175.50	Three Volume	
MW-70-105	East Ravine	541.47	85 - 105	Bedrock	2 in PVC	107.8	84.80	Three Volume	
MW-70BR-225	East Ravine	539.84	120 - 227	Bedrock	5 in	229.3	83.50	Three Volume	
MW-71-035	East Ravine	483.69	26 - 36	Alluvial	2 in	36.2	28.60	Minimal Drawdown	
MW-72-080	East Ravine	513.32	60 - 80	Bedrock	2 in	80.1	59.10	Three Volume	
MW-72BR-200	East Ravine	513.79	107 - 200	Bedrock	---	200.0	58.80	Three Volume	
MW-73-080	East Ravine	505.84	60.2 - 80.2	Bedrock	2 in	79.9	51.40	Three Volume	
MW-74-240	East Ravine	672.34	220 - 240	Bedrock	2 in	239.7	215.90	Three Volume	
OW-03D	West Mesa	558.63	242 - 262	Alluvial	2 in Sch 40 PVC	272.5	102.10	Minimal Drawdown	
OW-03M	West Mesa	558.9	180 - 200	Alluvial	2 in Sch 40 PVC	200.3	102.30	Minimal Drawdown	
OW-03S	West Mesa	558.58	86 - 116	Alluvial	2 in Sch 40 PVC	116.3	102.10	Three Volume	

TABLE A-1

Well Construction and Sampling Summary, Fourth Quarter 2017
 Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide
 Groundwater and Surface Water Monitoring Report,
 PG&E Topock Compressor Station, Needles, California

Well ID	Site Area	Measuring Point Elevation Interval (ft amsl)	Measuring Point Screen Elevation Interval (ft amsl)	Well Screen Lithology	Well Casing (inches)	Well Depth (ft bgs)	Initial Depth to Water (ft btoc)	Sampling System	Remarks
GMP MONITORING WELLS									
PGE-07BR	MW-24 Bench	---	249 - 300	Bedrock	7 in	300.0	110.50	Three Volume	inactive supply
PGE-08	Station	596.01	405 - 554	Bedrock	6.75 in Steel	564.0	141.10	Three Volume	inactive injection
Other Site Wells not in GMP									
MW-01	New Ponds	661.76	201 - 211	Alluvial	4 in PVC	217.0	205.20	Three Volume	active PG&E pond monitoring well
MW-03	New Ponds	650.51	193 - 203	Alluvial	4 in PVC	205.0	195.40	Three Volume	active PG&E pond monitoring well
MW-04	New Ponds	625.73	164.5 -	Alluvial	4 in PVC	176.3	170.15	Three Volume	active PG&E pond monitoring well
MW-05	New Ponds	635.69	175.9 -	Alluvial	4 in PVC	186.2	179.60	Three Volume	active PG&E pond monitoring well
MW-06	New Ponds	642.84	184.5 -	Alluvial	4 in PVC	194.9	185.81	Three Volume	active PG&E pond monitoring well
MW-07	New Ponds	631.91	172.7 -	Alluvial	4 in PVC	185.0	175.71	Three Volume	active PG&E pond monitoring well
MW-08	New Ponds	627.54	169 - 178	Alluvial	4 in PVC	179.9	170.61	Three Volume	active PG&E pond monitoring well
Test and Extraction Wells									
PE-01	Floodplain	457.52	79 - 89	Fluvial	6 in Sch 40	99.0	16.40	Extraction Well	active IM extraction well
TW-01	Plan B Test	620.55	169 - 269	Alluvial	5 in PVC	271.0	160.00	Three Volume	inactive pilot test well
TW-02D	MW-20 bench	493.29	113 - 148	Alluvial	6 in Sch 80 PVC	150.0	69.30	Extraction Well	inactive IM extraction well
TW-02S	MW-20 bench	499.05	42.5 - 92.5	Alluvial	6 in Sch 80 PVC	97.5	40.90	Extraction Well	inactive IM extraction well
TW-03D	MW-20 bench	498.09	111 - 156	Alluvial	8 in PVC	156.0	46.50	Extraction Well	active IM extraction well
TW-04	Floodplain	484.11	210 - 250	Alluvial	4 in PVC	255.0	31.10	Three Volume	
TW-05	Route 66	496.30	110 - 150	Alluvial	4 in PVC	155.0	43.00	Three Volume	
Water Supply Wells									
Park Moabi-3	Park Moabi	518.55	80 - 200	Alluvial	8 in Steel	252.0	61.30	Active supply well	call Park Ranger to schedule sampling
Park Moabi-4	Park Moabi	---	93 - 140	Alluvial	Steel	---	---	Active supply well	

Notes:

amsl = above mean sea level. bgs = below ground surface. btoc = below top of casing.

CD pump = dedicated constant-discharge electric submersible pump. Ded. RF = dedicated Redi - Flo submersible pump.

Flute = Flexible Liner Underground Technologies. GMP = Groundwa

NA = not known or available. PVC = polyvinyl chloride.

Redi-Flo AR = adjustable-rate electric submersible pump. Temp pump = temporary pump.

Depth to water shown is the most recently measured depth to water.

All GMP wells except low recharge wells, active IM extraction wells,

Table A-2
Well Inspection Log, Fourth Quarter 2017
Fourth Quarter 2017 and Annual 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 Poned 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)	Action Completed? (Yes/No)
PE-1	10/03/2017	NA	NA	Yes	No	Yes	NA	NA	No	NA	NA	NA	Yes	No	NA
PE-1	12/07/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
TW-3D	10/03/2017	NA	NA	Yes	No	Yes	NA	NA	NA	NA	NA	NA	Yes	No	NA
TW-3D	12/07/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
CW-01D	10/24/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
CW-01M	10/25/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
CW-02D	10/24/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
CW-02D	12/12/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
CW-02M	10/24/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
CW-03D	10/24/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
CW-03M	10/24/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
CW-03M	12/12/2017	NA	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
CW-04D	10/24/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
CW-04M	10/24/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
OW-01D	10/25/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
OW-01D	12/04/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
OW-01M	10/23/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
OW-01M	12/14/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
OW-01S	10/23/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
OW-01S	12/05/2017	NA	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
OW-02D	10/24/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
OW-02D	12/15/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
OW-02M	10/25/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
OW-02M	12/15/2017	NA	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
OW-02S	10/23/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
OW-02S	12/05/2017	NA	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
OW-05D	10/25/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
OW-05D	12/05/2017	NA	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
OW-05M	10/25/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
OW-05S	10/23/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
OW-05S	12/14/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
C-BNS	11/15/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-NR3-D	11/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-NR4-D	11/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-R22A-D	11/15/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-R27-D	11/15/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-TAZ-D	11/15/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-09	12/07/2017	NA	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-10	12/07/2017	NA	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-11	12/07/2017	NA	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-12	12/11/2017	No	NA	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-13	12/08/2017	NA	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-14	12/13/2017	NA	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-15	12/12/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-16	12/12/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-17	12/12/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-18	12/12/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-19	12/08/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-20-070	12/07/2017	NA	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-20-100	12/08/2017	NA	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA

Table A-2
Well Inspection Log, Fourth Quarter 2017
Fourth Quarter 2017 and Annual 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 Poned 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)	Action Completed? (Yes/No)
MW-20-130	12/07/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-22	12/06/2017	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-23-060	12/08/2017	Yes	No	No	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes	NA
MW-23-080	12/08/2017	Yes	No	No	No	Yes	No	Yes	No	NA	Yes	No	Yes	Yes	NA
MW-24A	12/07/2017	NA	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-24B	12/07/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-24BR	12/07/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-25	12/08/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-26	12/11/2017	NA	No	NA	No	No	NA	NA	No	NA	Yes	No	Yes	Yes	NA
MW-27-020	12/04/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-27-060	12/04/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-27-085	12/04/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-28-025	12/07/2017	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-28-090	12/07/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-29	12/07/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-30-030	12/06/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-30-050	12/06/2017	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-31-060	12/12/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-31-135	12/12/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-32-020	12/04/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-32-035	12/04/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-33-040	12/07/2017	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-33-090	12/07/2017	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-33-150	12/07/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-33-210	12/07/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-34-055	12/06/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-34-080	12/06/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-34-100	10/02/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-34-100	12/06/2017	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-35-060	12/08/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-35-135	12/08/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-36-020	12/06/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-36-040	12/06/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-36-050	12/06/2017	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-36-070	12/06/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-36-090	12/06/2017	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-36-100	12/06/2017	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-37D	12/08/2017	NA	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-37S	12/08/2017	NA	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-38D	12/07/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-38S	12/07/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-39-040	12/05/2017	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-39-050	12/05/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-39-060	12/05/2017	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-39-070	12/05/2017	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-39-080	12/05/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA

Table A-2
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Well/ Piezometer	Inspection Date	Survey Mark Present? (Yes/No)	Standing or Poned 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)	Action Completed? (Yes/No)
MW-39-100	12/05/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-41D	12/13/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-41M	12/13/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-41S	12/13/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-42-030	12/04/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-42-055	12/04/2017	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-42-065	12/04/2017	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-43-025	12/05/2017	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-43-075	12/05/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-43-090	12/05/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-44-070	12/06/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-44-115	10/02/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-44-115	12/06/2017	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-44-125	12/06/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-46-175	10/02/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-46-175	12/07/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-46-205	12/07/2017	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-47-055	12/07/2017	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-47-115	12/07/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-48	12/11/2017	No	No	Yes	No	Yes	Yes	NA	No	Yes	Yes	No	Yes	Yes	NA
MW-49-135	12/07/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-49-275	12/07/2017	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-49-365	12/07/2017	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-50-095	12/08/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-50-200	12/08/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-51	12/11/2017	NA	No	NA	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes	NA
MW-52D	12/05/2017	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-52M	12/05/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-52S	12/05/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-53D	12/05/2017	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-53M	12/05/2017	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-54-085	12/13/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-54-140	12/13/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-54-195	12/13/2017	Yes	No	Yes	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes	NA
MW-55-045	12/13/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-55-120	12/13/2017	Yes	No	Yes	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes	NA
MW-56D	12/13/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-56M	12/13/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-56S	12/13/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-57-050	12/11/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-57-070	12/11/2017	Yes	No	Yes	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes	NA
MW-57-185	12/11/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-58-065	12/11/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-58BR	12/11/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-59-100	12/07/2017	NA	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-60-125	12/06/2017	NA	No	NA	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes	NA

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Well/ Piezometer	Inspection Date	Survey Mark Present? (Yes/No)	Standing or Poned 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)	Action Completed? (Yes/No)
MW-61-110	12/06/2017	NA	No	NA	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes	NA
MW-62-065	12/06/2017	NA	No	NA	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes	NA
MW-62-110	12/06/2017	Yes	No	Yes	No	Yes	NA	Yes	No	NA	NA	No	Yes	Yes	NA
MW-62-190	12/06/2017	Yes	No	Yes	No	Yes	NA	Yes	No	NA	NA	No	Yes	Yes	NA
MW-63-065	12/12/2017	Yes	No	No	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes	NA
MW-64BR	12/06/2017	NA	No	NA	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes	NA
MW-65-160	12/05/2017	NA	No	NA	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes	NA
MW-65-225	12/05/2017	NA	No	NA	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes	NA
MW-66-165	12/05/2017	Yes	No	Yes	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes	NA
MW-66-230	12/05/2017	Yes	No	Yes	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes	NA
MW-66BR-270	12/12/2017	NA	NA	No	No	No	NA	Yes	No	NA	NA	No	Yes	Yes	NA
MW-67-185	12/04/2017	Yes	No	Yes	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes	NA
MW-67-225	12/04/2017	Yes	No	Yes	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes	NA
MW-67-260	12/04/2017	Yes	No	Yes	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes	NA
MW-69-195	12/04/2017	NA	NA	NA	No	No	NA	Yes	No	NA	Yes	No	Yes	Yes	NA
MW-70-105	12/11/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-71-035	12/11/2017	Yes	No	No	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes	NA
MW-72-080	12/07/2017	Yes	No	Yes	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes	NA
MW-73-080	12/06/2017	NA	No	NA	No	No	NA	Yes	No	NA	Yes	No	Yes	Yes	NA
PM-04	12/14/2017	NA	NA	Yes	No	No	NA	Yes	No	Yes	NA	NA	Yes	No	NA
R-19	11/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
R-28	11/15/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
R63	11/15/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RMP-AB1	11/15/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RMP-AB2	11/15/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RMP-AB3	11/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RRB	11/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW1	11/15/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW2	11/15/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TW-01	12/13/2017	No	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
TW-02D	10/24/2017	Yes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TW-02D	12/07/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
TW-02S	12/07/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
TW-03D	11/02/2017	NA	NA	NA	No	Yes	NA	NA	No	NA	NA	No	Yes	Yes	NA
C-CON-D	11/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-CON-S	11/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-I-3-D	11/15/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-I-3-S	11/15/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-MAR-D	11/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-MAR-S	11/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-NR1-D	11/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-NR1-S	11/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-NR3-S	11/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-NR4-S	11/16/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-R22A-S	11/15/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-R27-S	11/15/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C-TAZ-S	11/15/2017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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MW-38S-SMT	12/07/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-38D-SMT	12/07/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
OW-05M-LF	12/14/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
OW-05M-3V	12/14/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
OW-05S-LF	12/14/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
OW-05S-3V	12/14/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
CW-01D-3V	12/05/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
CW-01D-LF	12/05/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
CW-01M-LF	12/05/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
CW-01M-3V	12/05/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-72BR-200-3V	12/06/2017	Yes	No	Yes	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes	NA
MW-72BR-200-LF	12/06/2017	Yes	No	Yes	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes	NA
MW-72BR-200-LF	12/06/2017	Yes	No	Yes	No	Yes	NA	Yes	No	NA	Yes	No	Yes	Yes	NA
TW-04-3V	12/14/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
TW-04-LF	12/14/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
CW-02D-3V	12/12/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
CW-02D-LF	12/12/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
CW-02M-3V	12/12/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
CW-02M-LF	12/12/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
CW-03D-LF	12/12/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
CW-03D-3V	12/12/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
CW-03M-3V	12/12/2017	NA	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
CW-03M-LF	12/12/2017	No	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
CW-04D-3V	12/12/2017	NA	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
CW-04D-LF	12/12/2017	NA	No	Yes	No	Yes	NA	NA	No	Yes	Yes	No	Yes	Yes	NA
CW-04M-3V	12/12/2017	NA	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
CW-04M-LF	12/12/2017	No	NA	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-57-185-3V	12/11/2017	Yes	No	Yes	No	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	NA
MW-57-185-LF_D	12/11/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-57-185-LF_S	12/11/2017	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-70BR-225-3V	12/11/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-70BR-225-LF	12/11/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
MW-60BR-245-3V	12/13/2017	NA	No	Yes	No	Yes	NA	NA	No	NA	Yes	No	Yes	Yes	NA
MW-60BR-245-LF	12/13/2017	NA	No	Yes	No	Yes	NA	NA	No	NA	Yes	No	Yes	Yes	NA
MW-60BR-245-LF	12/13/2017	NA	No	Yes	No	Yes	NA	NA	No	Yes	Yes	No	Yes	Yes	NA
TW-05-3V	12/14/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA
TW-05-LF	12/14/2017	Yes	No	Yes	No	Yes	NA	Yes	No	Yes	Yes	No	Yes	Yes	NA

APPENDIX B

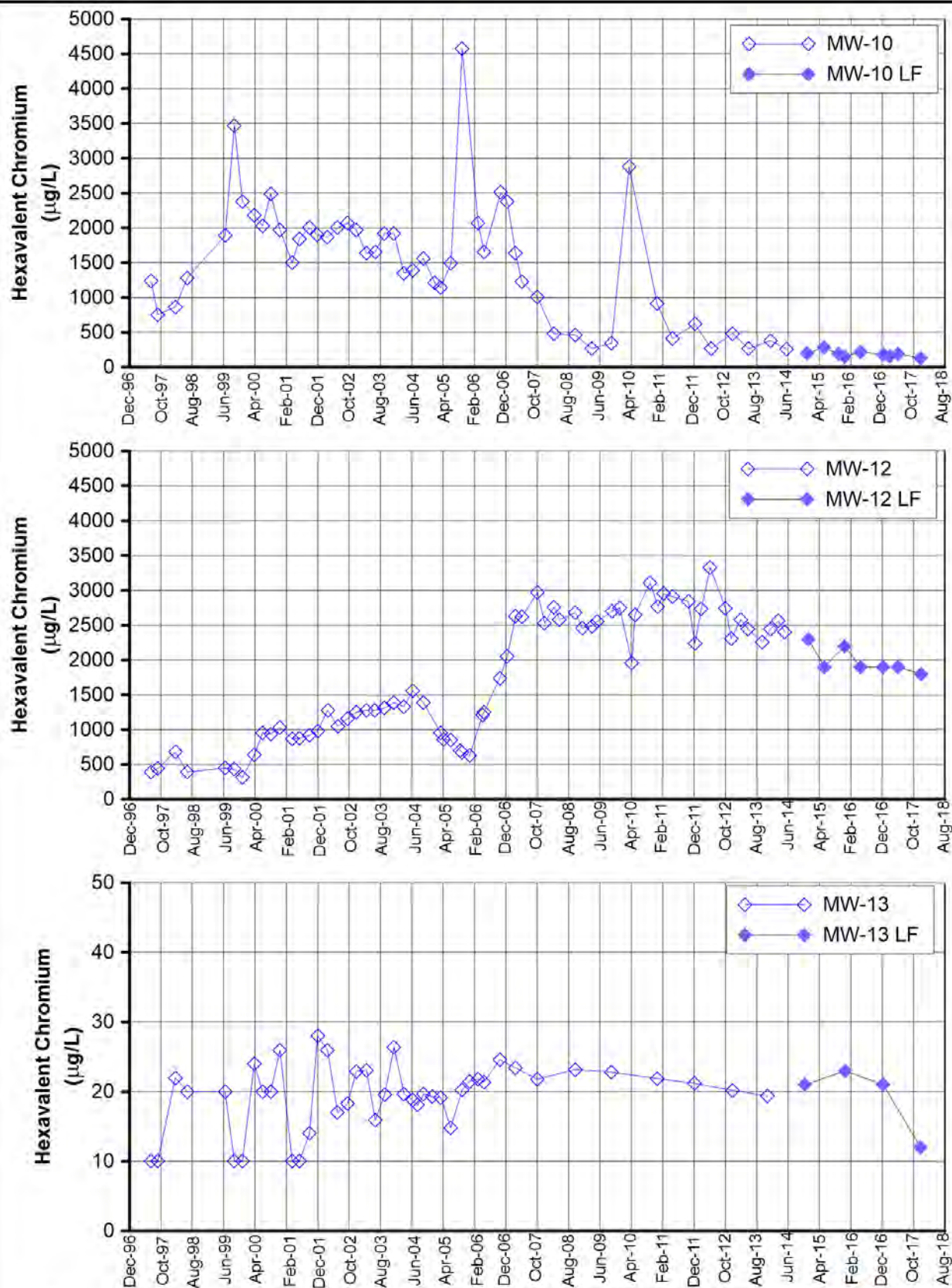
January through December 2017 Field Sampling Forms and November through December 2017 Analytical Lab Reports (Provided on CD Only with Hard Copy Submittal)



APPENDIX C

Chromium, Molybdenum, Nitrate, and Selenium Concentration Graphs
and PE-01 Notification Table





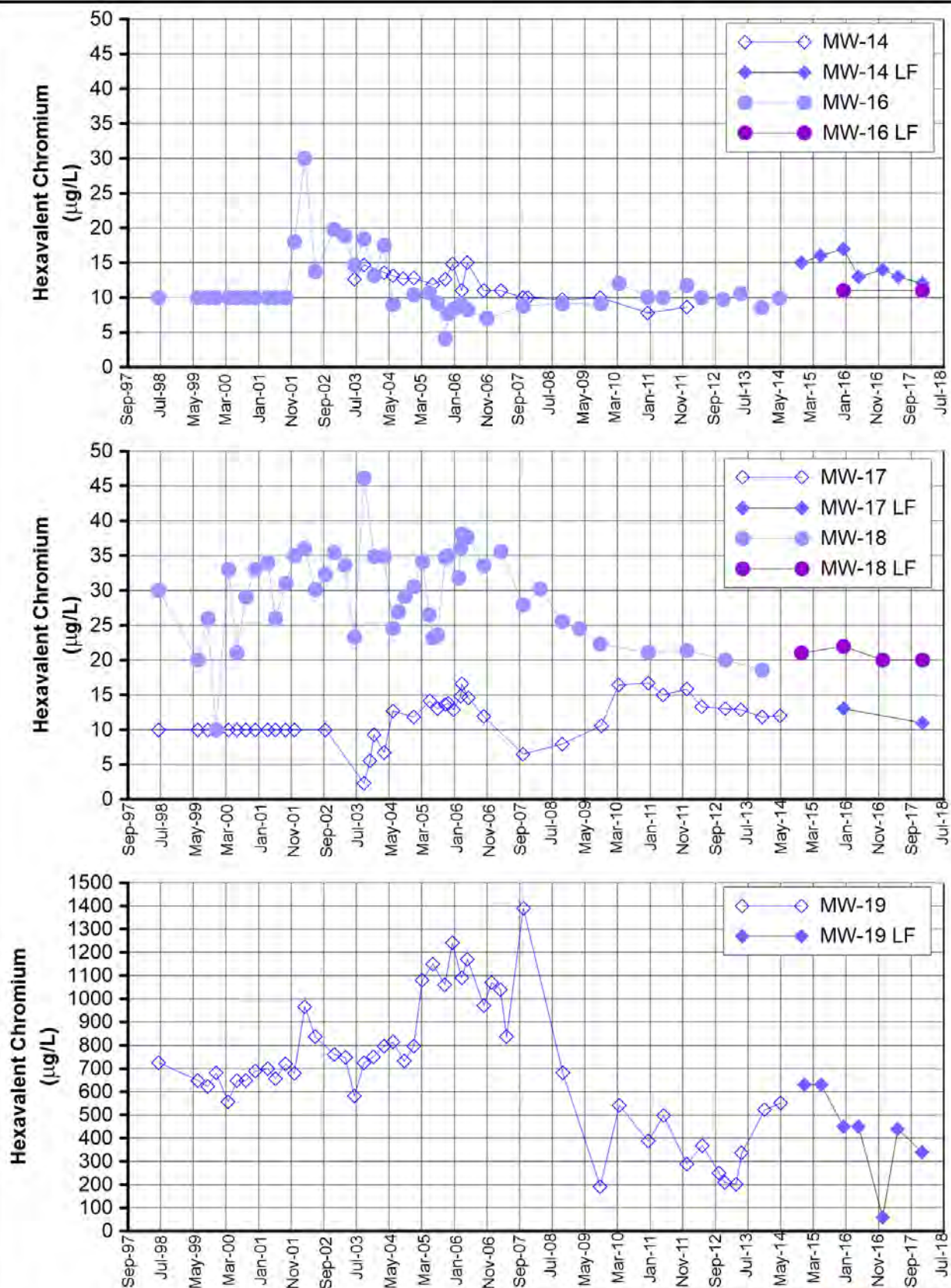
Notes:

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 C-1
HEXAVALENT CHROMIUM
IN MW-10, MW-12, AND MW-13**

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



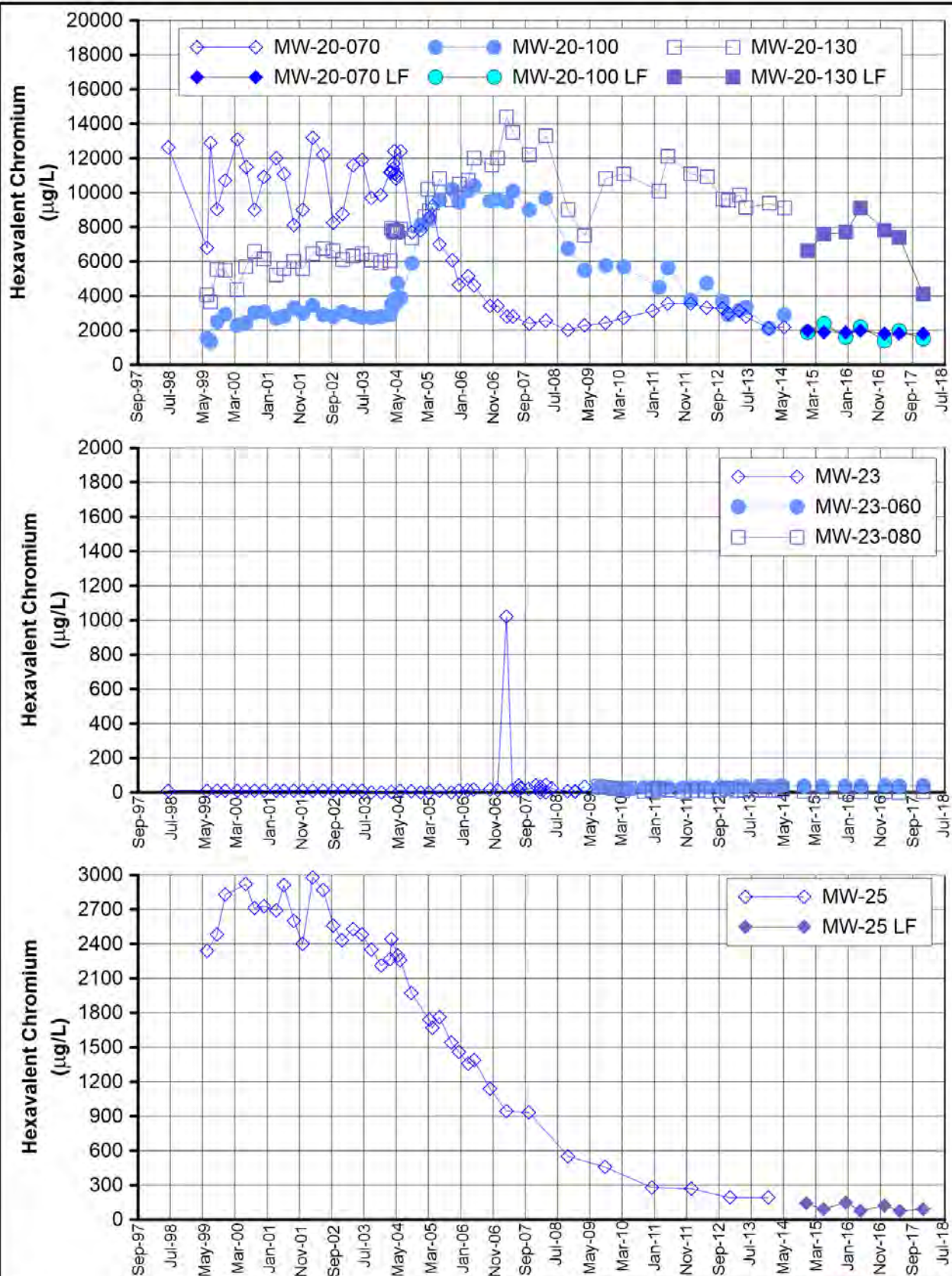


Notes:

1. 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 C-2
HEXAVALENT CHROMIUM
IN MW-14, MW-16, MW-17, MW-18, AND MW-19
 FOURTH QUARTER 2017 AND ANNUAL 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.

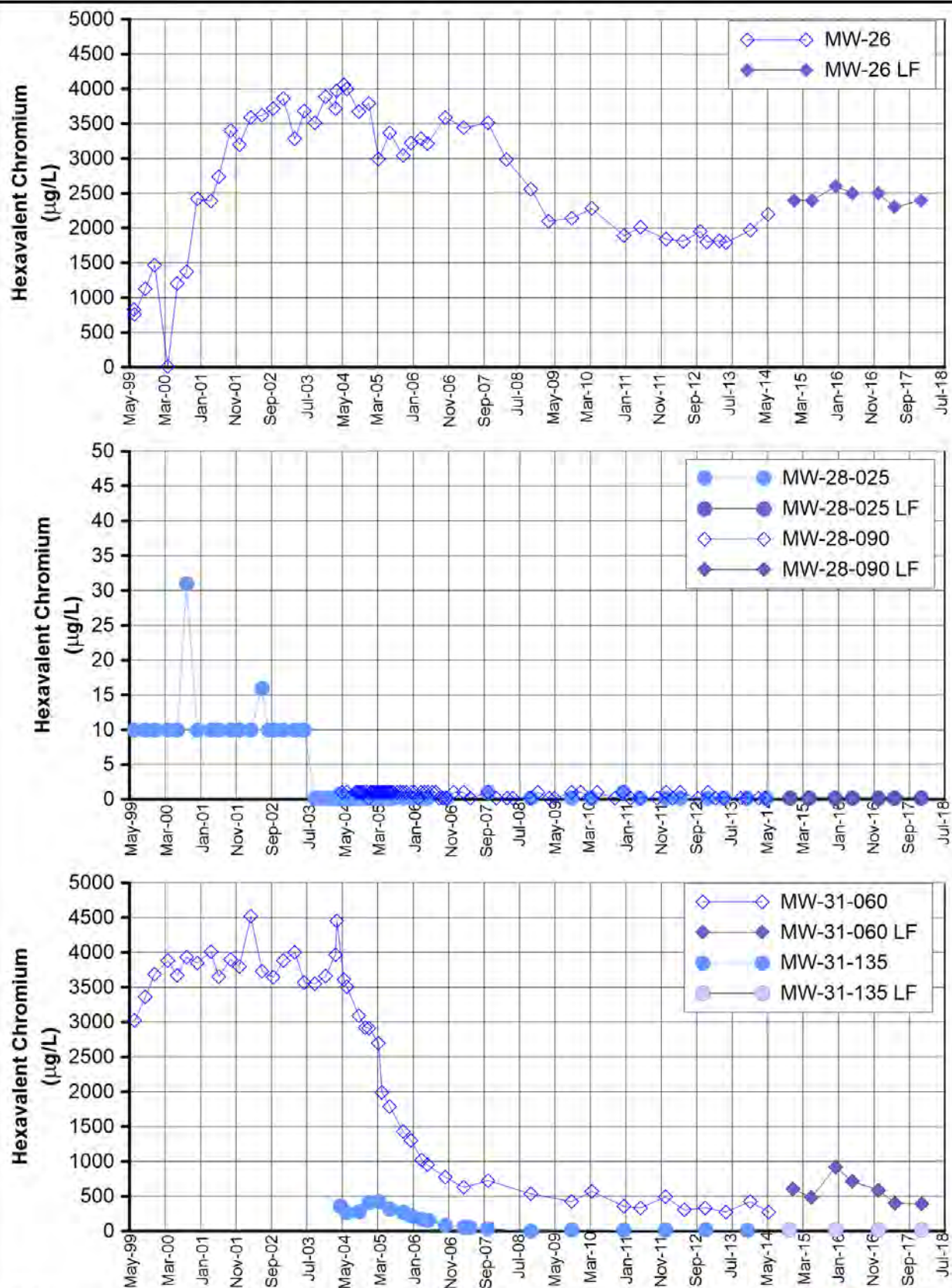
FIGURE C-3

HEXAVALENT CHROMIUM

IN MW-20 AND MW-23 CLUSTERS AND MW-25

FOURTH QUARTER 2017 AND ANNUAL 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-28-090 is 20 µg/L.

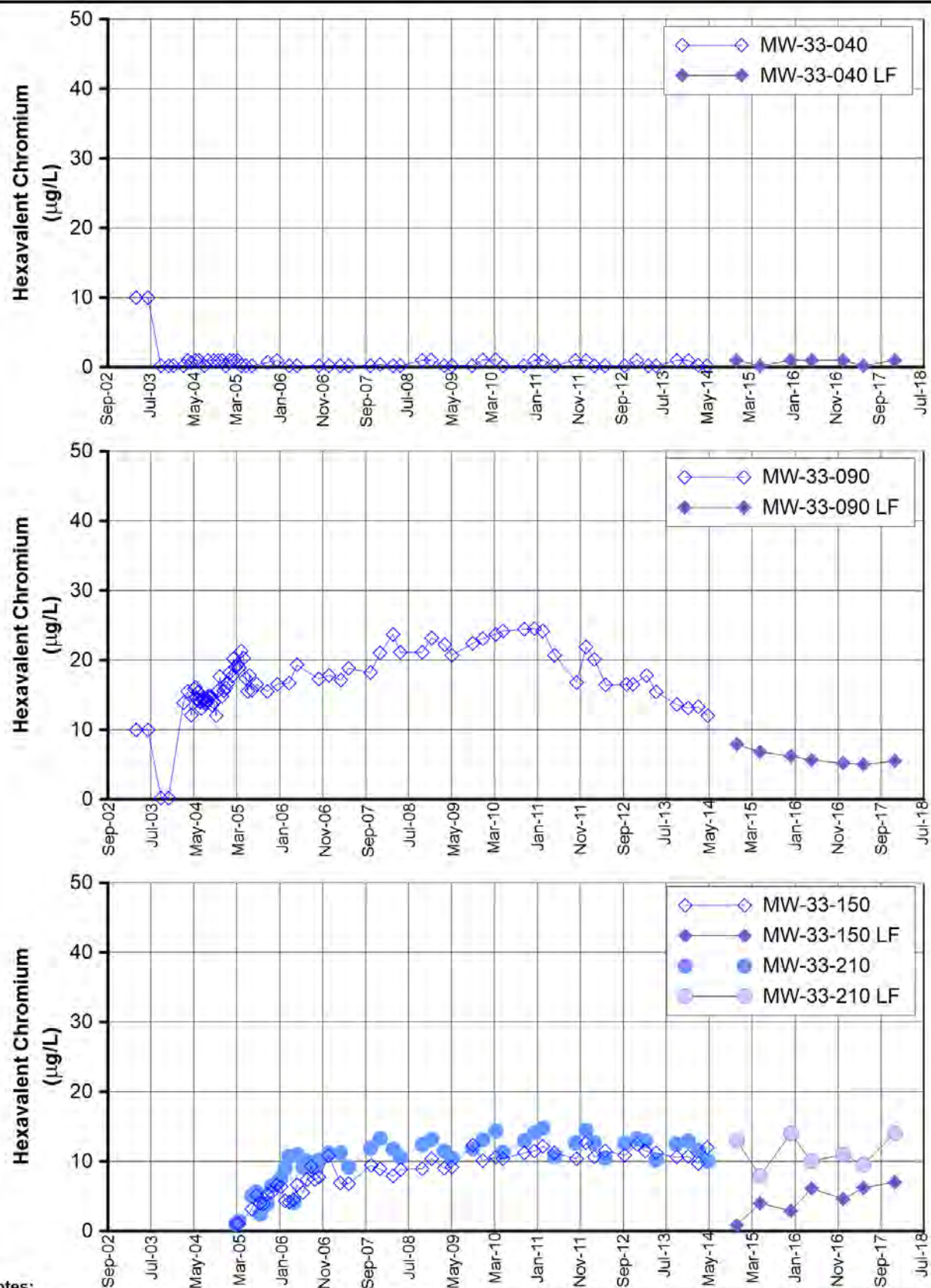
LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

FIGURE C-4

**HEXAVALENT CHROMIUM
IN MW-26, MW-28, AND MW-31 CLUSTERS**

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





Notes:

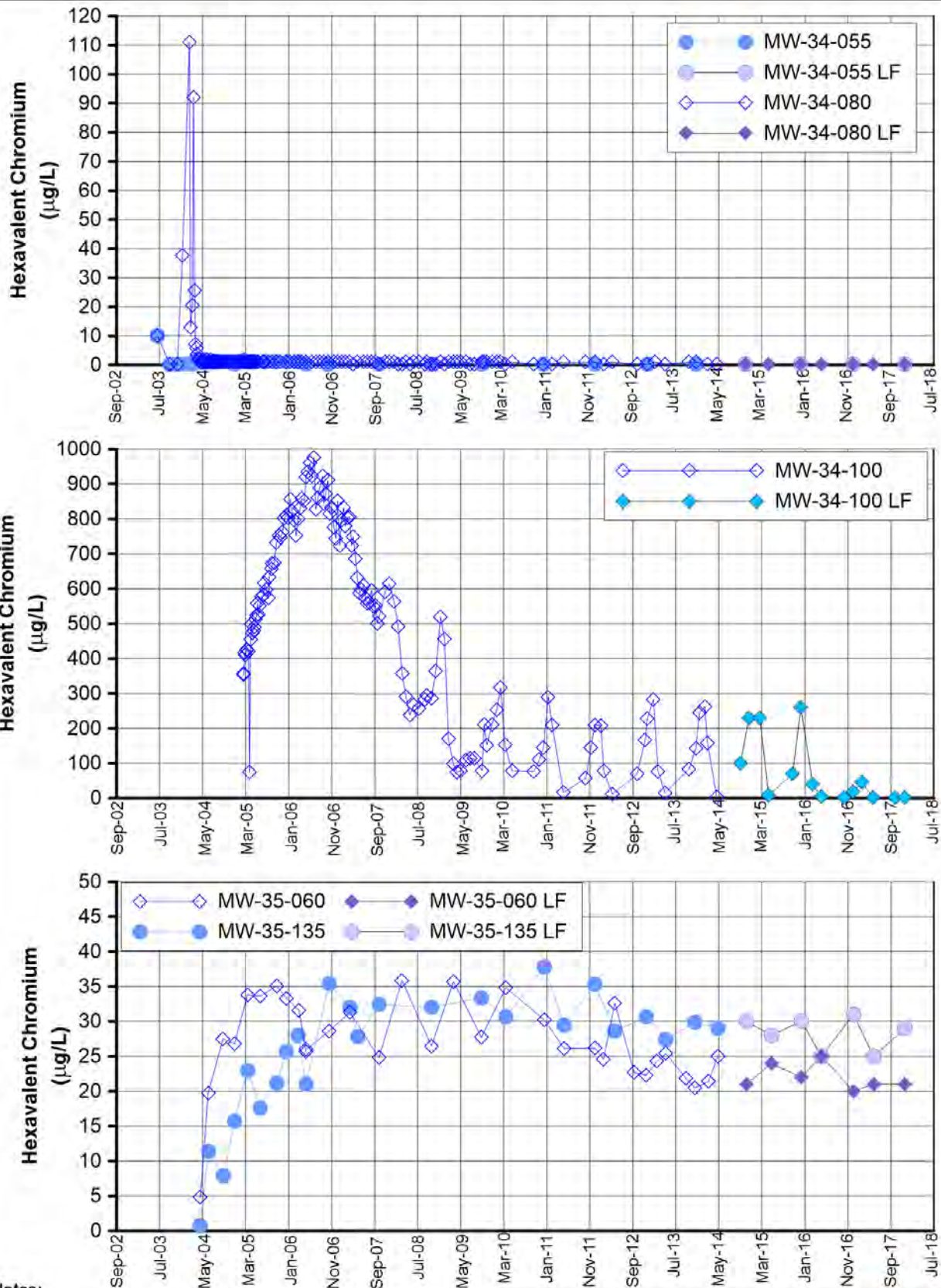
- 1) The IM Contingency Plan and hexavalent chromium [Cr(VI)] trigger levels were updated July 17, 2008 (DTSC, 2008b).
 - 2) The trigger level for MW-33-040 is 20 µg/L.
 - 3) The trigger level for MW-33-090 is 25 µg/L.
 - 4) The trigger level for MW-33-150 is 20 µg/L.
 - 5) The trigger level for MW-33-210 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 C-5

**HEXAVALENT CHROMIUM
IN MW-33 CLUSTER**



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



Notes:

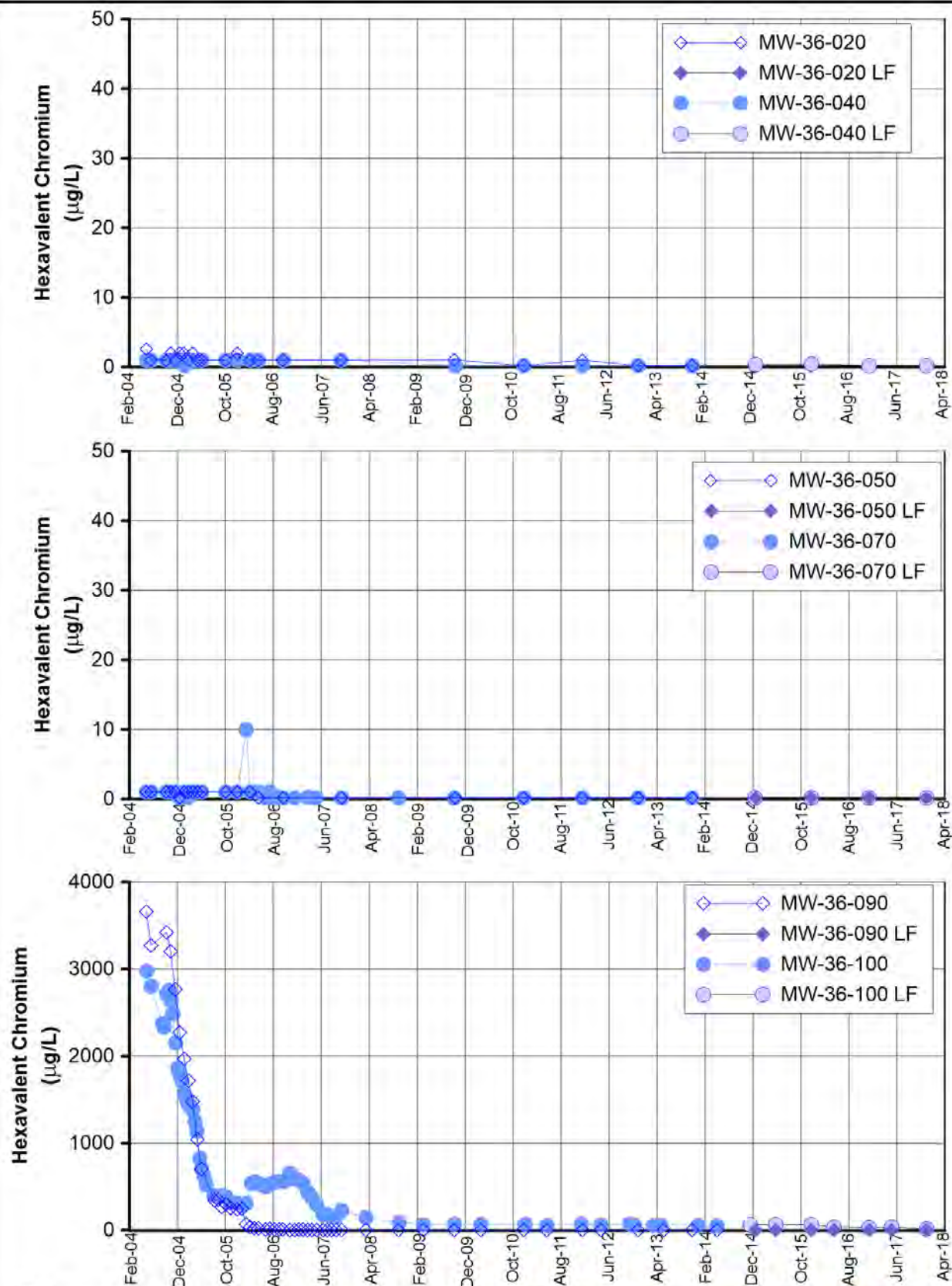
- 1) The IM Contingency Plan and hexavalent chromium [Cr(VI)] trigger levels were updated July 17, 2008 (DTSC, 2008b).
- 2) The trigger level for MW-34-080 is 20 µg/L.
- 3) The trigger level for MW-34-100 is 750 µg/L.

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 C-6
HEXAVALENT CHROMIUM
IN MW-34 AND MW-35 CLUSTERS**

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





Notes:

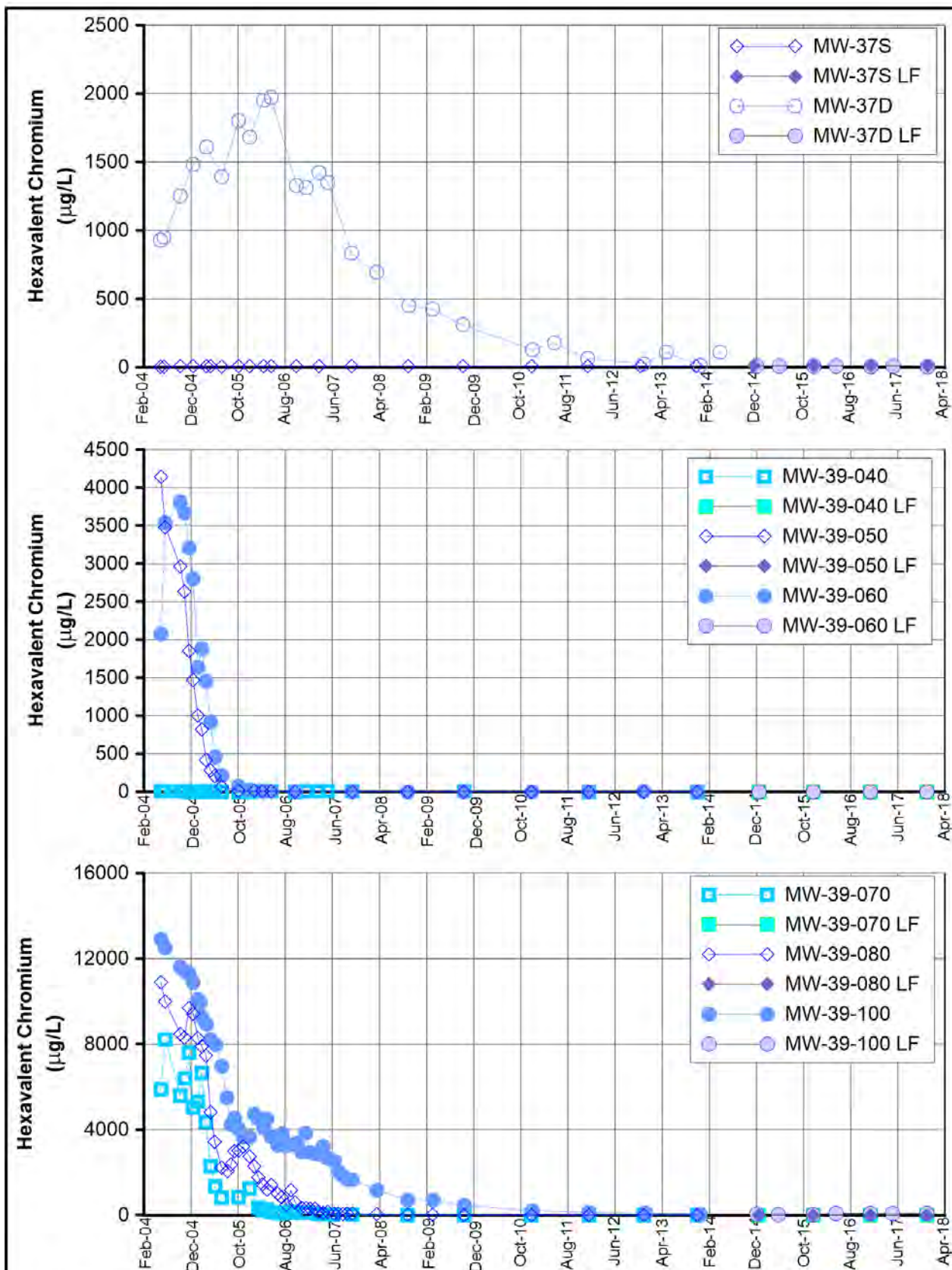
- 1) The IM Contingency Plan and hexavalent chromium [Cr(VI)] trigger levels were updated July 17, 2008 (DTSC, 2008b).
- 2) The trigger level for MW-36-070 is 20 µg/L.

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

**FIGURE C-7
HEXAVALENT CHROMIUM
IN MW-36 CLUSTER**



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



Notes:

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

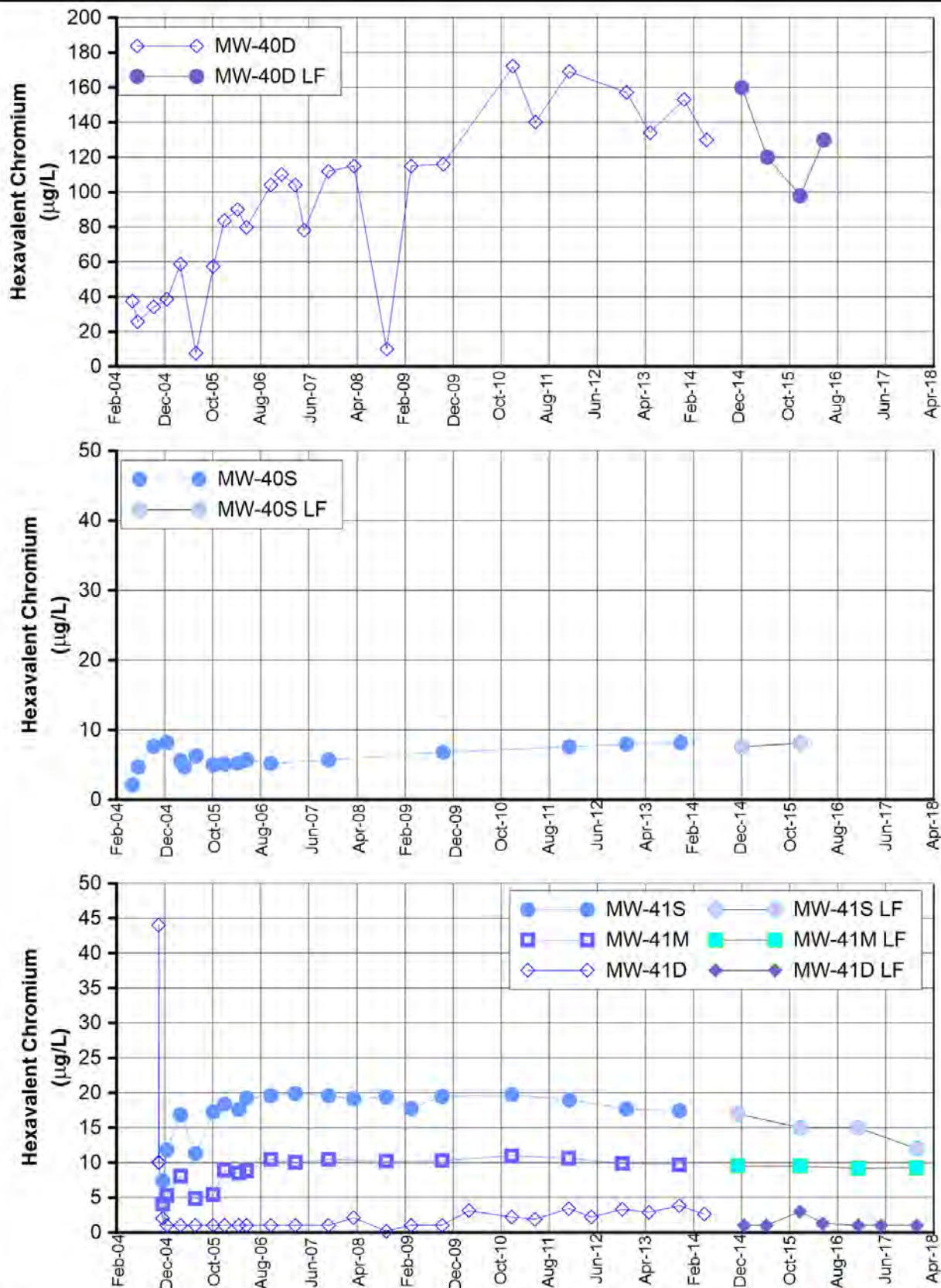
LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

FIGURE C-8

HEXAVALENT CHROMIUM IN MW-37 AND MW-39 CLUSTERS

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





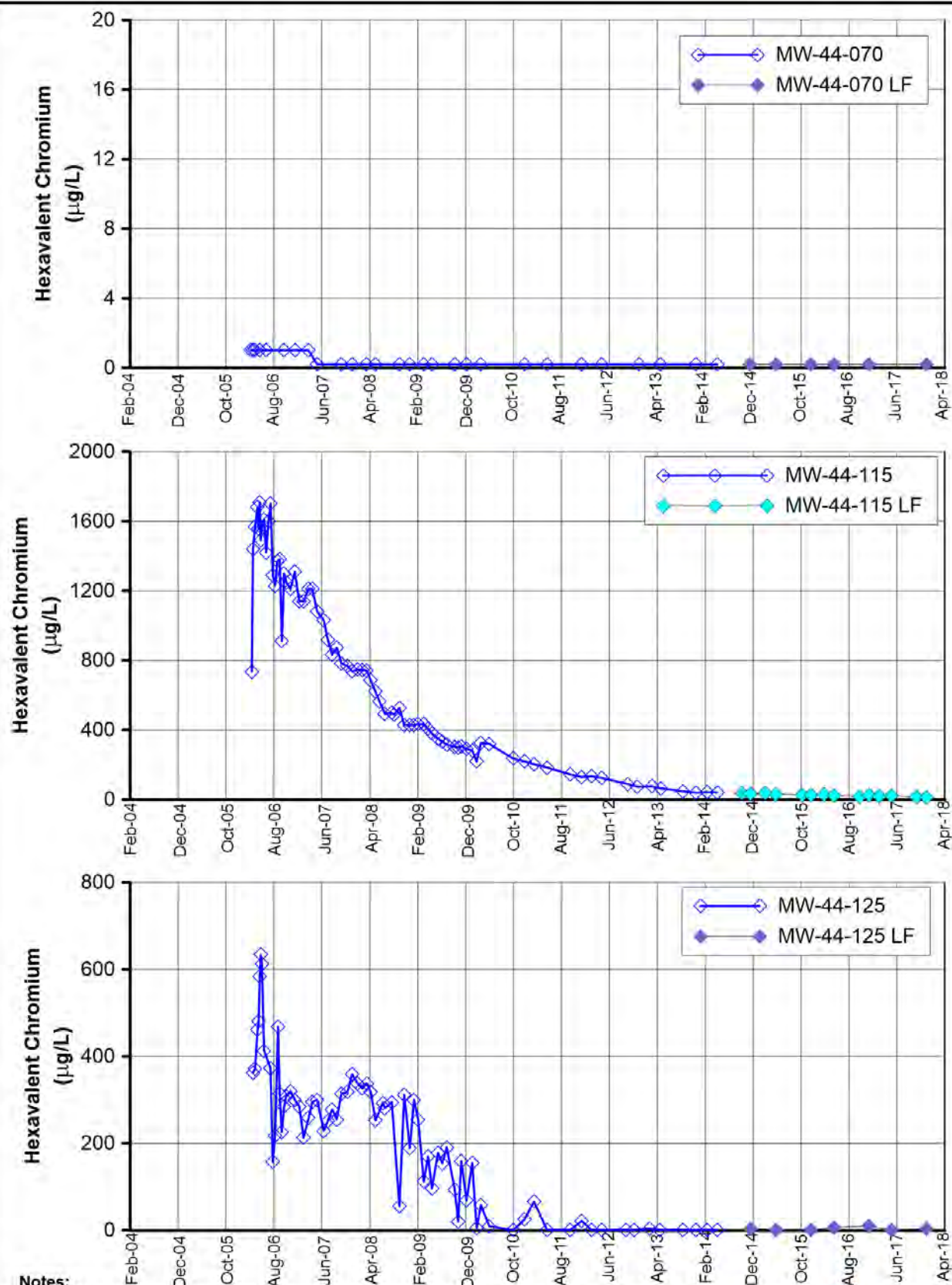
Notes:

1. 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.
2. MW-40D and MW-40S were not sampled during 4th Quarter 2016 due to traffic control issues.

**FIGURE C-9
HEXAVALENT CHROMIUM
IN MW-40 AND MW-41 CLUSTERS**

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





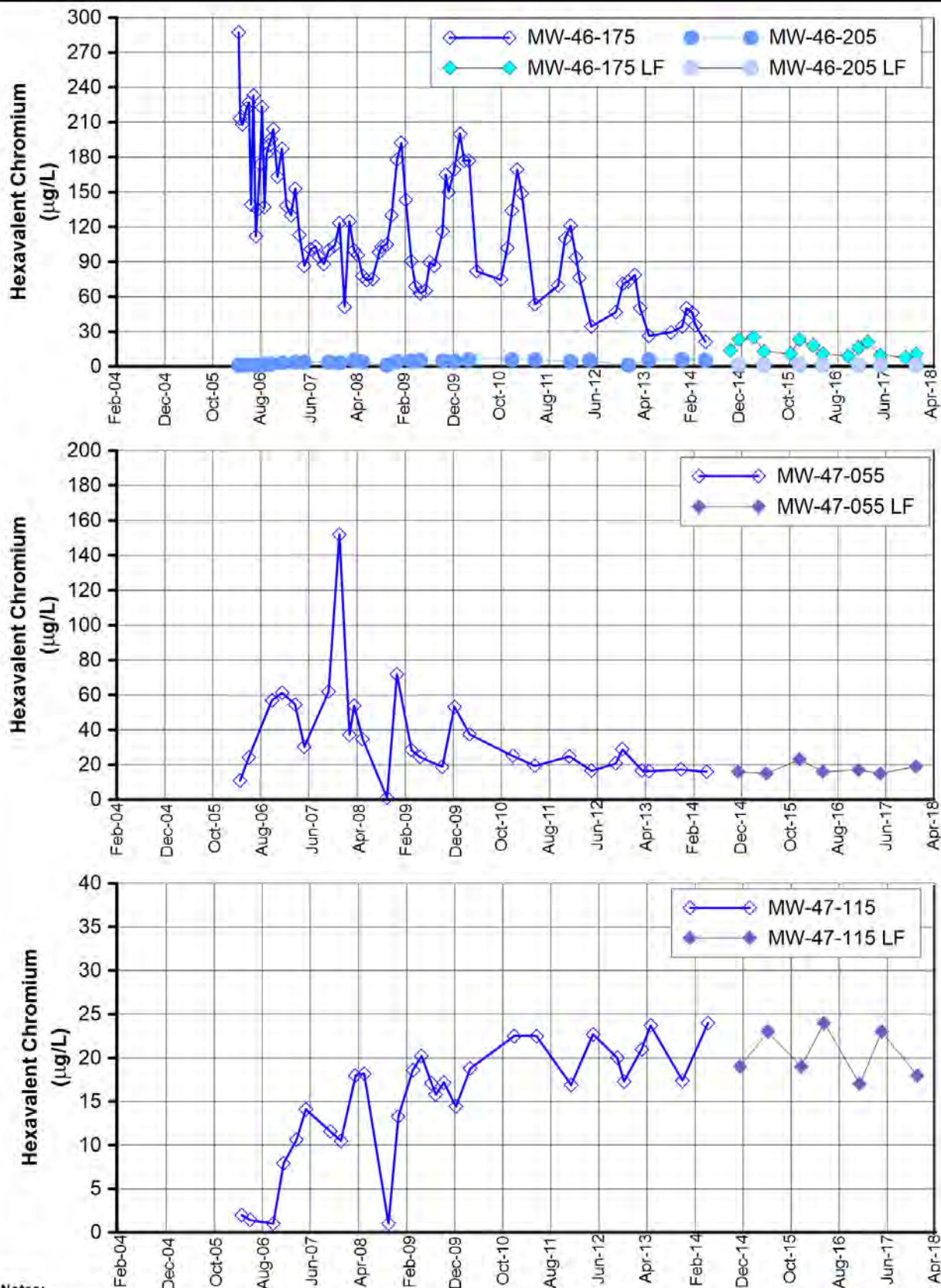
Notes:

- 1) The IM Contingency Plan and hexavalent chromium [Cr(VI)] trigger levels were updated July 17, 2008 (DTSC, 2008b).
 - 2) The trigger level for MW-44-070 is 20 µg/L.
 - 3) The trigger level for MW-44-115 is 1,200 µg/L.
 - 4) The trigger level for MW-44-125 is 475 µg/L.
- LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

**FIGURE C-10
HEXAVALENT CHROMIUM
IN MW-44 CLUSTER**

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





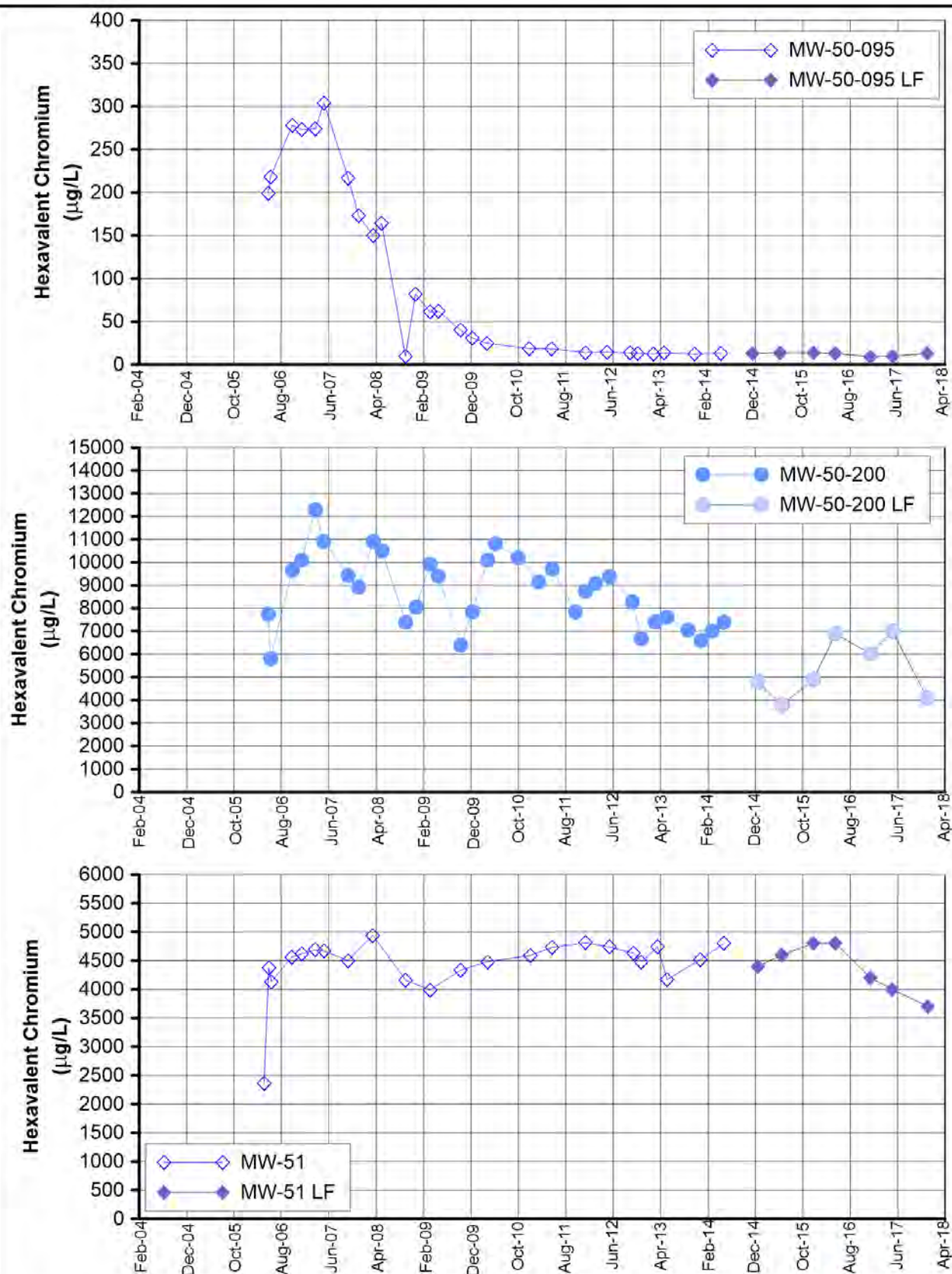
Notes:

- 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 C-11
HEXAVALENT CHROMIUM
IN MW-46 AND MW-47 CLUSTERS**



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



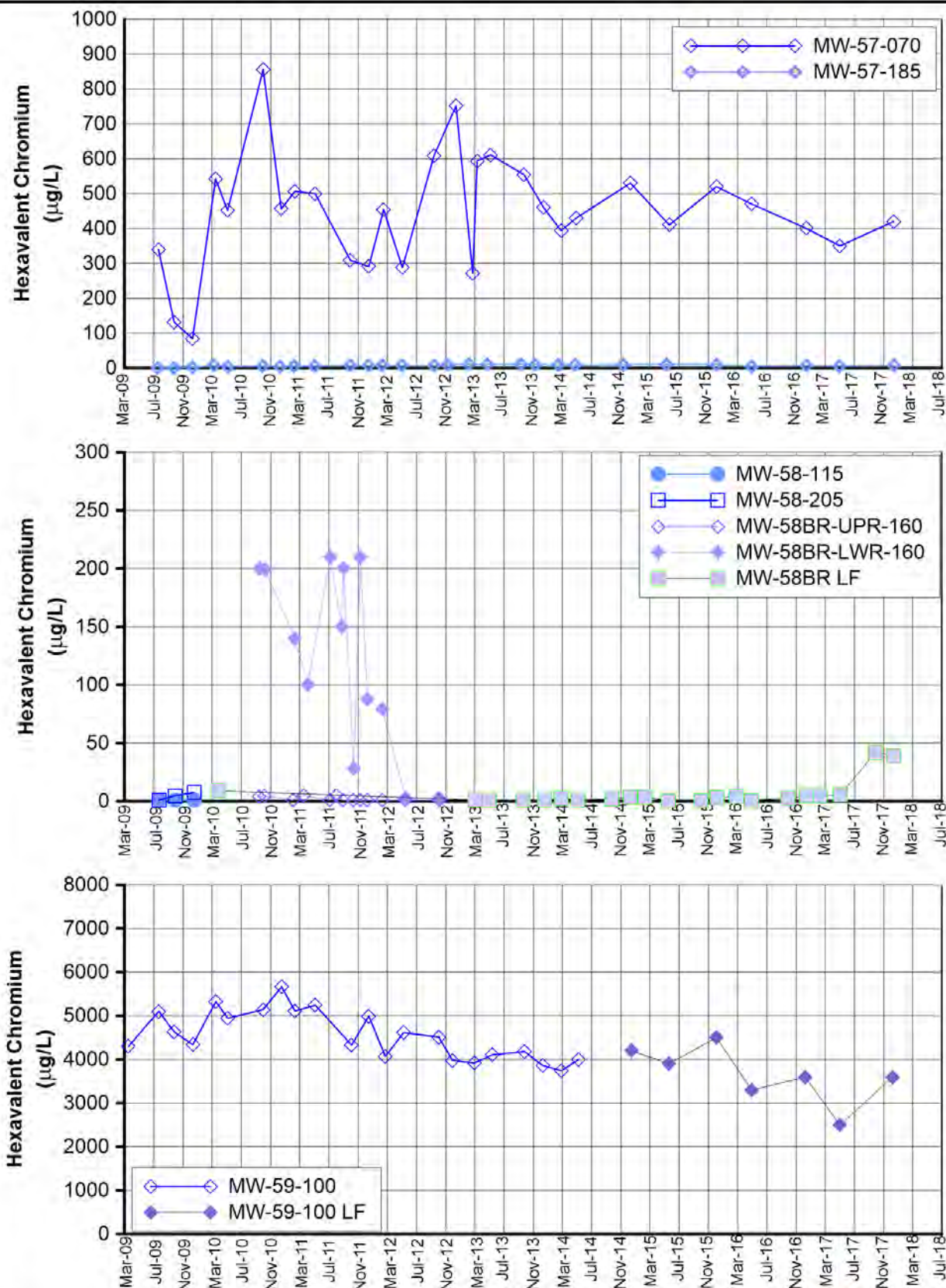
Notes:

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



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

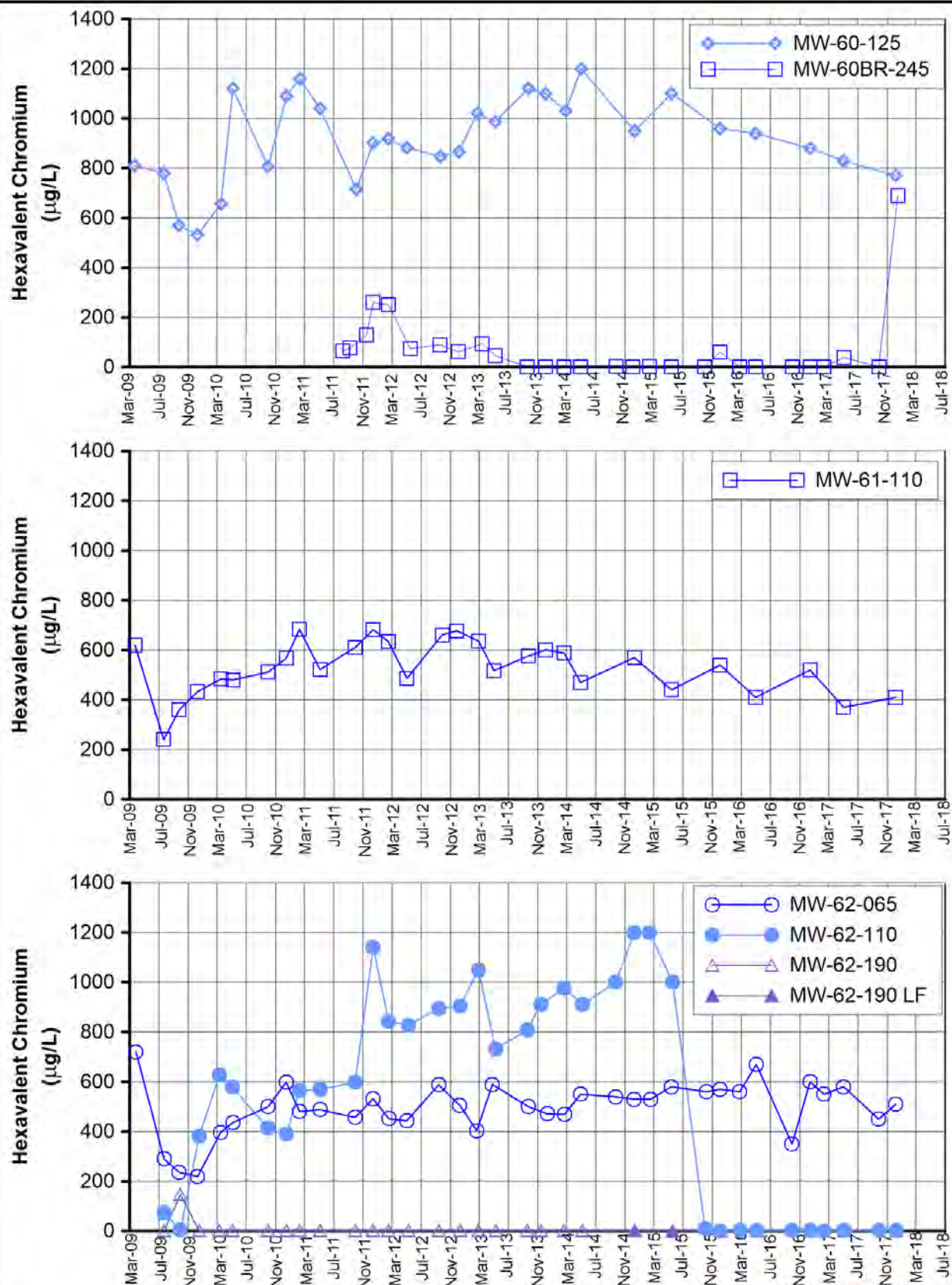


Note:

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

FIGURE C-13
HEXAVALENT CHROMIUM
IN MW-57 CLUSTER, MW-58 CLUSTER AND MW-59-100
 FOURTH QUARTER 2017 AND ANNUAL INTERIM MEASURES
 PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER
 AND SURFACE WATER MONITORING REPORT,
 PG&E TOPOCK COMPRESSOR STATION,
 NEEDLES, CALIFORNIA





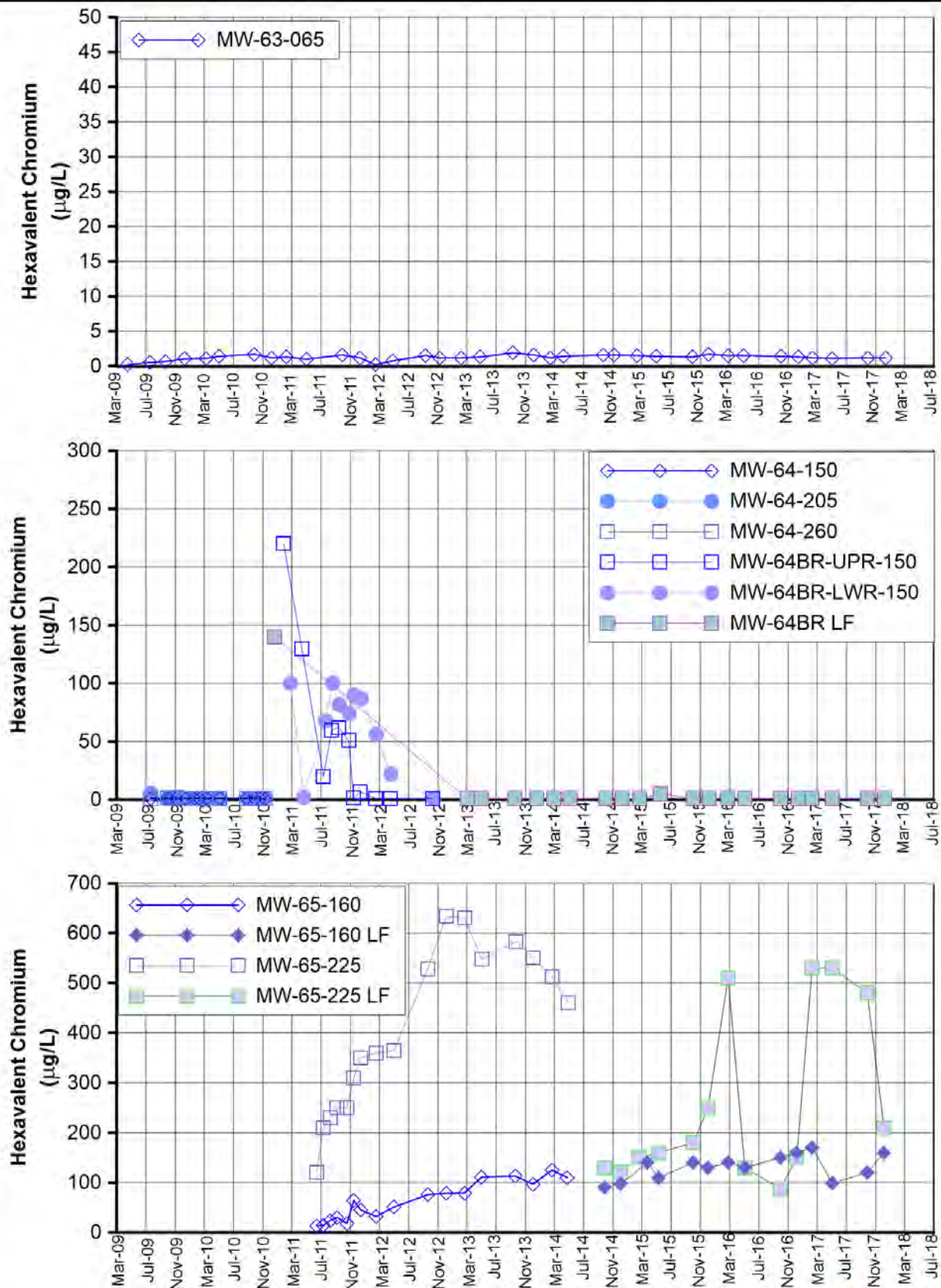
Notes:

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.

1. MW-60-125 sampled using LF method on 12/06/2017.
2. MW-62-065 sampled using LF method on 5/02/2017, 9/25/2017 & 12/06/2017.

FIGURE C-14
HEXAVALENT CHROMIUM
IN MW-60 CLUSTER, MW-61-110 AND MW-62 CLUSTER
 FOURTH QUARTER 2017 AND ANNUAL 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.

1. MW-63-065 sampled using LF method on 5/02/2017, 9/28/2017 & 12/12/2017.

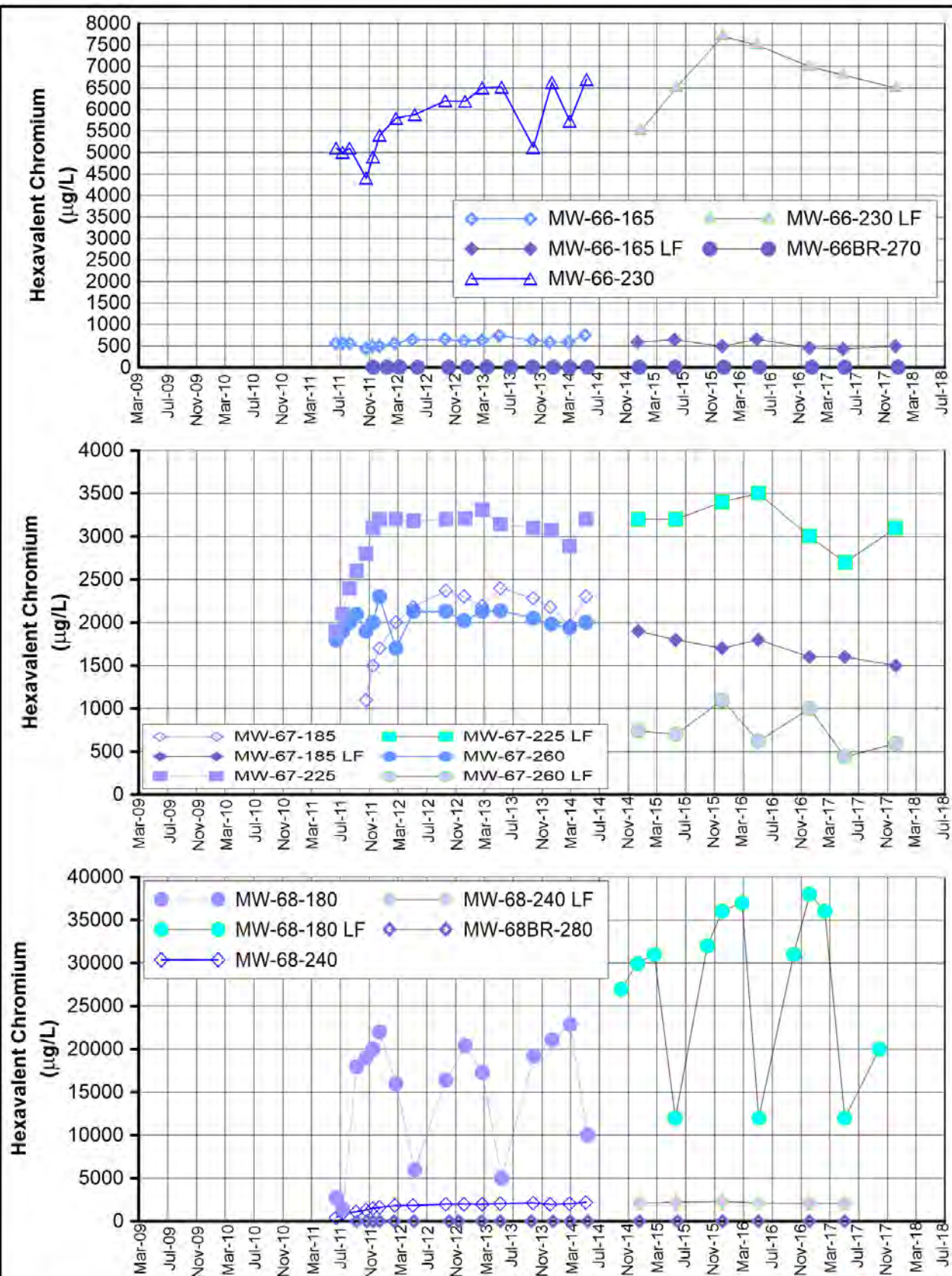
FIGURE C-15

HEXAVALENT CHROMIUM

IN MW-63-065, MW-64 CLUSTER AND MW-65 CLUSTER

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





Notes:

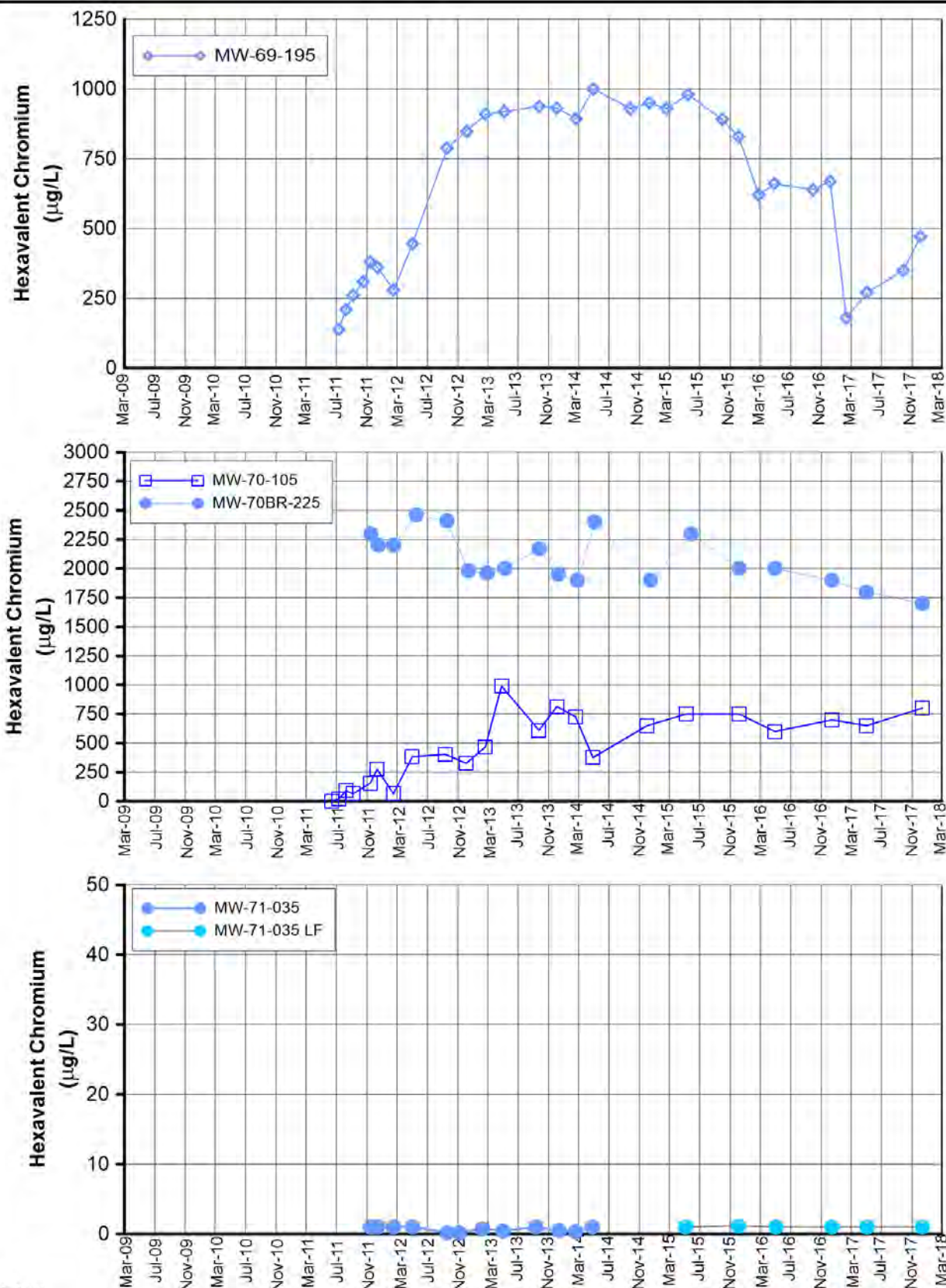
LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

FIGURE C-16

HEXAVALENT CHROMIUM IN MW-66, MW-67, AND MW-68 CLUSTERS

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





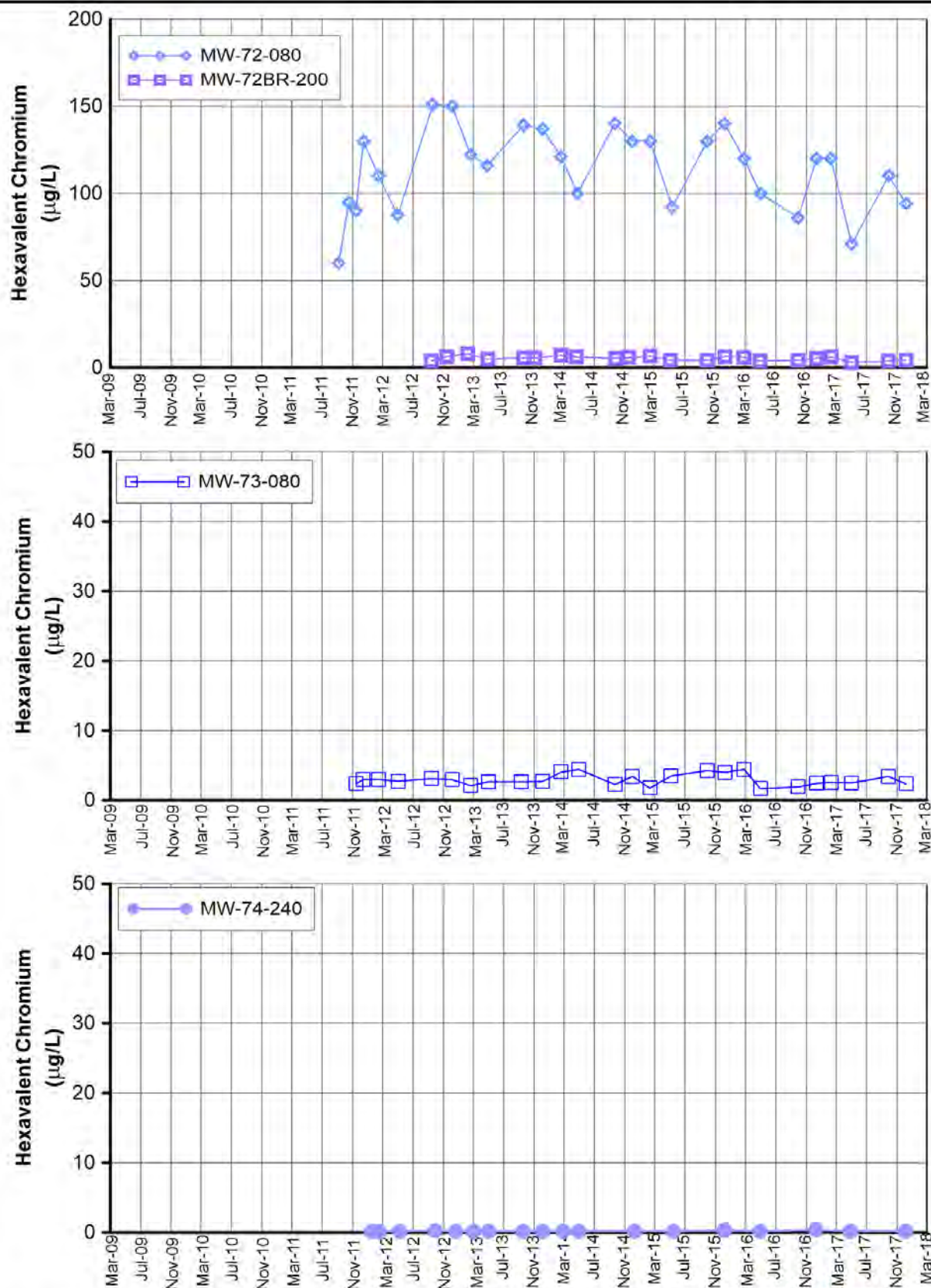
Notes:

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.

1. MW-69-195 sampled using LF method on 2/09/2017, 5/3/2017, 9/26/2017, & 12/04/2017.
2. MW-70-105 sampled using LF method on 5/02/2017 & 12/11/2017.

FIGURE C-17
HEXAVALENT CHROMIUM
IN MW-69-195, MW-70 CLUSTER, AND MW-71-035
 FOURTH QUARTER 2017 AND ANNUAL INTERIM MEASURES
 PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER
 AND SURFACE WATER MONITORING REPORT,
 PG&E TOPOCK COMPRESSOR STATION,
 NEEDLES, CALIFORNIA



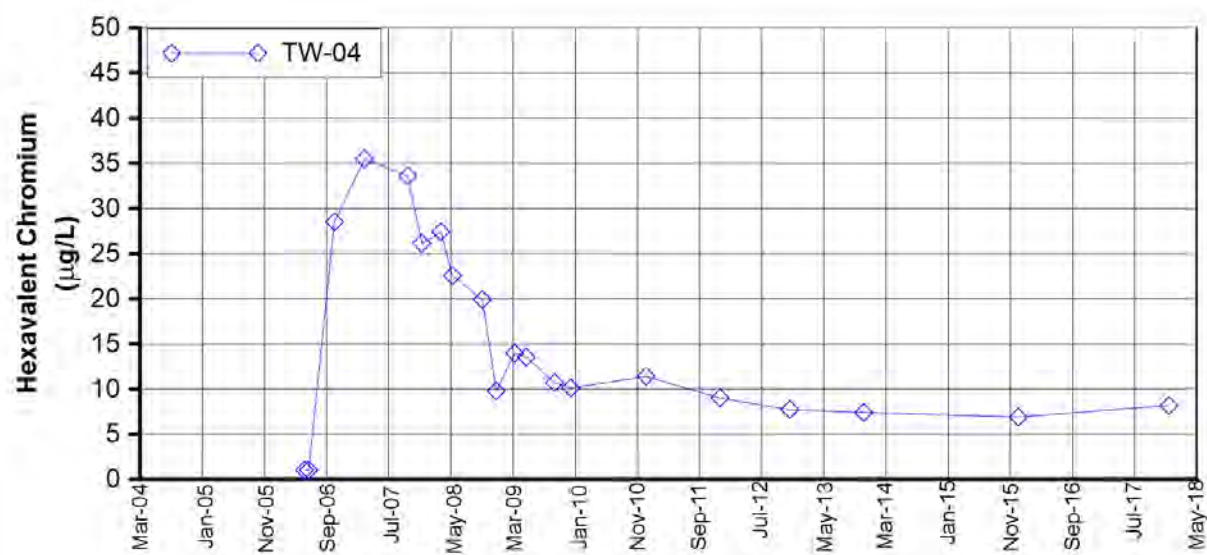


Notes:

1. MW-72-080 sampled using low flow sampling method on 5/02/2017 & 12/07/2017.
2. MW-73-080 sampled using low flow sampling method on 5/02/2017, 9/27/2017, & 12/6/2017.
3. MW-74-240 sampled using low flow sampling method on 4/27/2017 & 12/06/2017.

FIGURE C-18
HEXAVALENT CHROMIUM
IN MW-72 CLUSTER, MW-73-080, AND MW-74-240
 FOURTH QUARTER 2017 AND ANNUAL INTERIM MEASURES
 PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER
 AND SURFACE WATER MONITORING REPORT,
 PG&E TOPOCK COMPRESSOR STATION,
 NEEDLES, CALIFORNIA

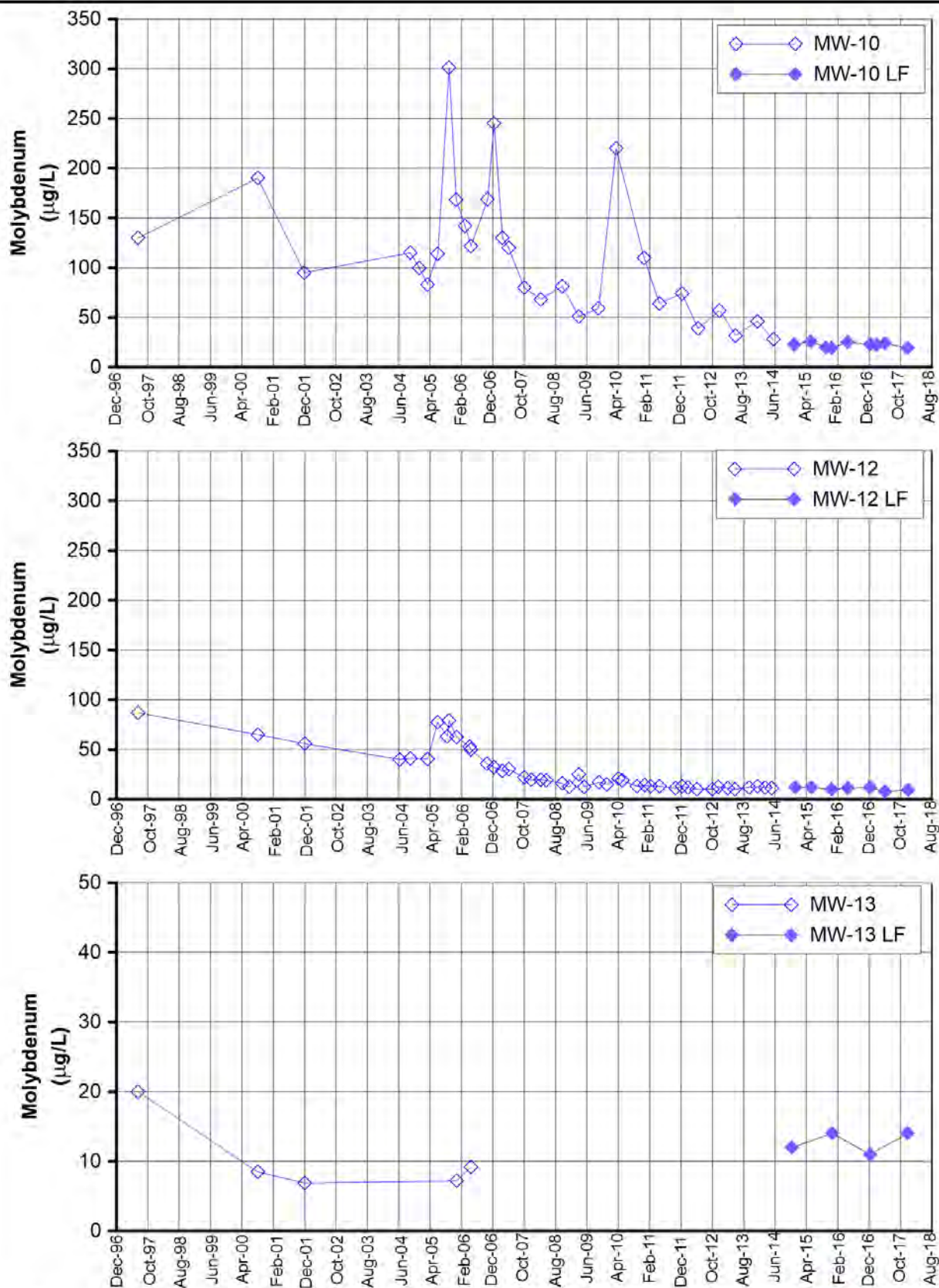




**FIGURE C-19
HEXAVALENT CHROMIUM
IN TW-04**



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



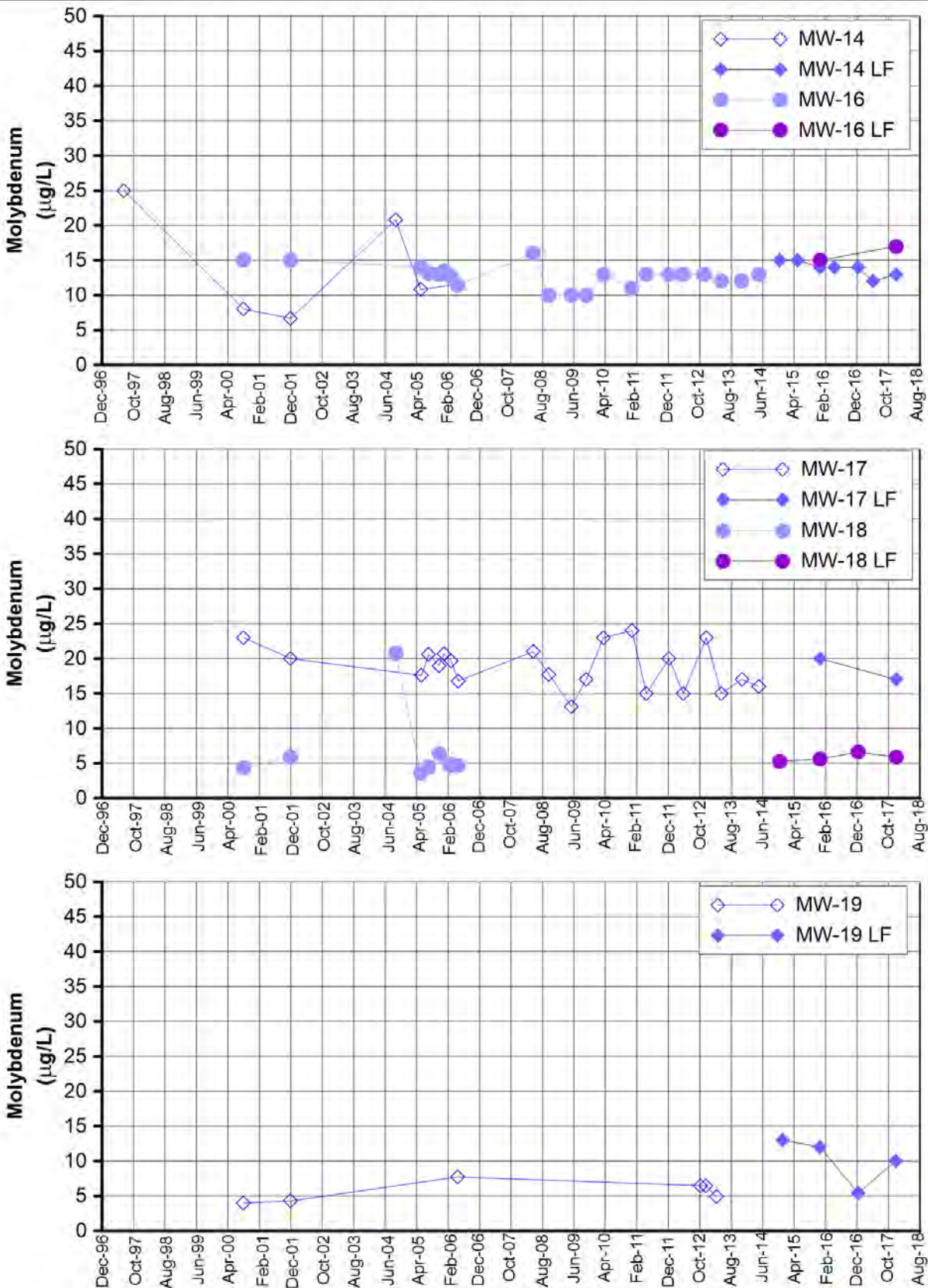
Notes:

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 C-20
MOLYBDENUM
IN MW-10, MW-12, AND MW-13**

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





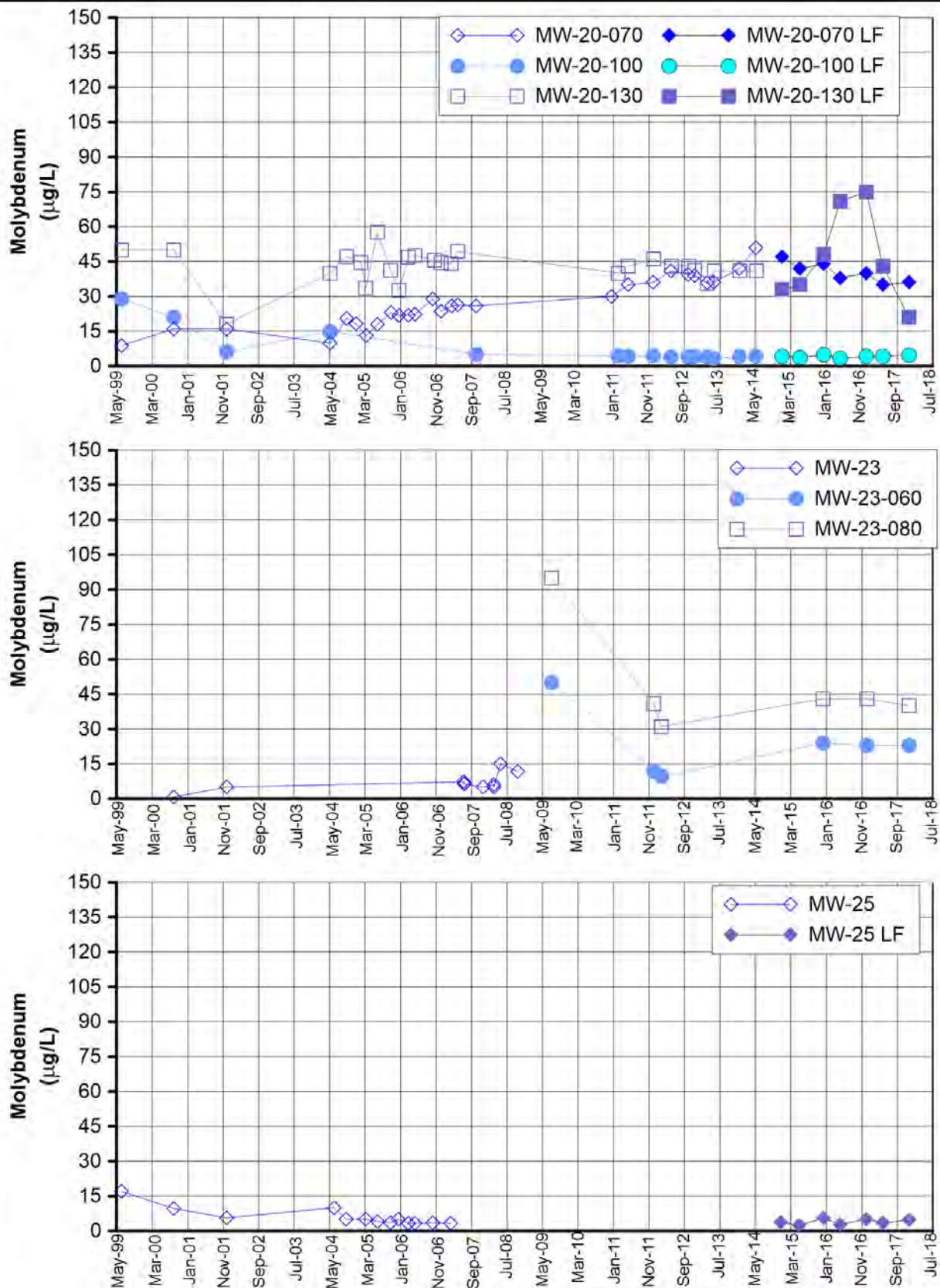
Notes:

1. 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 C-21
MOLYBDENUM**

IN MW-14, MW-16, MW-17, MW-18, AND MW-19
FOURTH QUARTER 2017 AND ANNUAL INTERIM MEASURES
PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER
AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA





Notes:

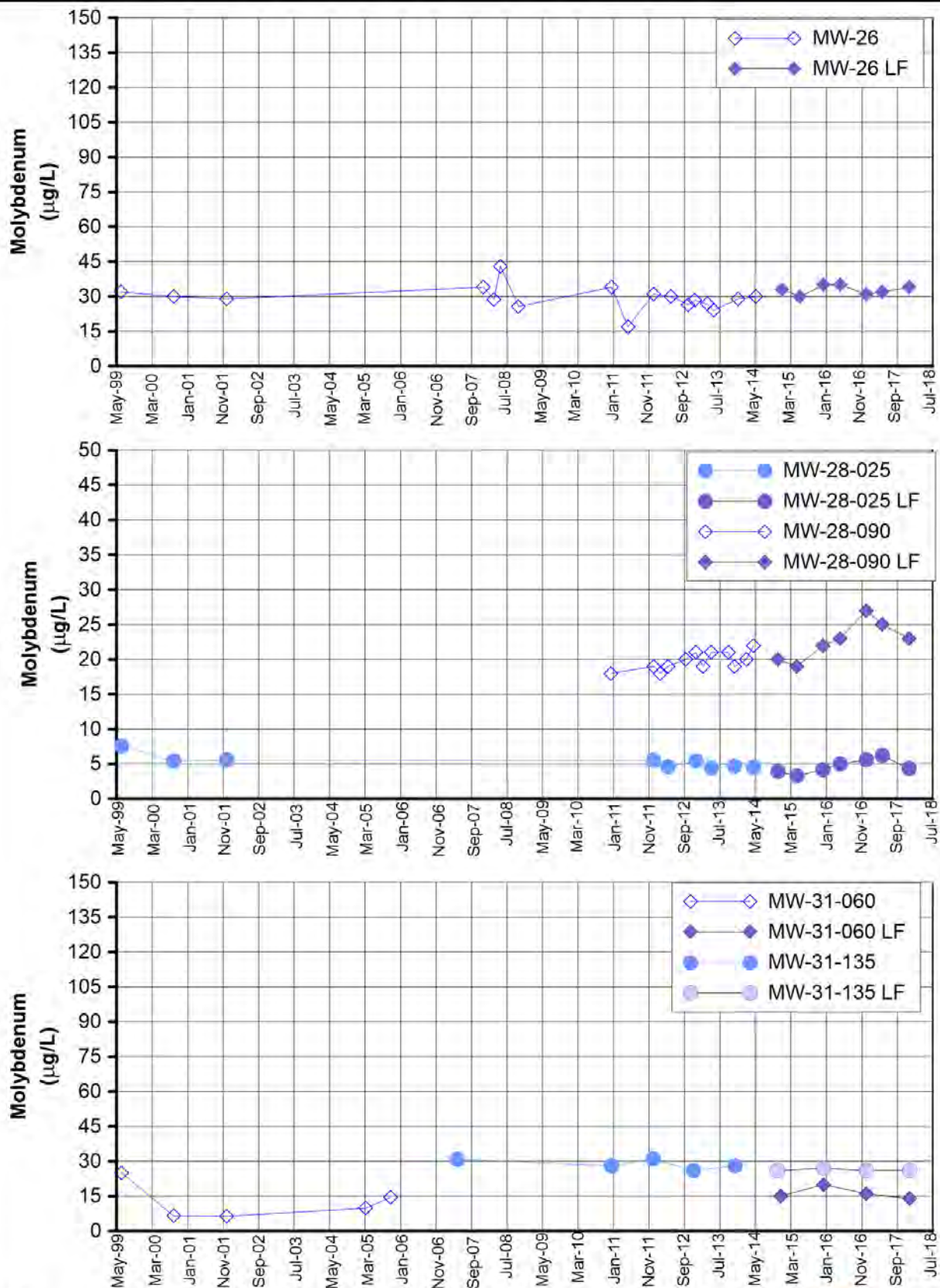
LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

**FIGURE C-22
MOLYBDENUM**

IN MW-20, MW-23, AND MW-25 CLUSTERS

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





Notes:

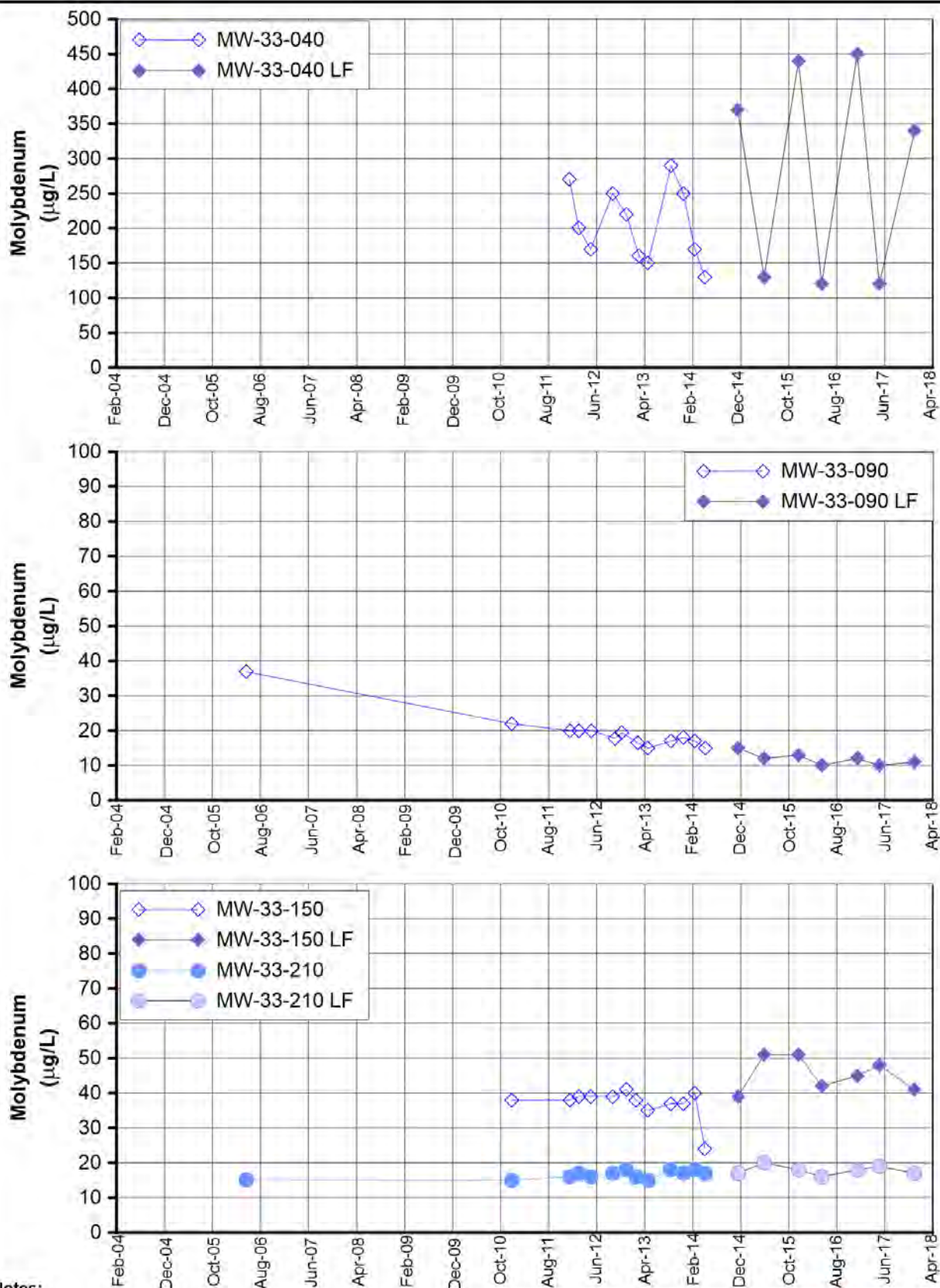
LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

**FIGURE C-23
MOLYBDENUM**

IN MW-26, MW-28, AND MW-31 CLUSTERS

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





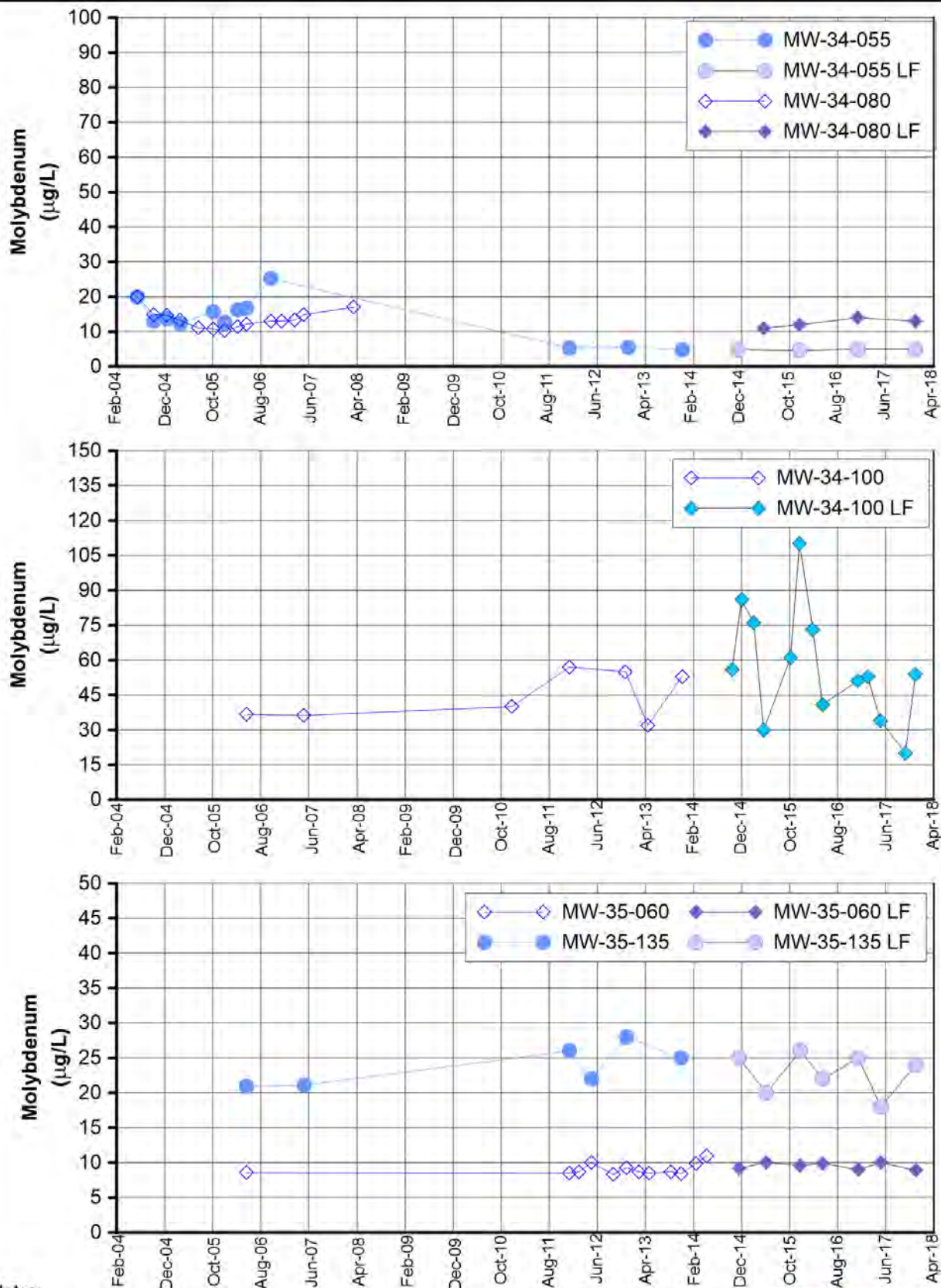
Notes:

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 C-24
MOLYBDENUM
IN MW-33 CLUSTER**

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





Notes:

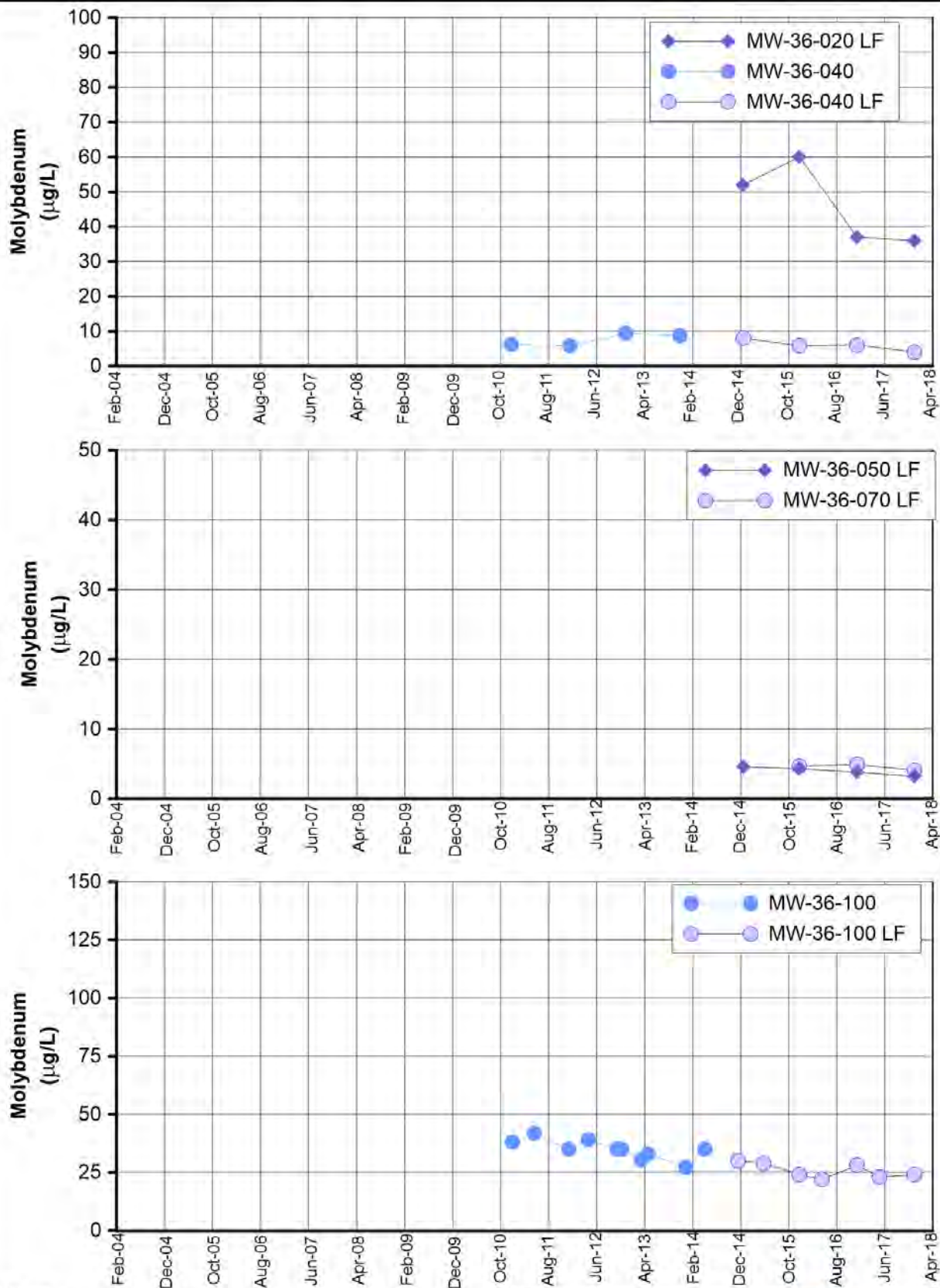
LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

**FIGURE C-25
MOLYBDENUM**

IN MW-34 AND MW-35 CLUSTERS

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





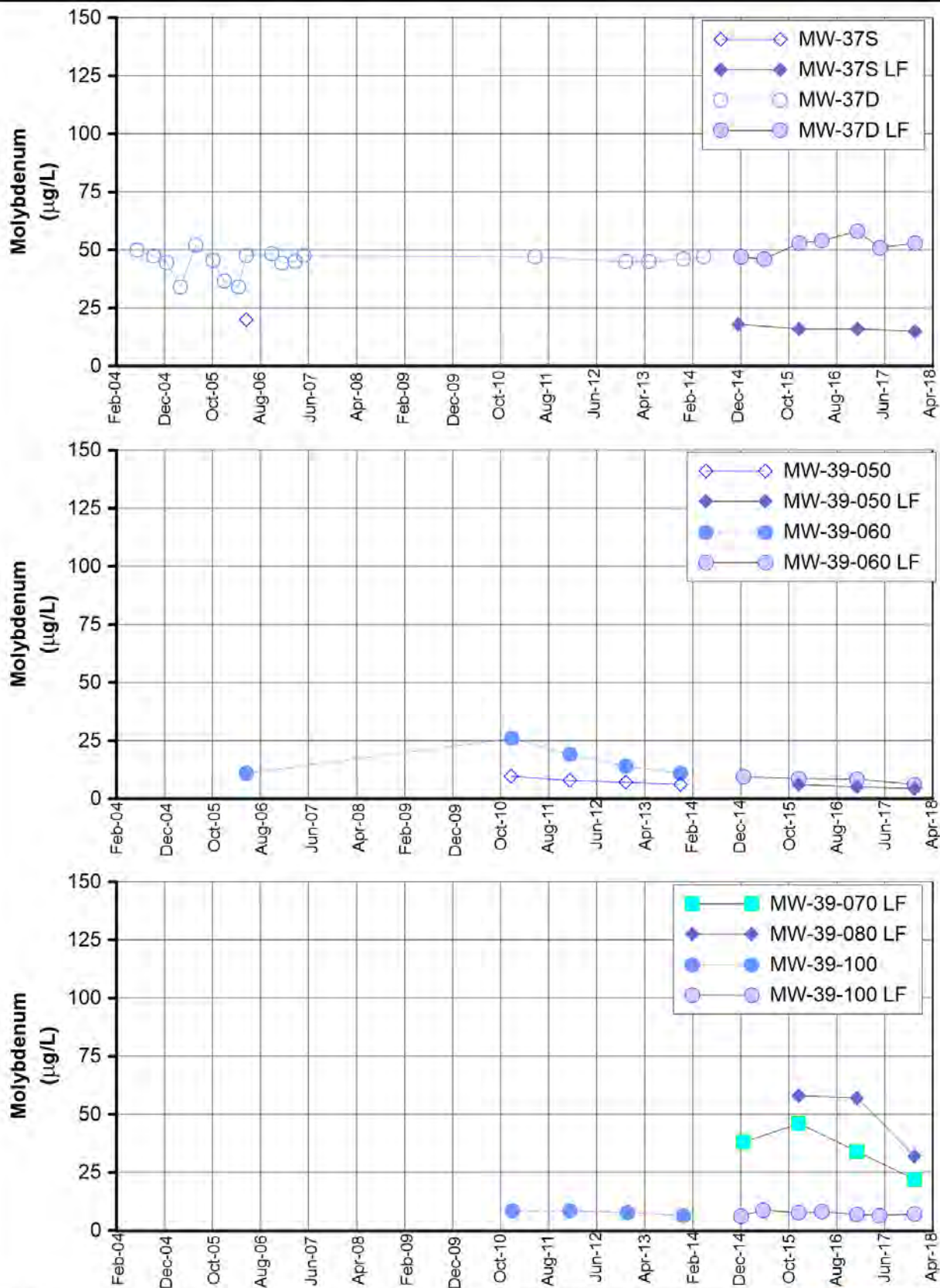
Notes:

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 C-26
MOLYBDENUM
IN MW-36 CLUSTER**

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





Notes:

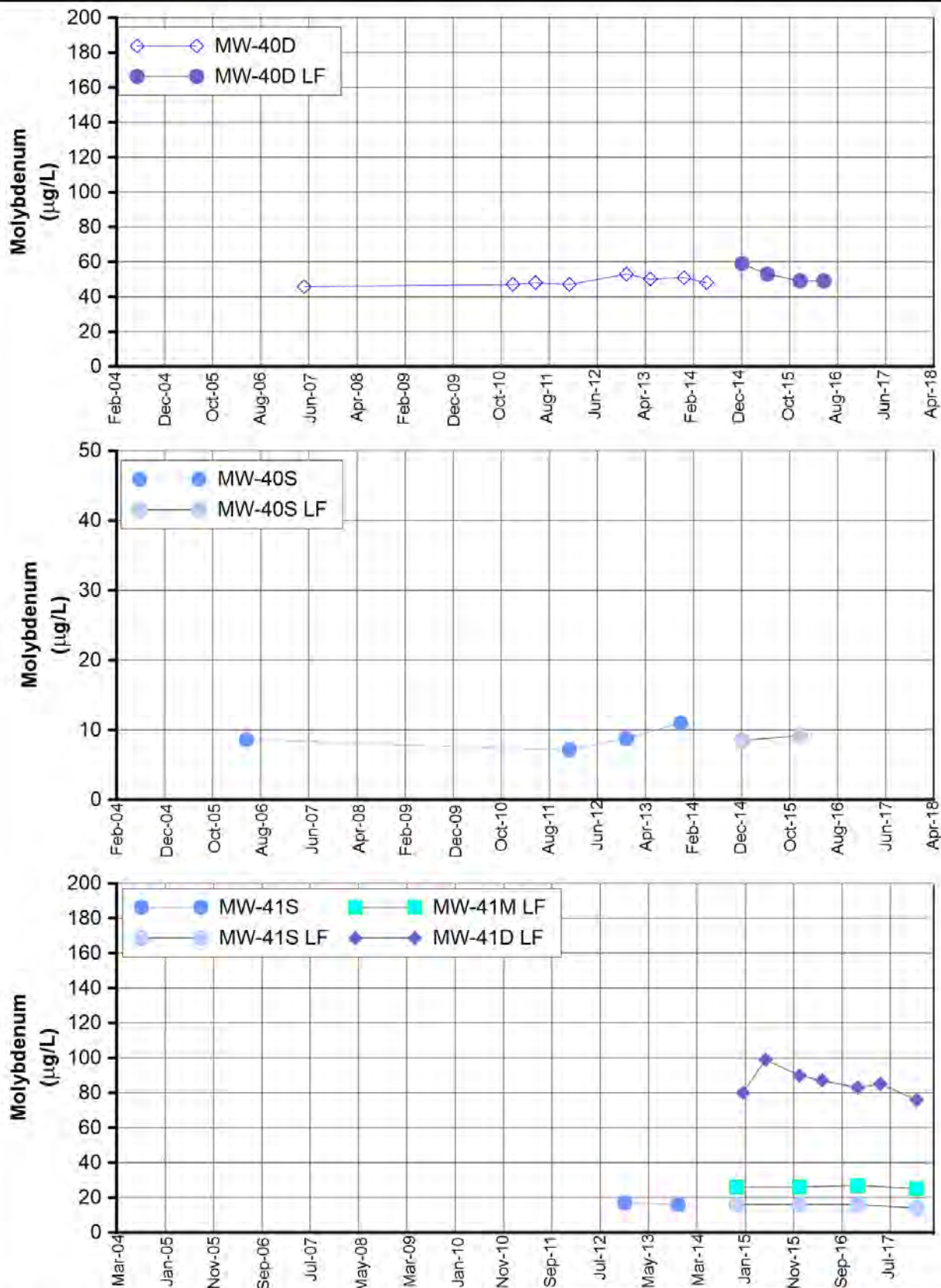
LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

**FIGURE C-27
MOLYBDENUM**

IN MW-37 AND MW-39 CLUSTERS

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





Notes:

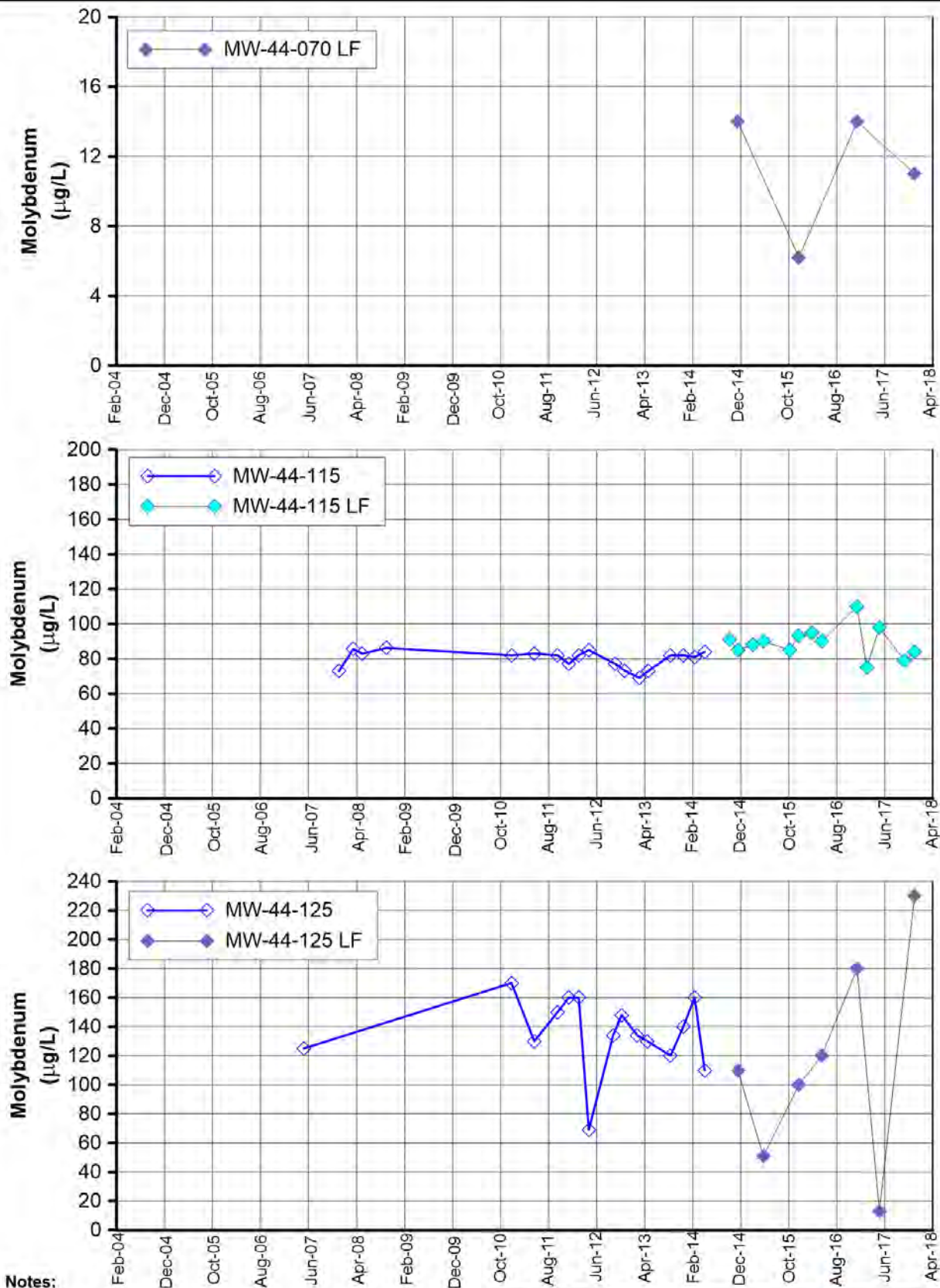
1. LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.
2. MW-40D and MW-40S were not sampled during 4th Quarter 2017 due to traffic control issues.

**FIGURE C-28
MOLYBDENUM**

IN MW-40 AND MW-41 CLUSTERS

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





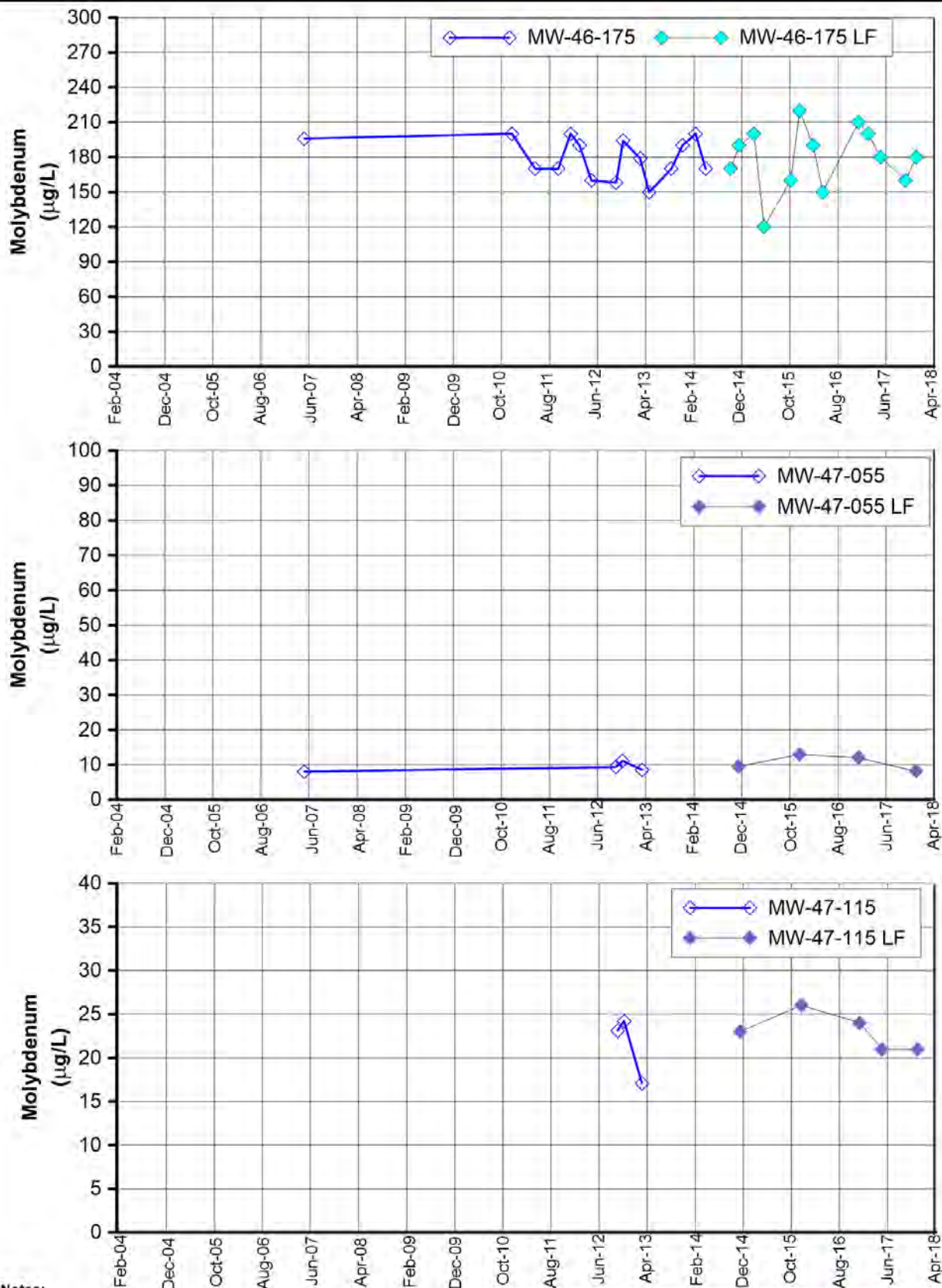
Notes:

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 C-29
MOLYBDENUM
IN MW-44 CLUSTER**

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





Notes:

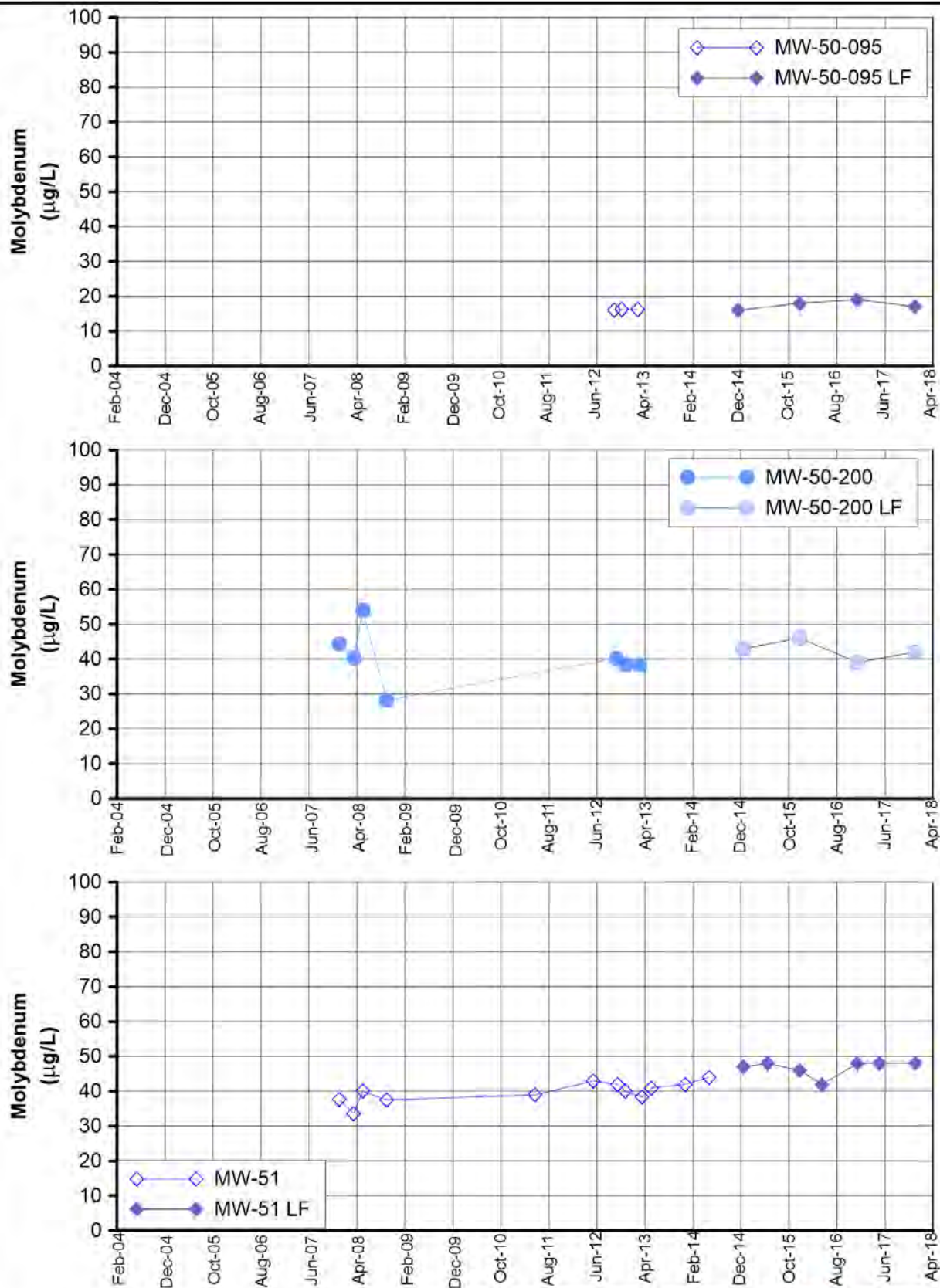
LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

**FIGURE C-30
MOLYBDENUM**

IN MW-46 AND MW-47 CLUSTERS

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





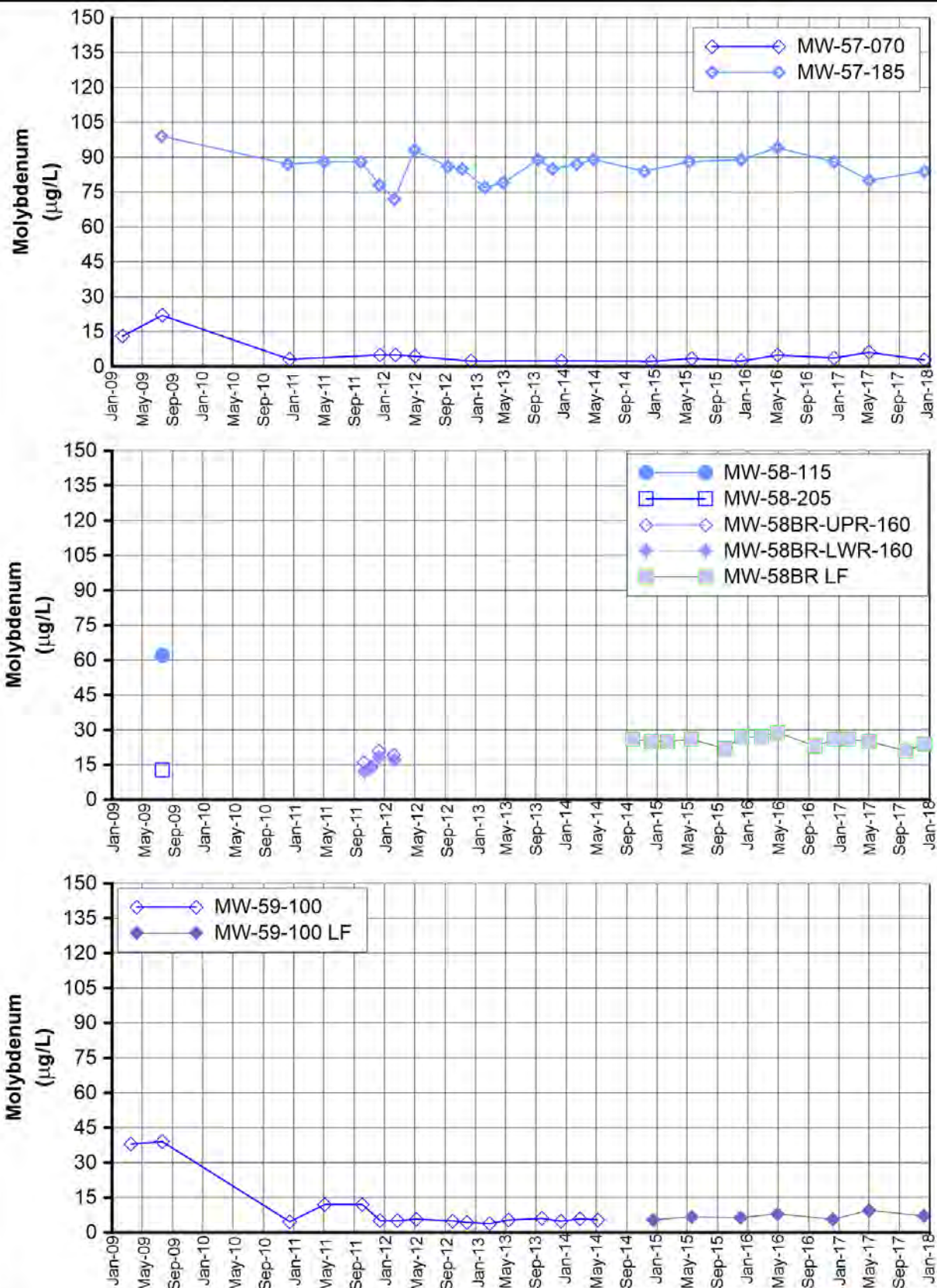
Notes:

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 C-31
MOLYBDENUM
IN MW-50 AND MW-51 CLUSTERS**



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



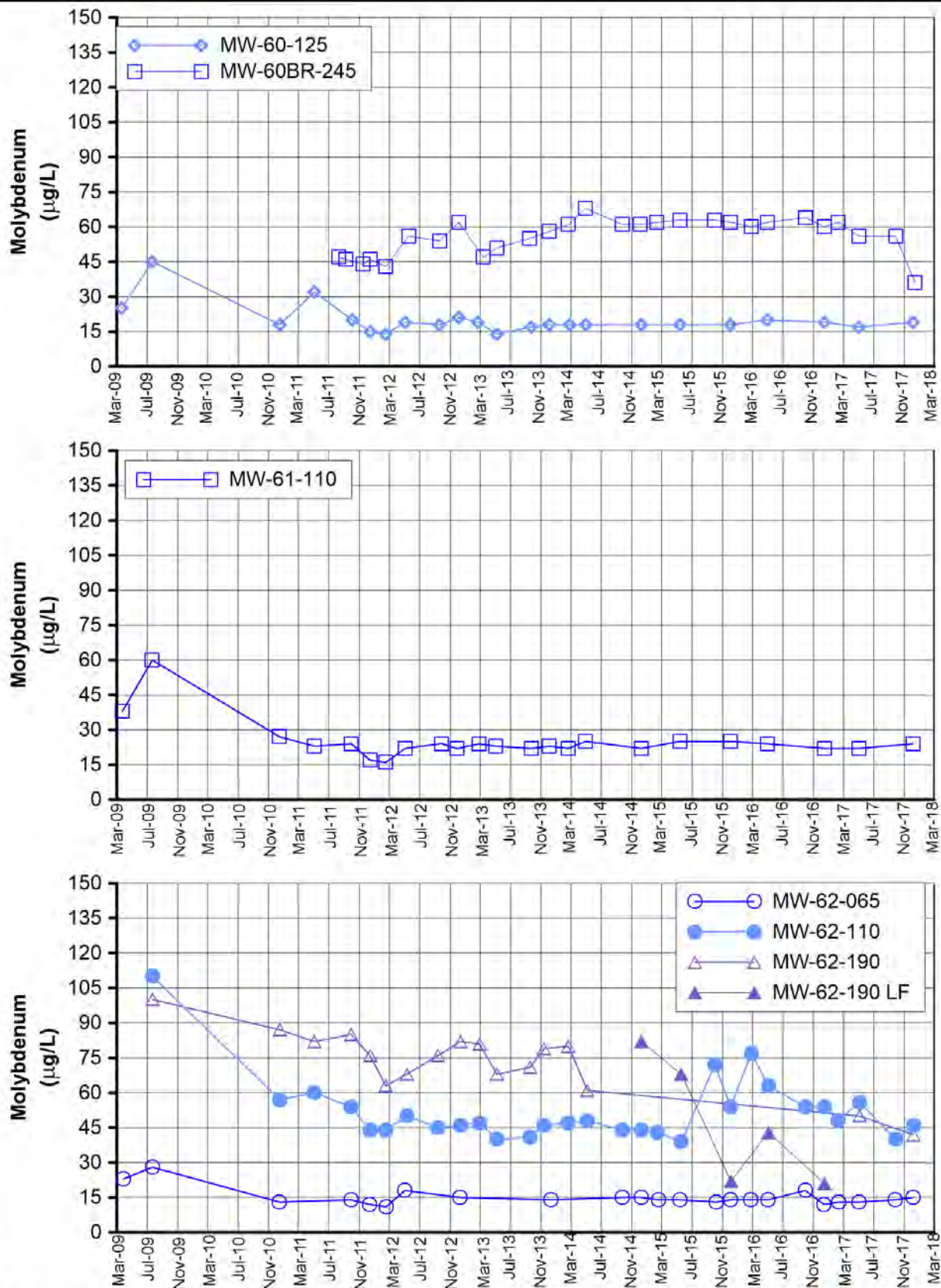
Note:

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

FIGURE C-32 MOLYBDENUM

IN MW-57 CLUSTER, MW-58 CLUSTER AND MW-59-100
FOURTH QUARTER 2017 AND ANNUAL 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.

- MW-60-125 sampled using LF method on 5/02/2017 & 12/06/2017.
- MW-62-065 sampled using LF method on 5/02/2017, 9/25/2017, & 12/06/2017.

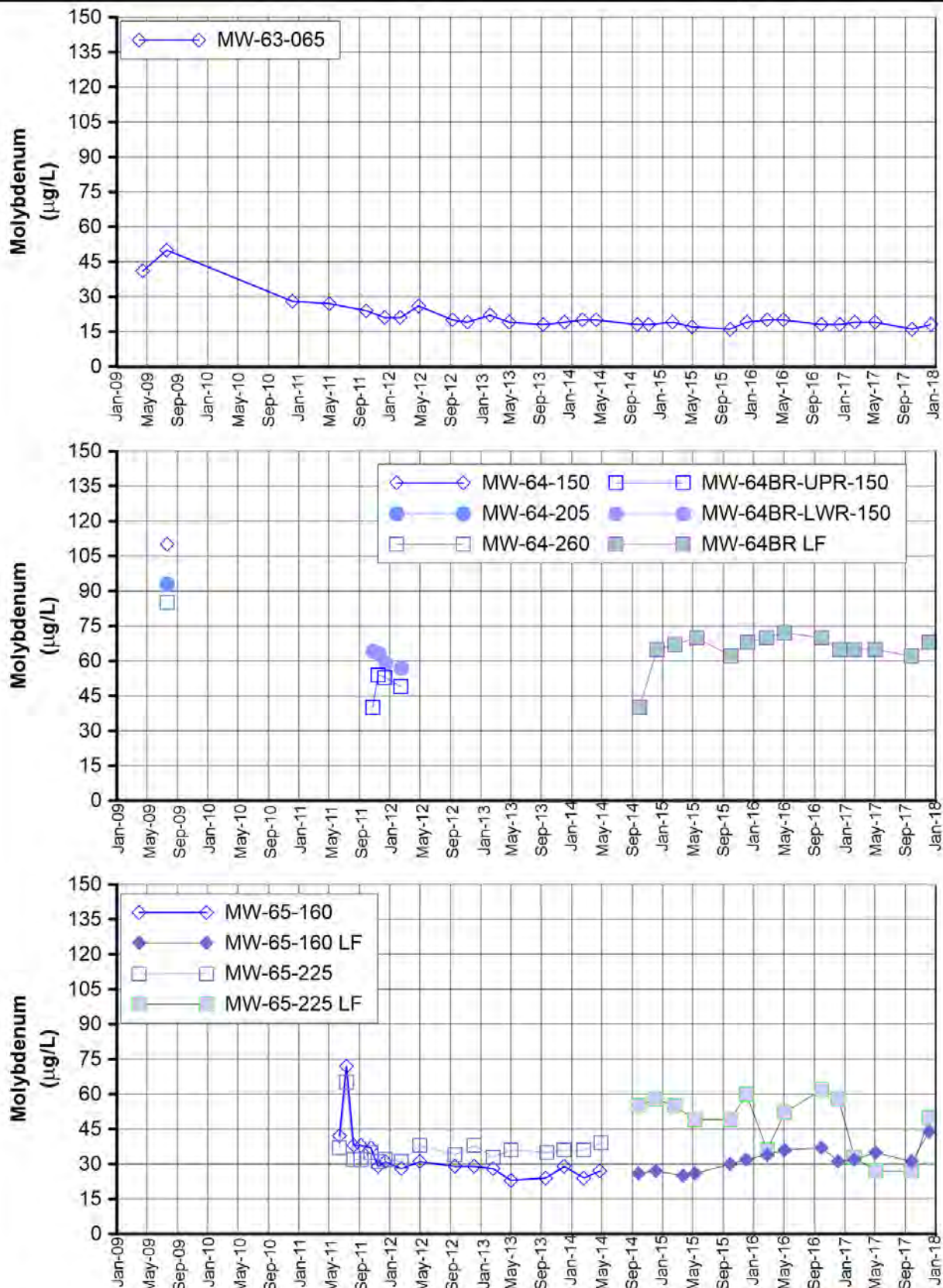
FIGURE C-33

MOLYBDENUM

IN MW-60 CLUSTER, MW-61-110, AND MW-62 CLUSTER

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





Notes:

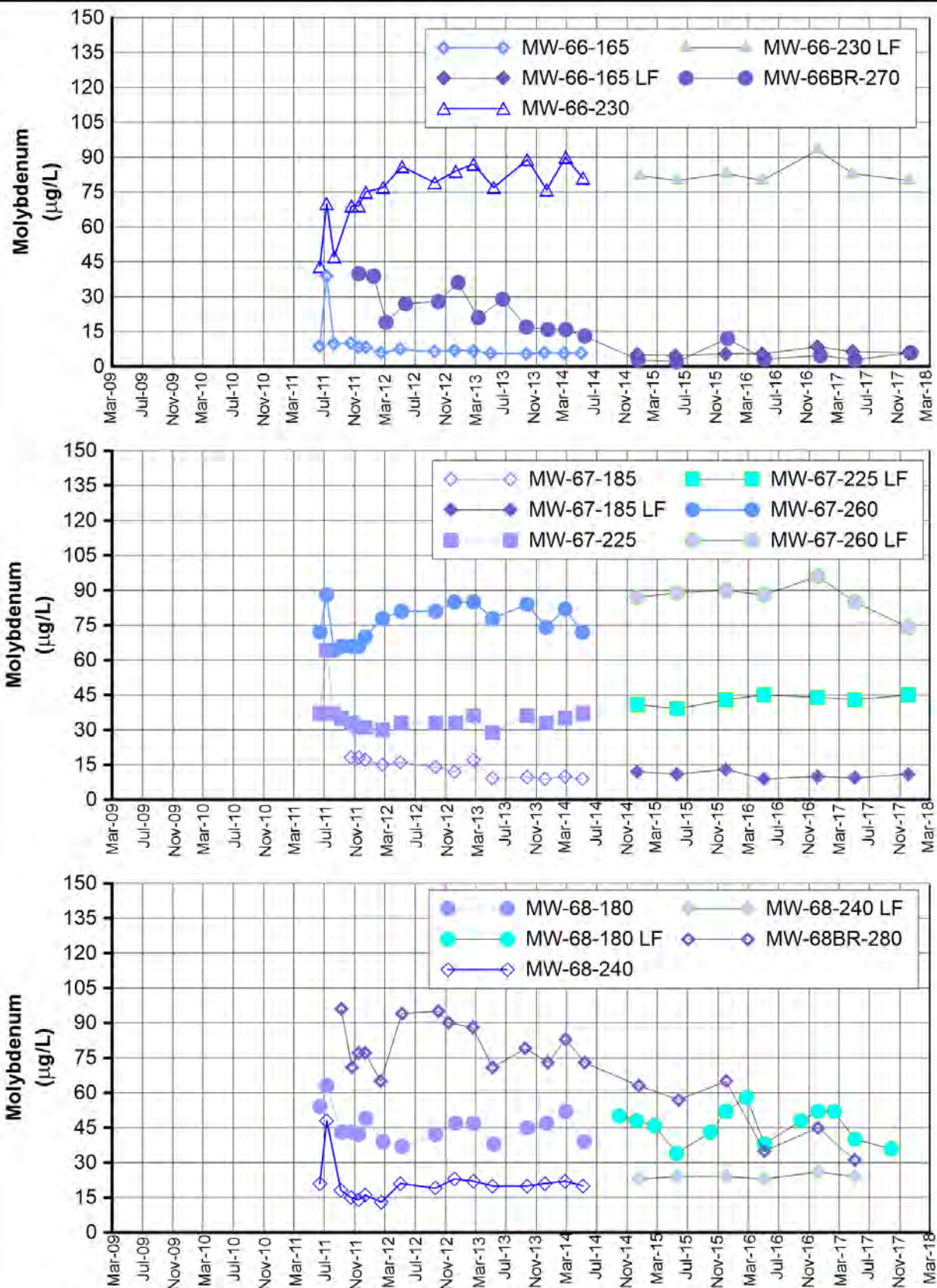
LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

1. MW-63-065 sampled using LF method on 5/02/2017, 9/28/2017, & 12/12/2017.

**FIGURE C-34
MOLYBDENUM**

IN MW-63-065, MW-64 CLUSTER AND MW-65 CLUSTER
FOURTH QUARTER 2017 AND ANNUAL INTERIM MEASURES
PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER
AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA





Notes:

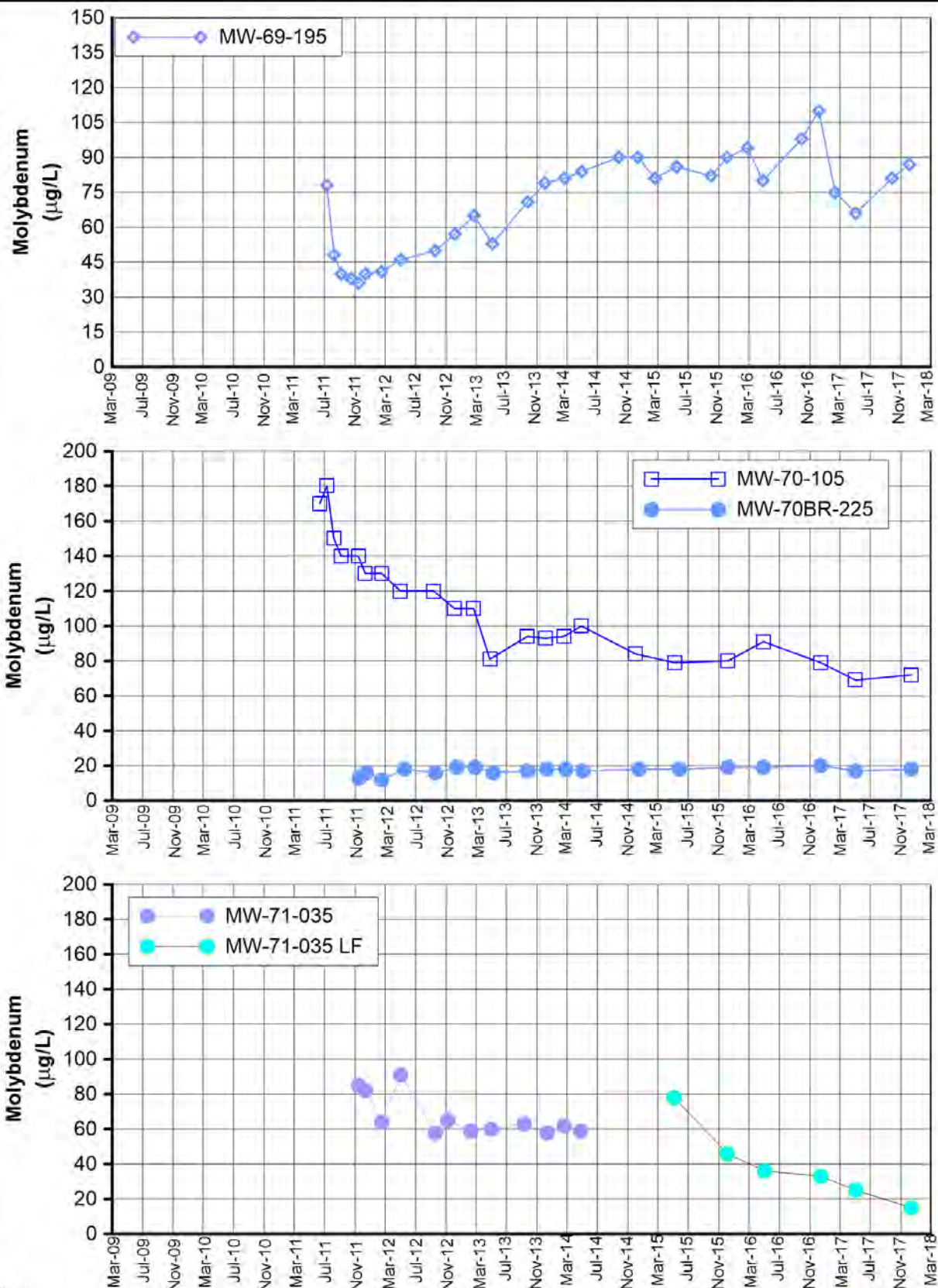
LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

**FIGURE C-35
MOLYBDENUM**

IN MW-66, MW-67, AND MW-68 CLUSTERS

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





Notes:

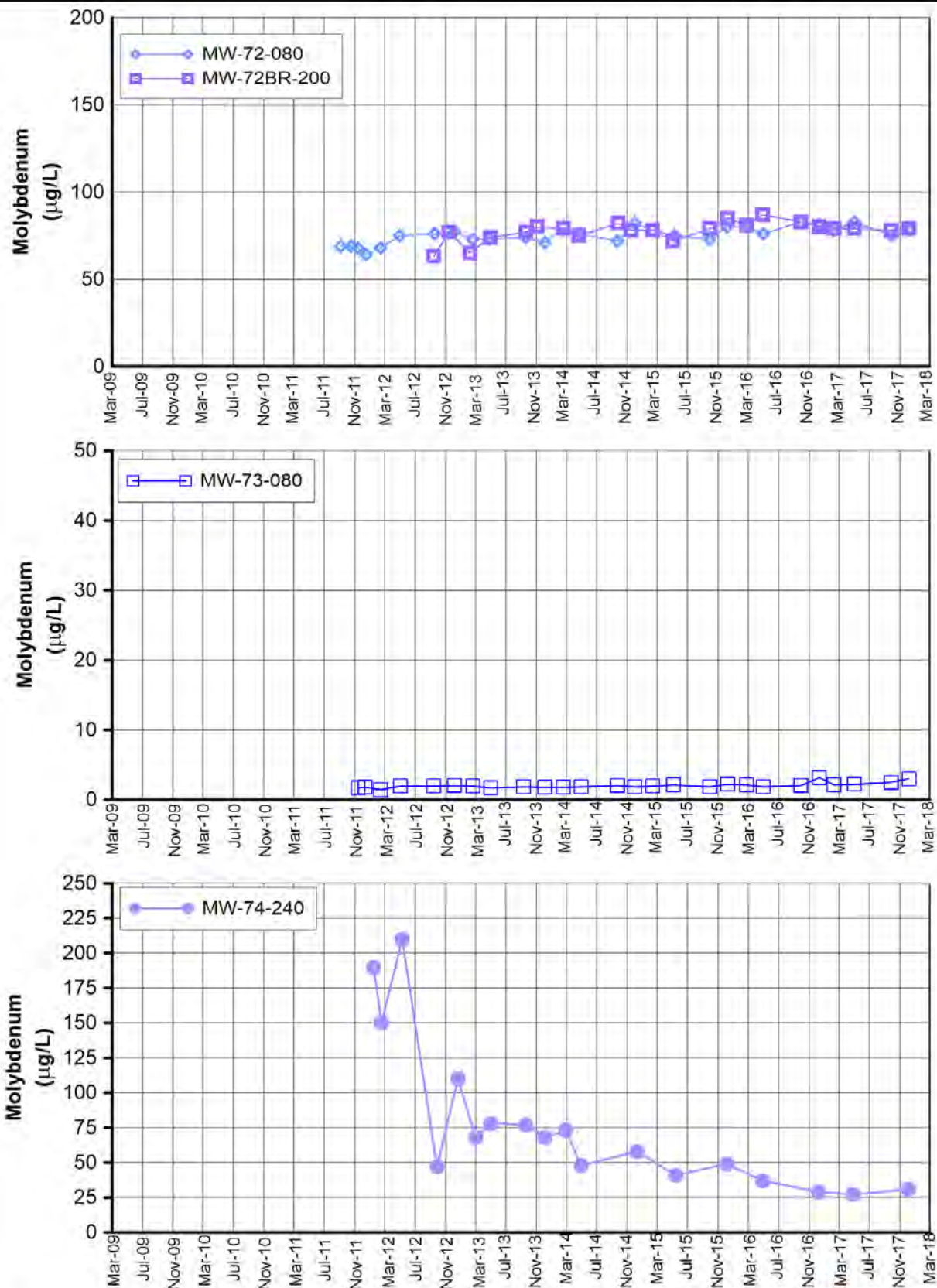
LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

1. MW-69-195 sampled using LF method on 2/09/2017, 5/03/2017, 9/26/2017, & 12/04/2017.
2. MW-70-105 sampled using LF method on 5/02/2017 & 12/11/2017.

**FIGURE C-36
MOLYBDENUM**

IN MW-69-195, THE MW-70 CLUSTER, AND MW-71-035
FOURTH QUARTER 2017 AND ANNUAL INTERIM MEASURES
PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER
AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA





Notes:

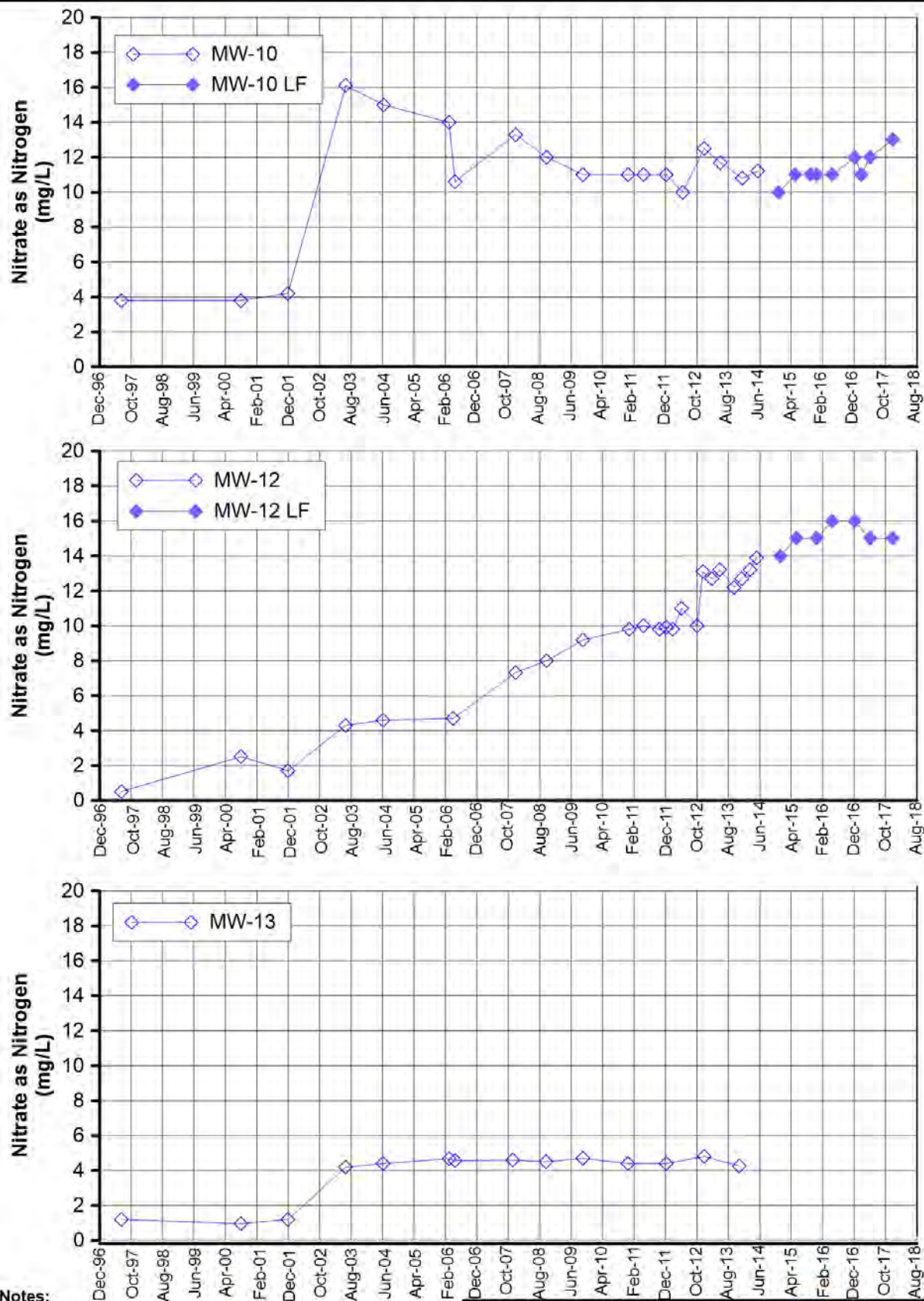
1. MW-72-080 sampled using low flow sampling method on 5/02/2017 & 12/07/2017.
2. MW-73-080 sampled using low flow sampling method on 5/02/2017, 9/27/2017, & 12/06/2017.
3. MW-74-240 sampled using low flow sampling method on 4/27/2017 & 12/06/2017.

**FIGURE C-37
MOLYBDENUM**

IN MW-72 CLUSTER, MW-73-080, AND MW-74-240

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





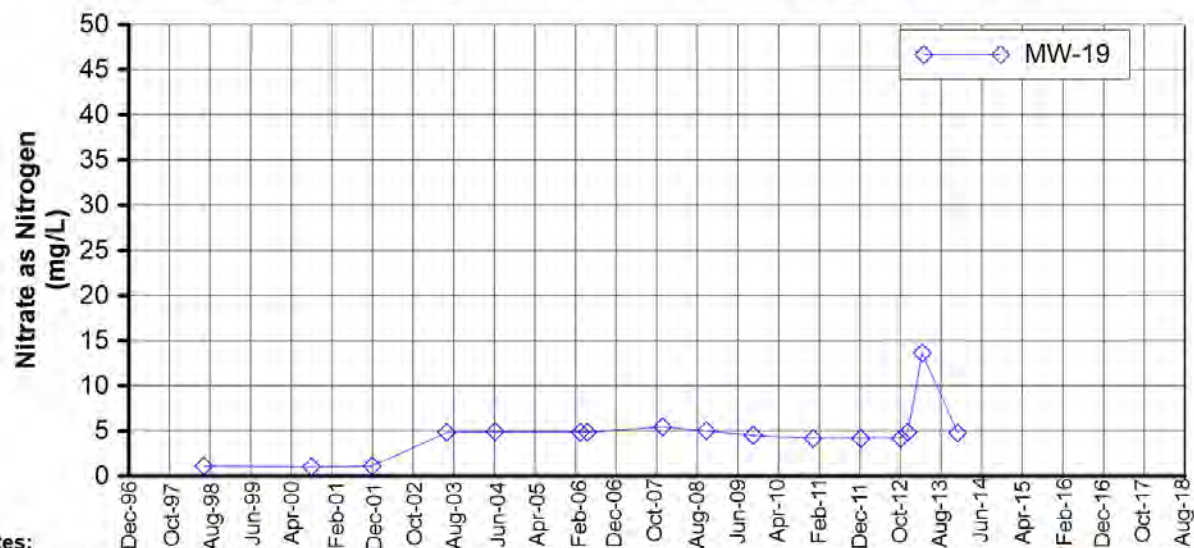
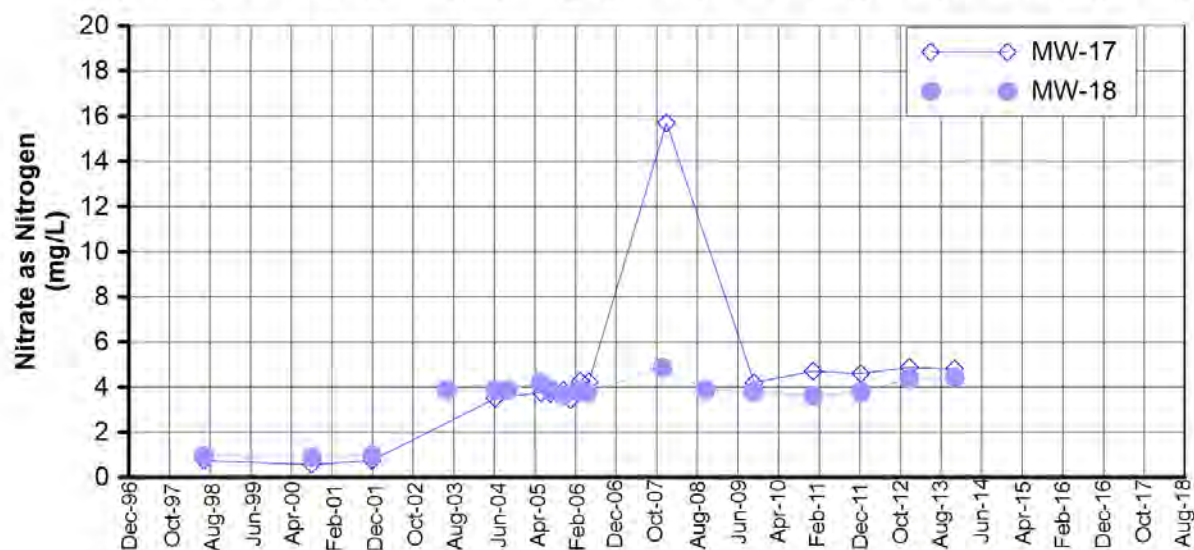
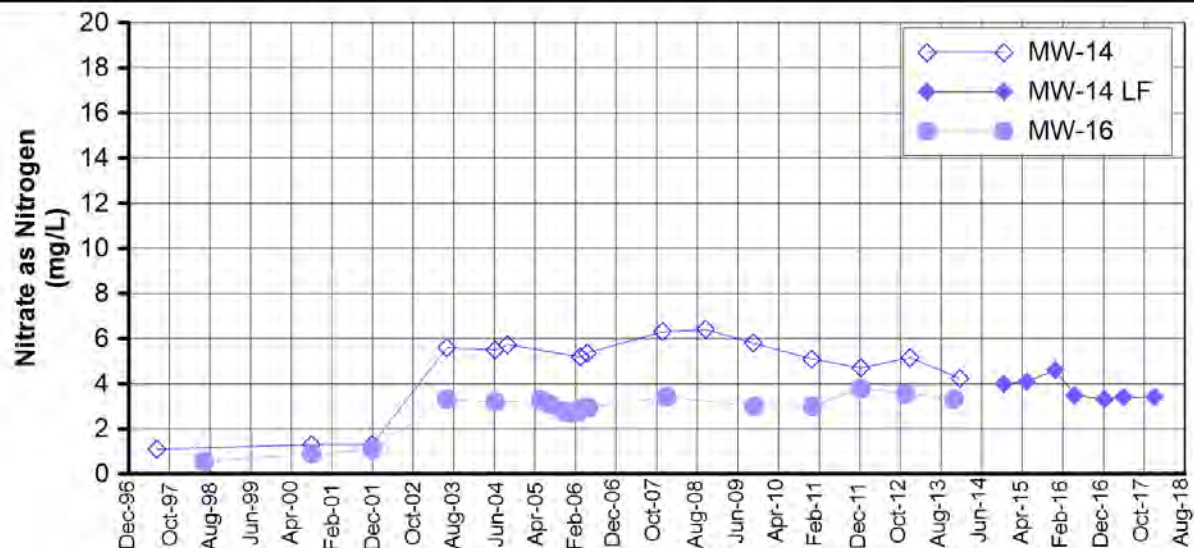
Notes:

1. Starting in Fourth Quarter 2012 nitrate samples were analyzed using method USEPA 353.2, which reports a combination of nitrate and nitrite. The contribution of nitrite to the reported result of nitrate plus nitrite as nitrogen is expected to be negligible; therefore, sample results for method USEPA 353.2 are expected to be essentially the same as previous samples analyzed using method USEPA 300.0 and reported as nitrate as nitrogen.
2. 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 C-38
NITRATE as NITROGEN
IN MW-10, MW-12, AND MW-13**

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



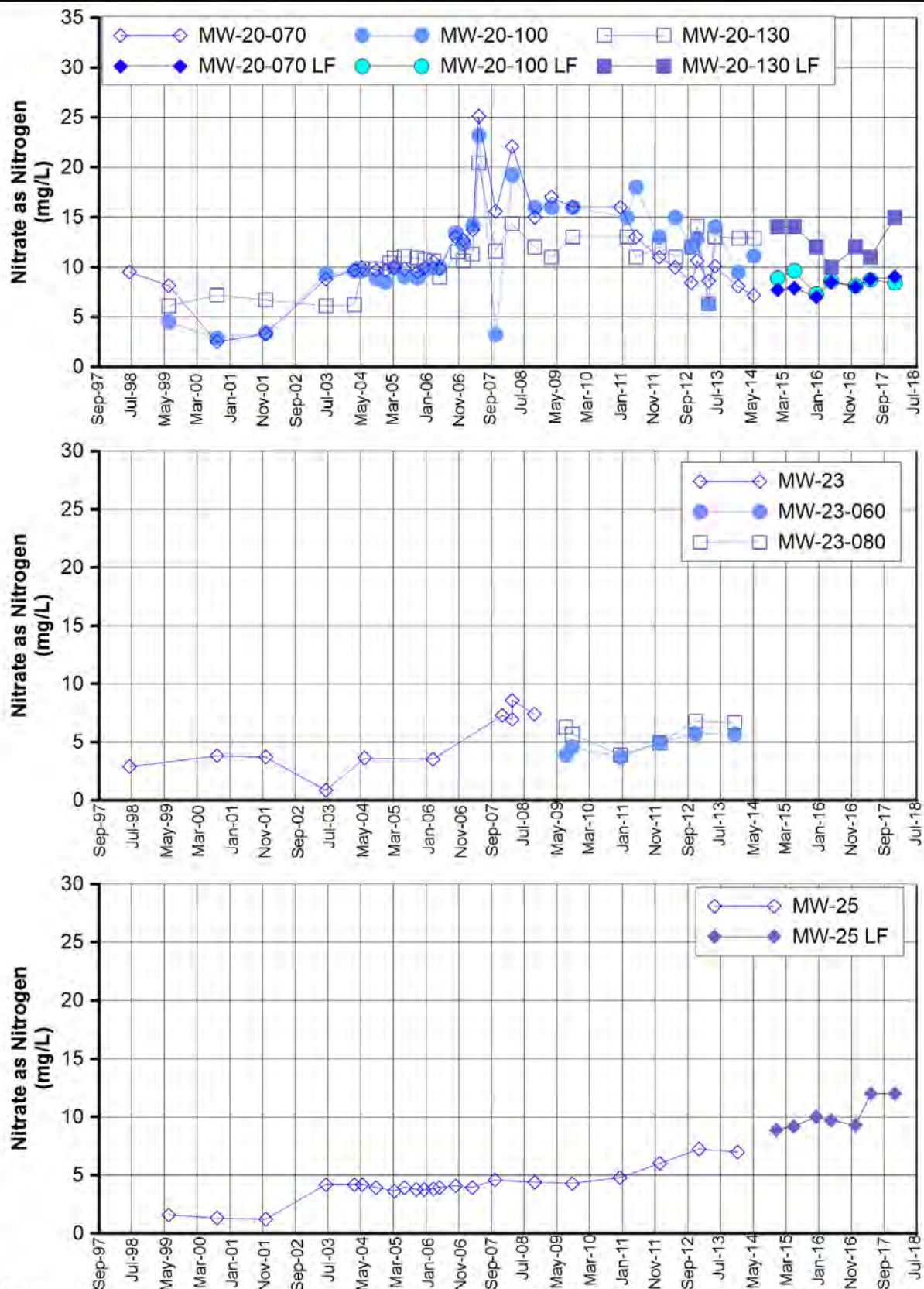


Notes:

1. Starting in Fourth Quarter 2012 nitrate samples were analyzed using method USEPA 353.2, which reports a combination of nitrate and nitrite. The contribution of nitrite to the reported result of nitrate plus nitrite as nitrogen is expected to be negligible; therefore, sample results for method USEPA 353.2 are expected to be essentially the same as previous samples analyzed using method USEPA 300.0 and reported as nitrate as nitrogen.
2. 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 C-39
NITRATE as NITROGEN
IN MW-14, MW-16, MW-17, MW-18, AND MW-19
 FOURTH QUARTER 2017 AND ANNUAL INTERIM MEASURES
 PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER
 AND SURFACE WATER MONITORING REPORT,
 PG&E TOPOCK COMPRESSOR STATION,
 NEEDLES, CALIFORNIA





Notes:

1. Starting in Fourth Quarter 2012 nitrate samples were analyzed using method USEPA 353.2, which reports a combination of nitrate and nitrite. The contribution of nitrite to the reported result of nitrate plus nitrite as nitrogen is expected to be negligible; therefore, sample results for method USEPA 353.2 are expected to be essentially the same as previous samples analyzed using method USEPA 300.0 and reported as nitrate as nitrogen.
2. 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.

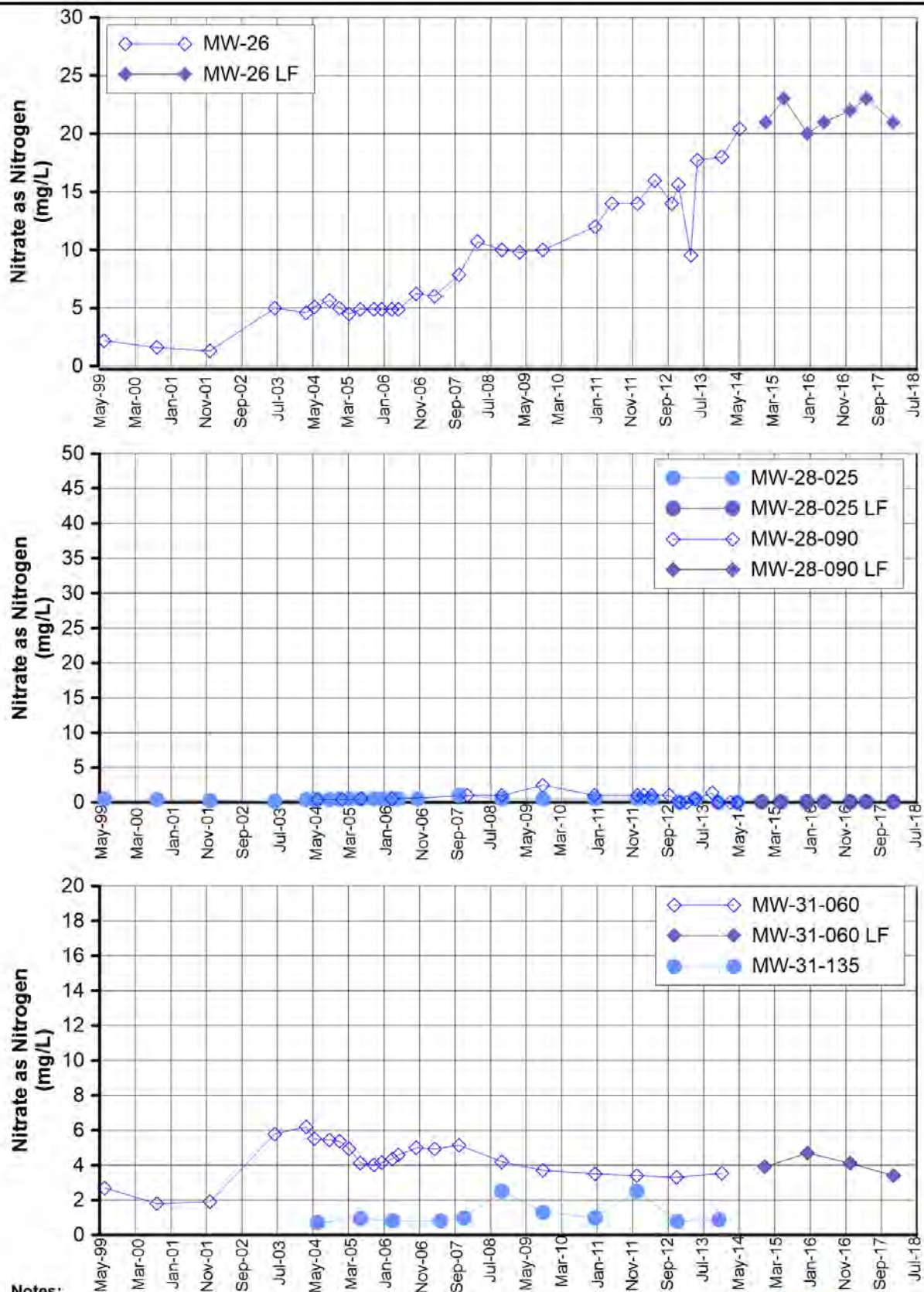
FIGURE C-40

NITRATE as NITROGEN

IN MW-20, MW-23, AND MW-25 CLUSTERS

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





Notes:

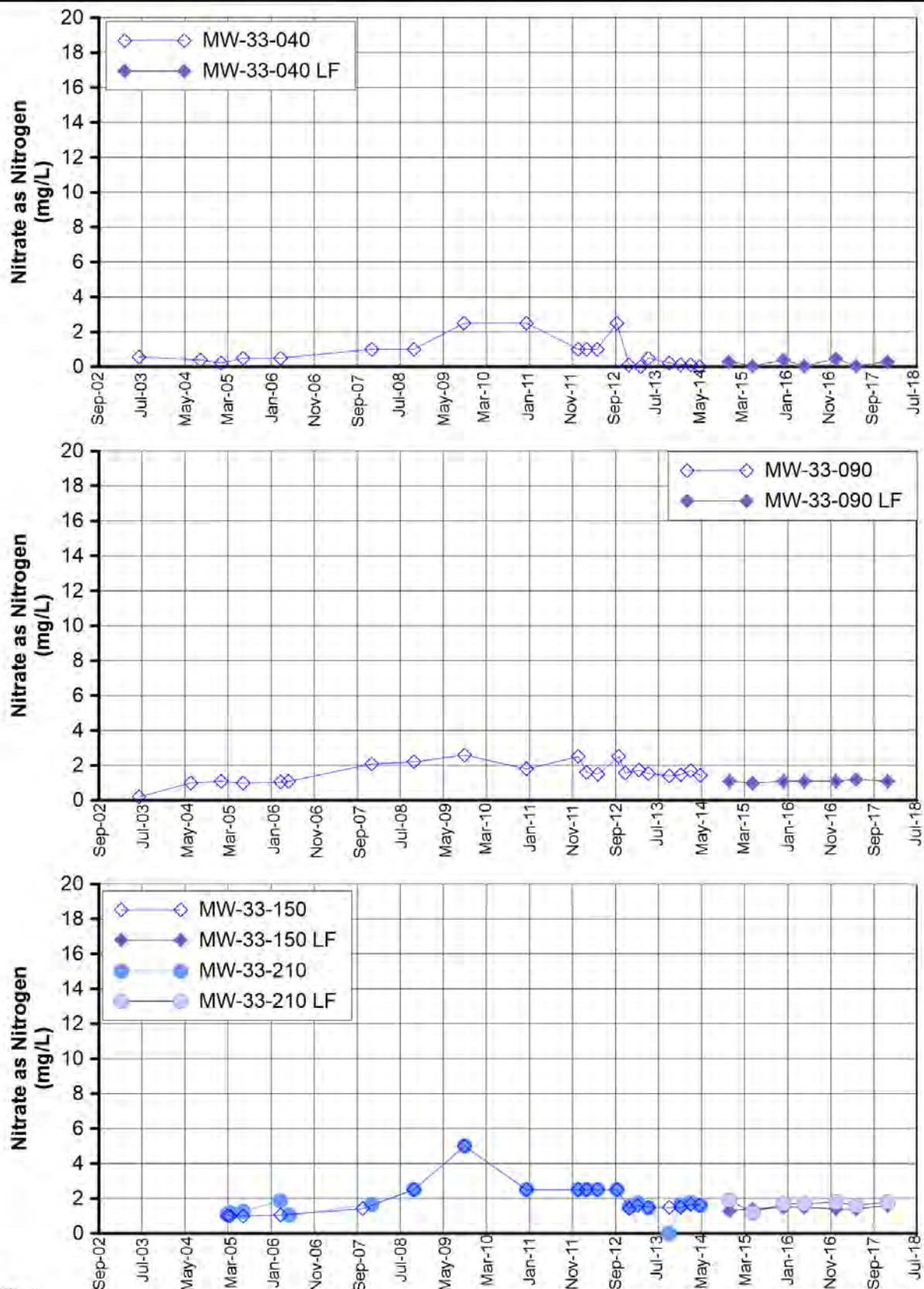
- Starting in Fourth Quarter 2012 nitrate samples were analyzed using method USEPA 353.2, which reports a combination of nitrate and nitrite. The contribution of nitrite to the reported result of nitrate plus nitrite as nitrogen is expected to be negligible; therefore, sample results for method USEPA 353.2 are expected to be essentially the same as previous samples analyzed using method USEPA 300.0 and reported as nitrate as nitrogen.
- 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 C-41
NITRATE as NITROGEN**

IN MW-26, MW-28, AND MW-31 CLUSTERS

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





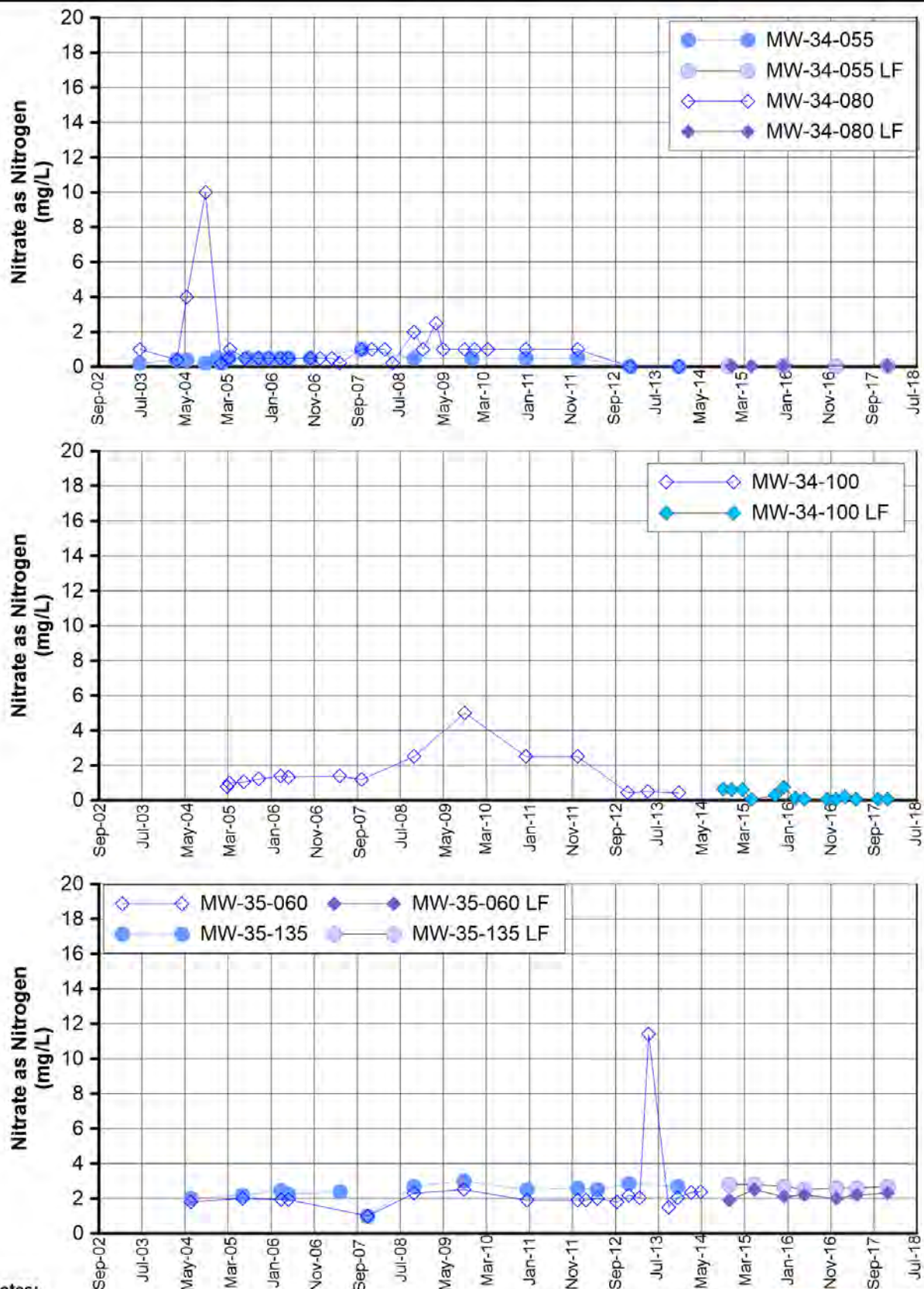
Notes:

- Starting in Fourth Quarter 2012 nitrate samples were analyzed using method USEPA 353.2, which reports a combination of nitrate and nitrite. The contribution of nitrite to the reported result of nitrate plus nitrite as nitrogen is expected to be negligible; therefore, sample results for method USEPA 353.2 are expected to be essentially the same as previous samples analyzed using method USEPA 300.0 and reported as nitrate as nitrogen.
- 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 C-42
NITRATE as NITROGEN
IN MW-33 CLUSTER**



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



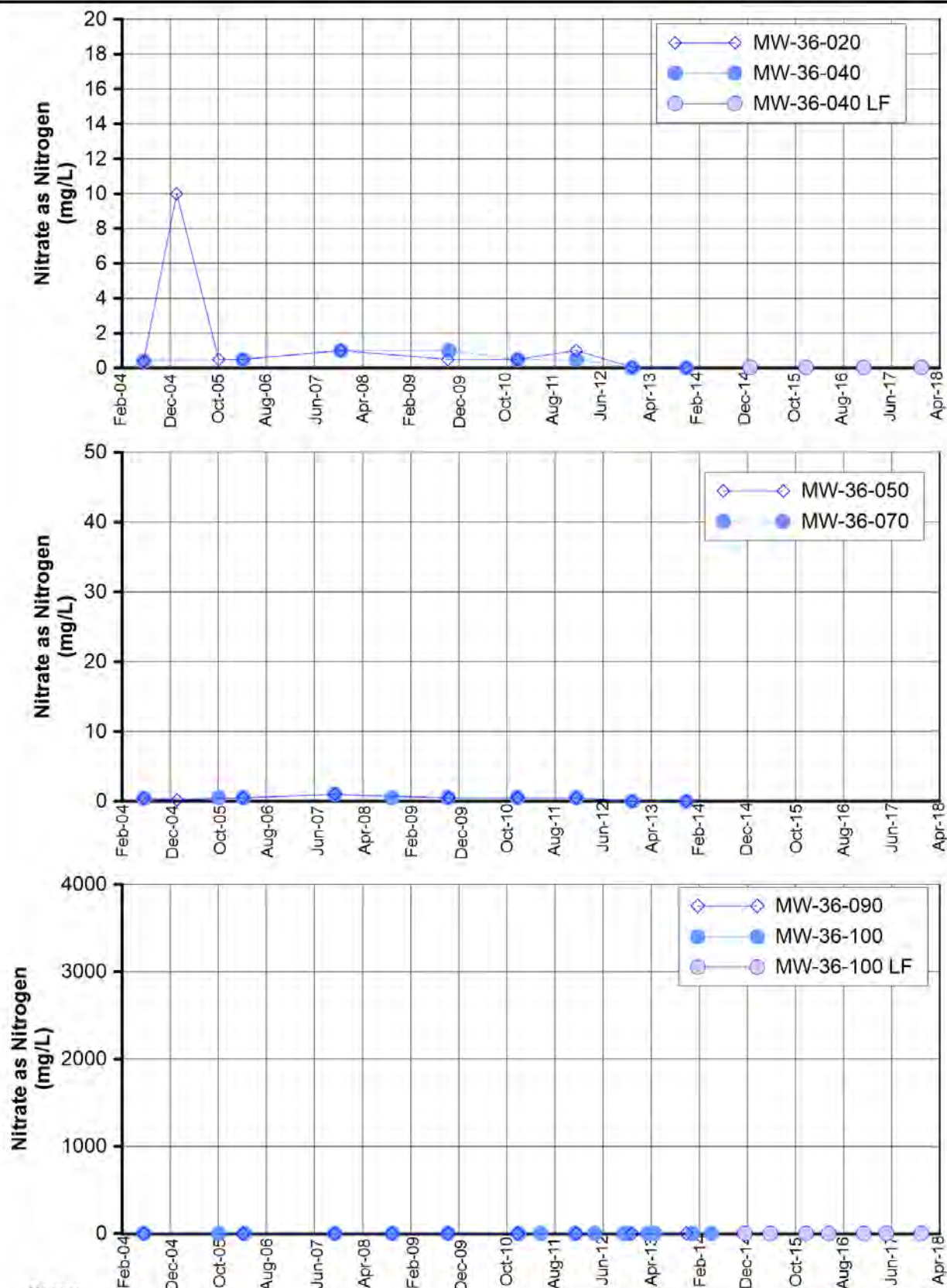
Notes:

1. Starting in Fourth Quarter 2012 nitrate samples were analyzed using method USEPA 353.2, which reports a combination of nitrate and nitrite. The contribution of nitrite to the reported result of nitrate plus nitrite as nitrogen is expected to be negligible; therefore, sample results for method USEPA 353.2 are expected to be essentially the same as previous samples analyzed using method USEPA 300.0 and reported as nitrate as nitrogen.
2. 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 C-43
NITRATE as NITROGEN
IN MW-34 AND MW-35 CLUSTERS**

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





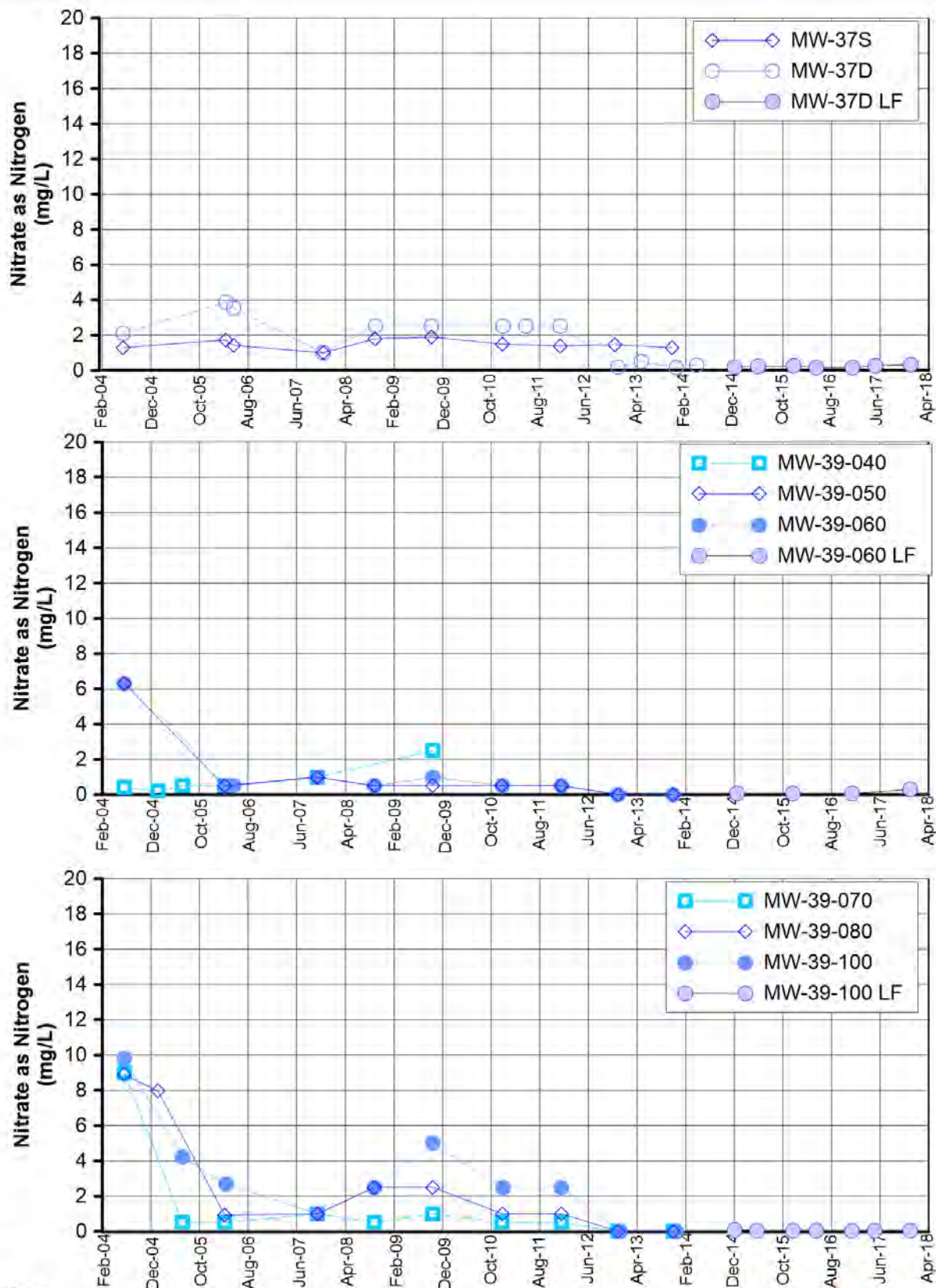
Notes:

1. Starting in Fourth Quarter 2012 nitrate samples were analyzed using method USEPA 353.2, which reports a combination of nitrate and nitrite. The contribution of nitrite to the reported result of nitrate plus nitrite as nitrogen is expected to be negligible; therefore, sample results for method USEPA 353.2 are expected to be essentially the same as previous samples analyzed using method USEPA 300.0 and reported as nitrate as nitrogen.
2. 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 C-44
NITRATE as NITROGEN
IN MW-36 CLUSTER

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





Notes:

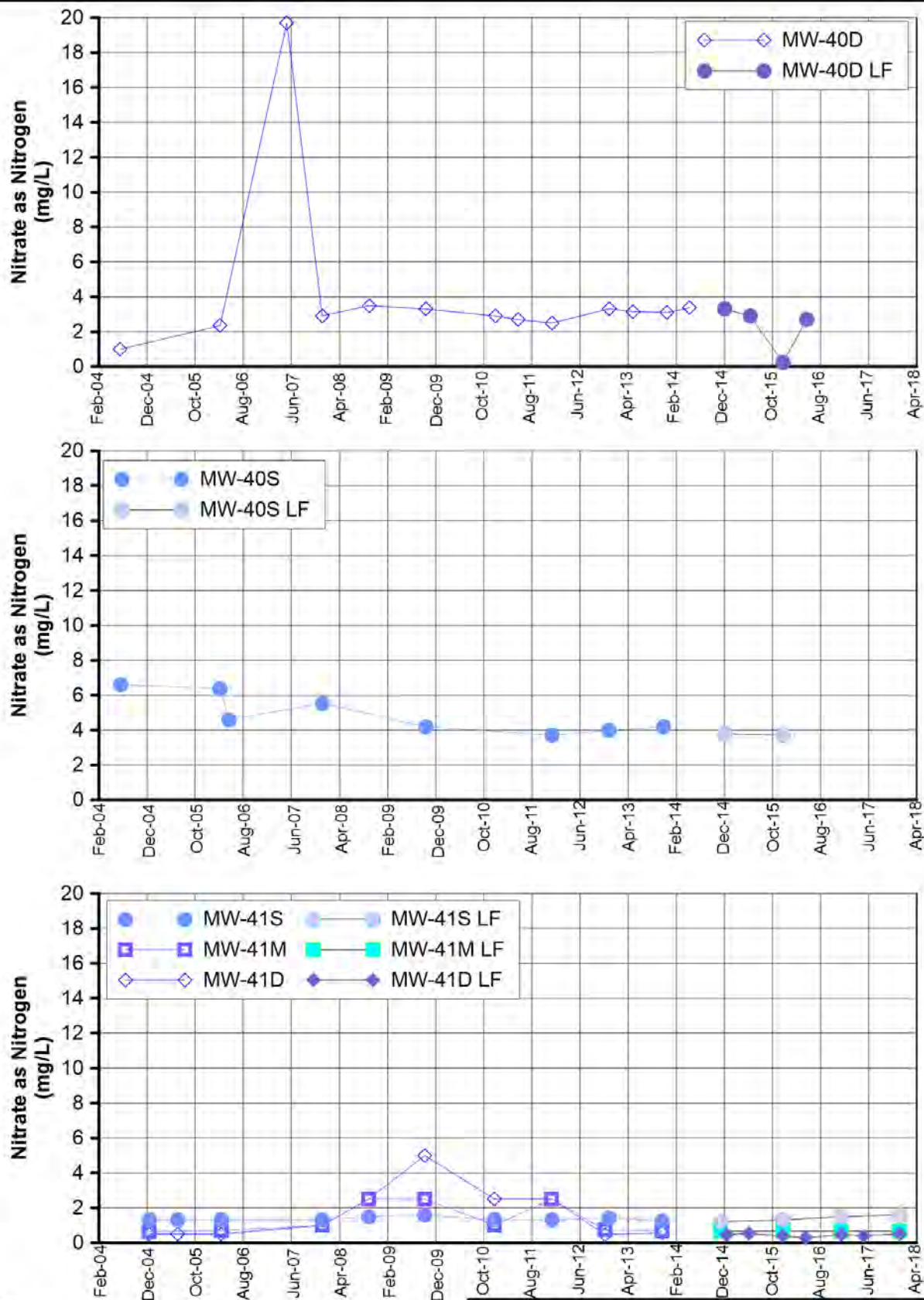
1. Starting in Fourth Quarter 2012 nitrate samples were analyzed using method USEPA 353.2, which reports a combination of nitrate and nitrite. The contribution of nitrite to the reported result of nitrate plus nitrite as nitrogen is expected to be negligible; therefore, sample results for method USEPA 353.2 are expected to be essentially the same as previous samples analyzed using method USEPA 300.0 and reported as nitrate as nitrogen.
2. 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 C-45

**NITRATE as NITROGEN
IN MW-37 AND MW-39 CLUSTERS**

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





Notes:

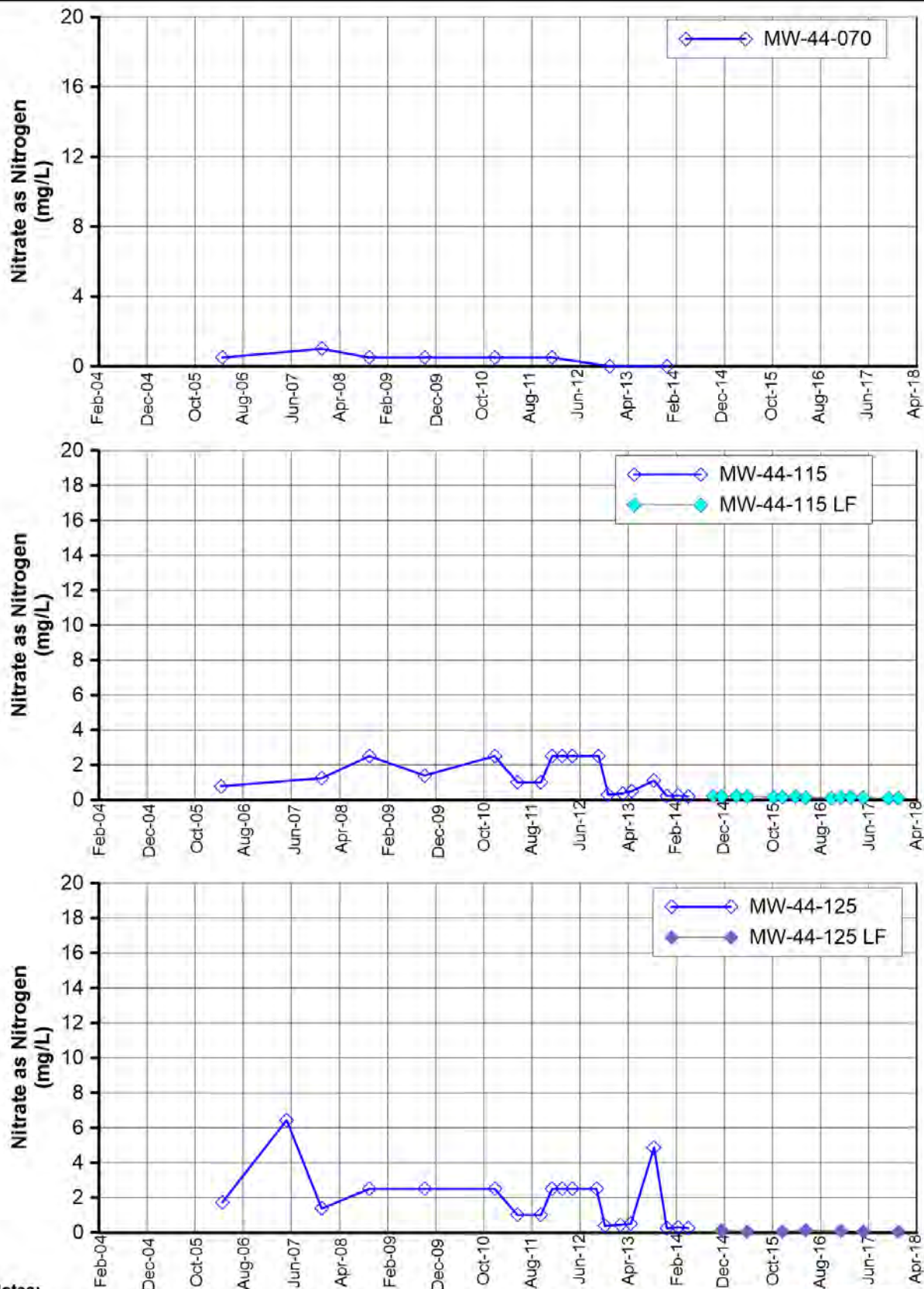
- Starting in Fourth Quarter 2012 nitrate samples were analyzed using method USEPA 353.2, which reports a combination of nitrate and nitrite. The contribution of nitrite to the reported result of nitrate plus nitrite as nitrogen is expected to be negligible; therefore, sample results for method USEPA 353.2 are expected to be essentially the same as previous samples analyzed using method USEPA 300.0 and reported as nitrite as nitrogen.
- 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.
- MW-40D and MW-40S were not sampled during 4th Quarter 2017 due to traffic control issues.

FIGURE C-46

NITRATE as NITROGEN IN MW-40 AND MW-41 CLUSTERS

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





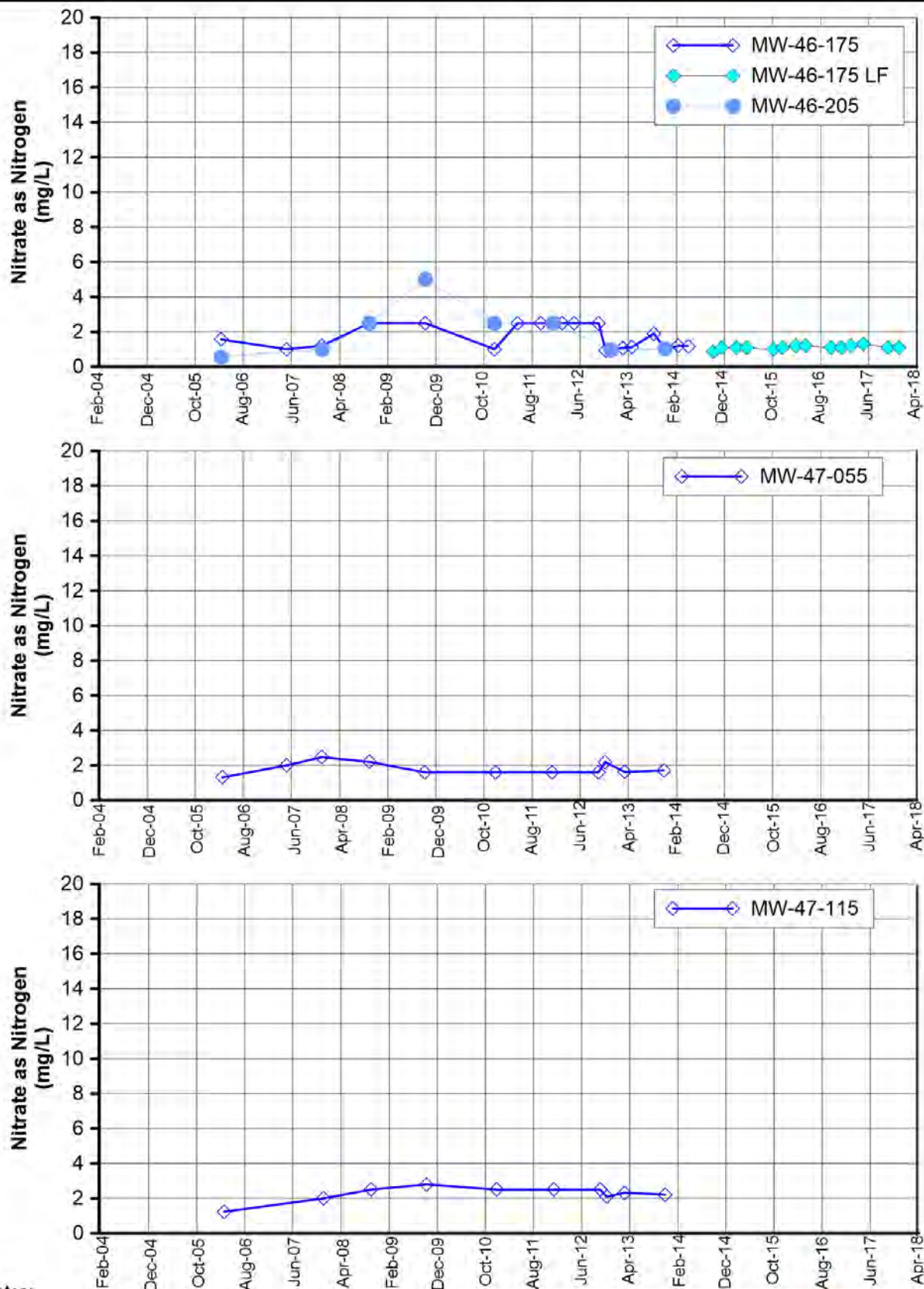
Notes:

1. Starting in Fourth Quarter 2012 nitrate samples were analyzed using method USEPA 353.2, which reports a combination of nitrate and nitrite. The contribution of nitrite to the reported result of nitrate plus nitrite as nitrogen is expected to be negligible; therefore, sample results for method USEPA 353.2 are expected to be essentially the same as previous samples analyzed using method USEPA 300.0 and reported as nitrate as nitrogen.
2. 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 C-47
NITRATE as NITROGEN
IN MW-44 CLUSTER**

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





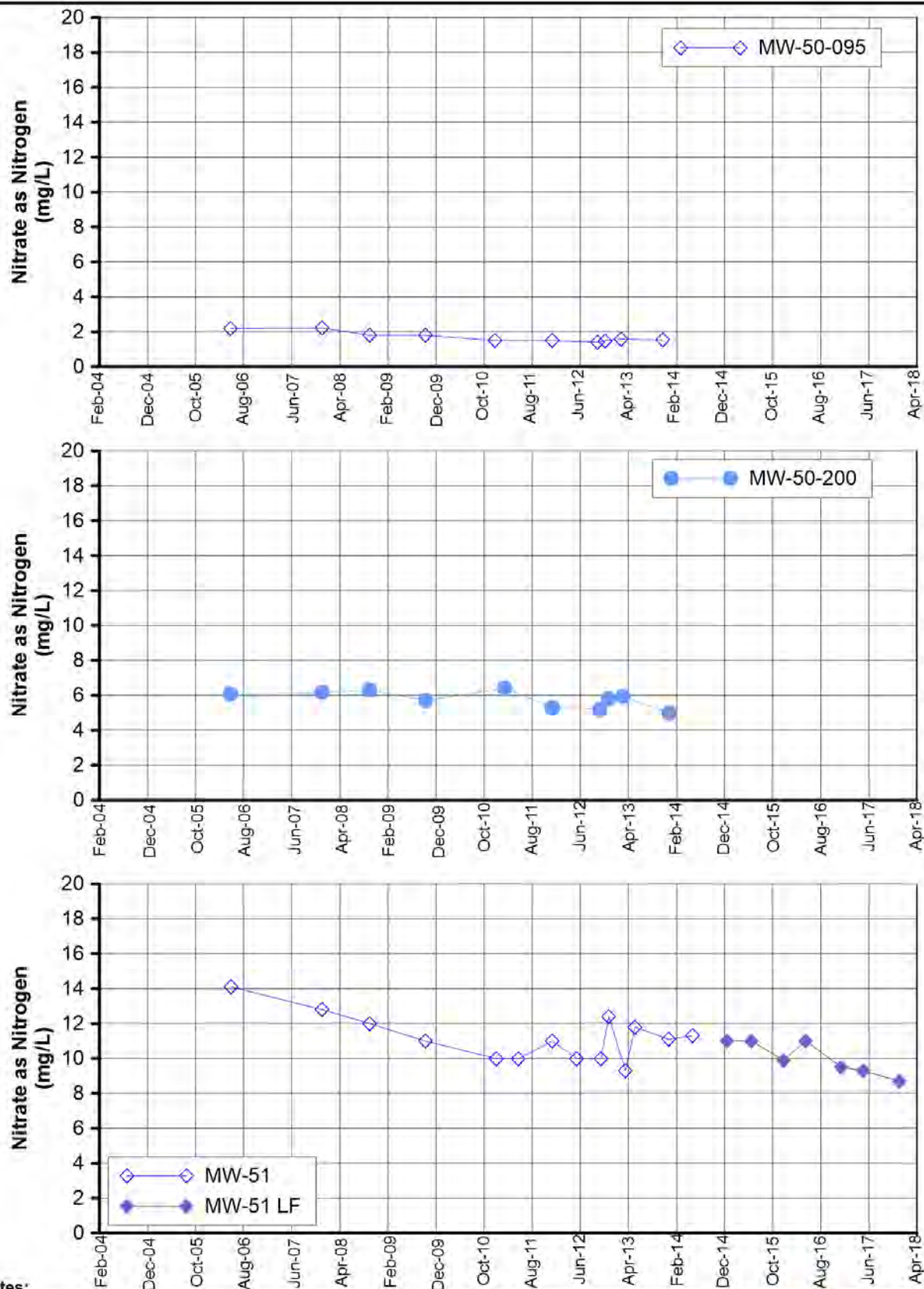
Notes:

1. Starting in Fourth Quarter 2012 nitrate samples were analyzed using method USEPA 353.2, which reports a combination of nitrate and nitrite. The contribution of nitrite to the reported result of nitrate plus nitrite as nitrogen is expected to be negligible; therefore, sample results for method USEPA 353.2 are expected to be essentially the same as previous samples analyzed using method USEPA 300.0 and reported as nitrate as nitrogen.
2. 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 C-48
NITRATE as NITROGEN
IN MW-46 AND MW-47 CLUSTERS

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





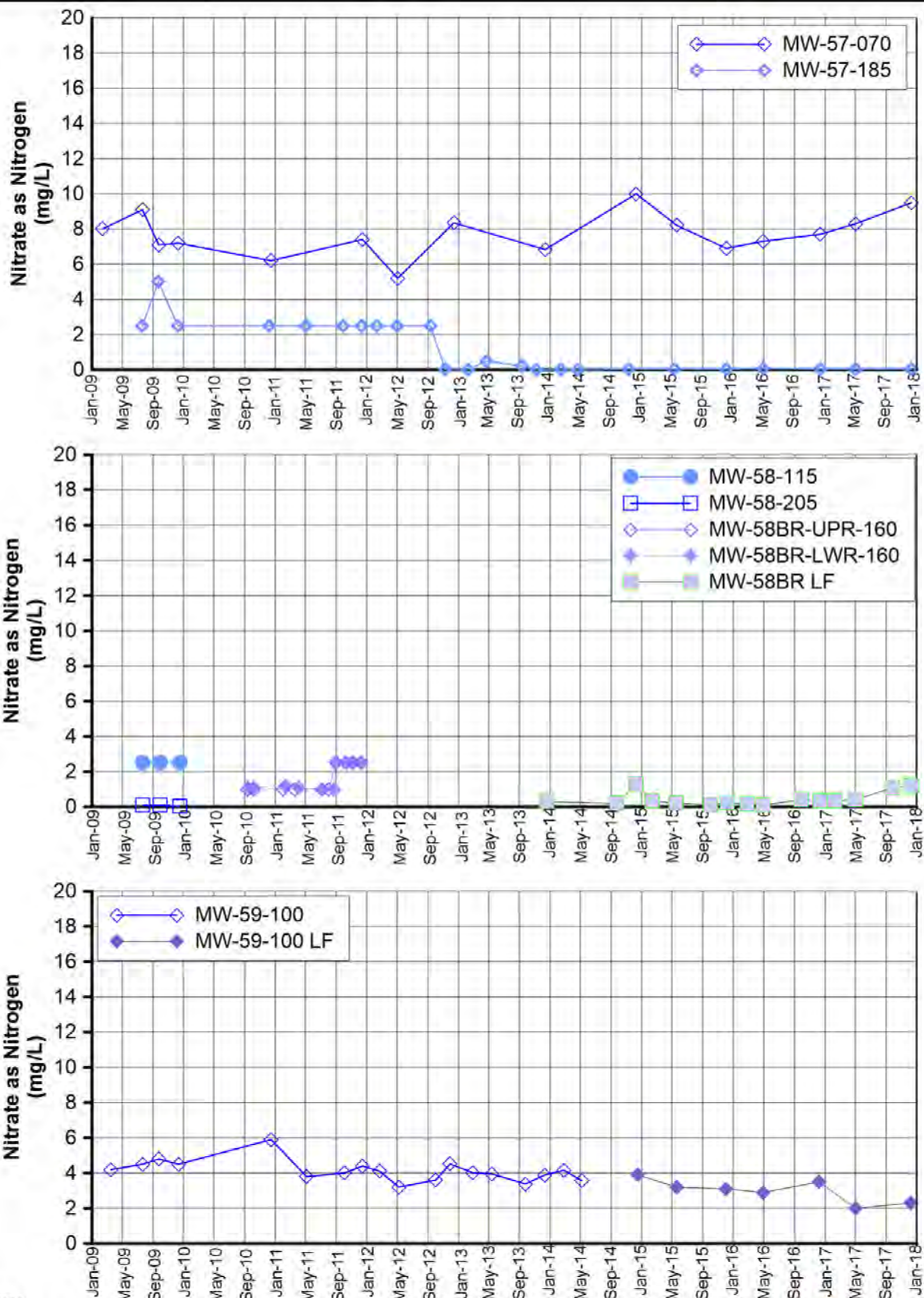
Notes:

1. Starting in Fourth Quarter 2012 nitrate samples were analyzed using method USEPA 353.2, which reports a combination of nitrate and nitrite. The contribution of nitrite to the reported result of nitrate plus nitrite as nitrogen is expected to be negligible; therefore, sample results for method USEPA 353.2 are expected to be essentially the same as previous samples analyzed using method USEPA 300.0 and reported as nitrate as nitrogen.
2. 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 C-49
NITRATE as NITROGEN
IN MW-50 AND MW-51 CLUSTERS**

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



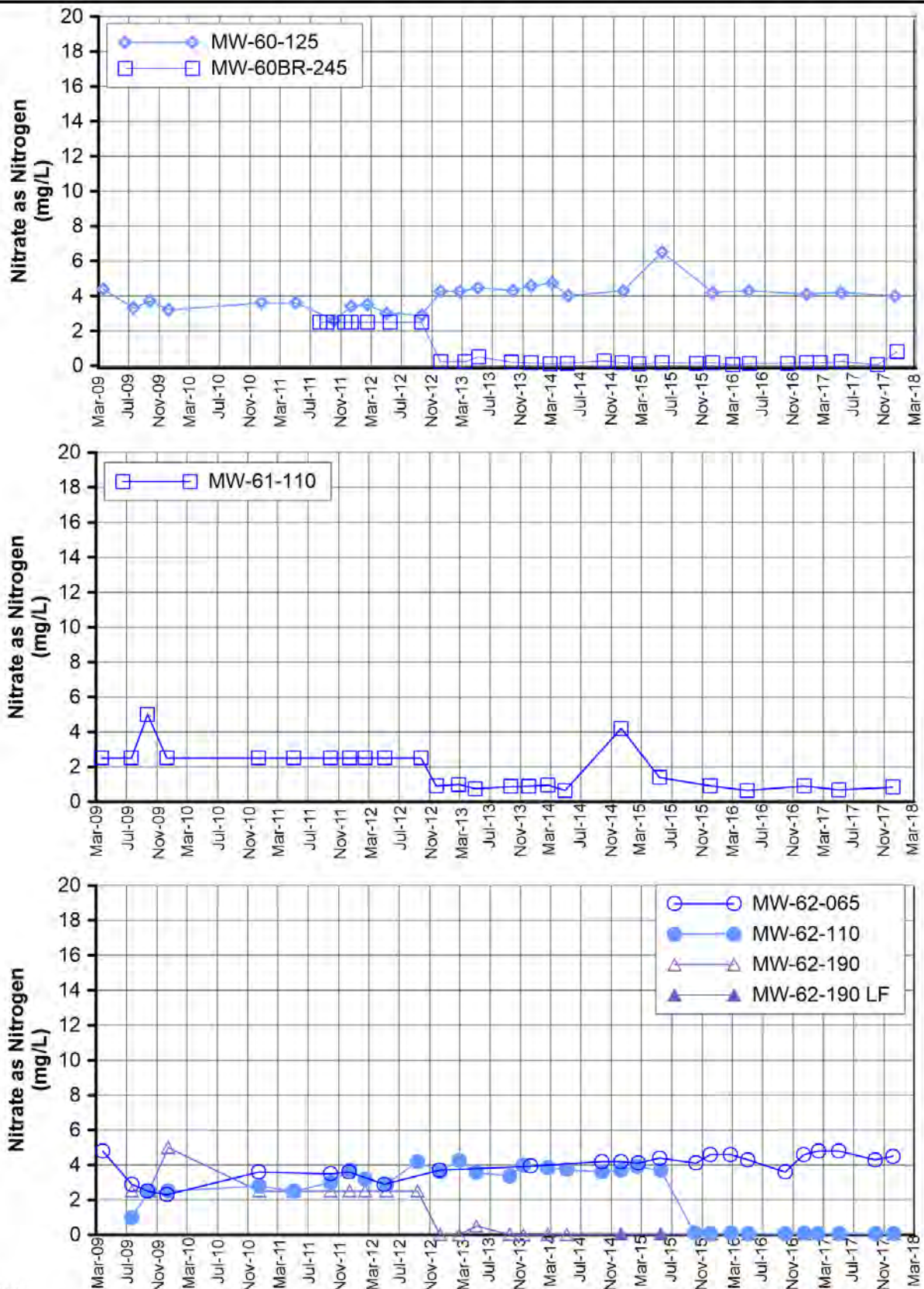


Notes:

- Starting in Fourth Quarter 2012 nitrate samples were analyzed using method USEPA 353.2, which reports a combination of nitrate and nitrite. The contribution of nitrite to the reported result of nitrate plus nitrite as nitrogen is expected to be negligible; therefore, sample results for method USEPA 353.2 are expected to be essentially the same as previous samples analyzed using method USEPA 300.0 and reported as nitrate as nitrogen.
- 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 C-50
NITRATE as NITROGEN
IN MW-57 CLUSTER, MW-58 CLUSTER AND MW-59-100
 FOURTH QUARTER 2017 AND ANNUAL INTERIM MEASURES
 PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER
 AND SURFACE WATER MONITORING REPORT,
 PG&E TOPOCK COMPRESSOR STATION,
 NEEDLES, CALIFORNIA



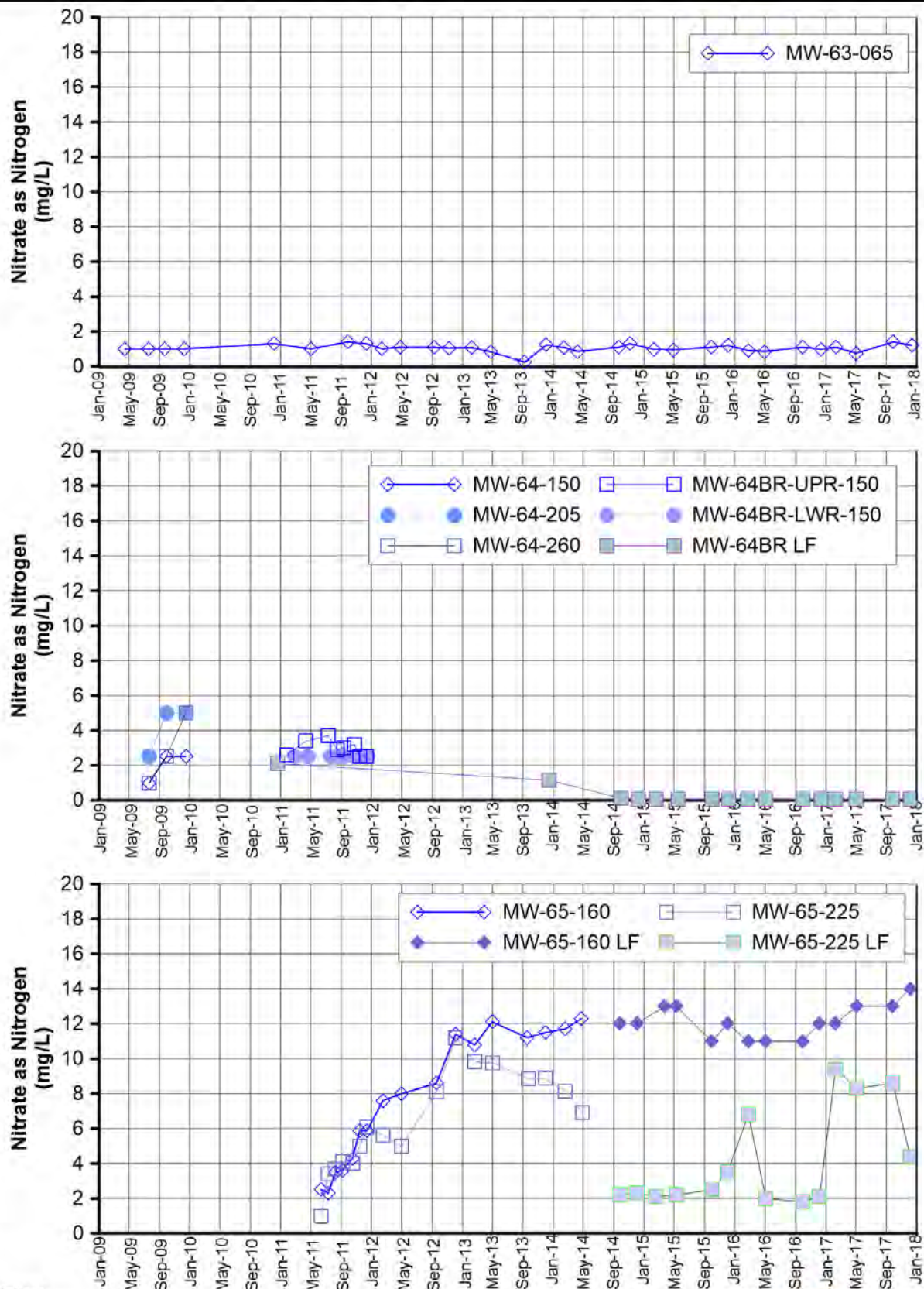


Notes:

- Starting in Fourth Quarter 2012 nitrate samples were analyzed using method USEPA 353.2, which reports a combination of nitrate and nitrite. The contribution of nitrite to the reported result of nitrate plus nitrite as nitrogen is expected to be negligible; therefore, sample results for method USEPA 353.2 are expected to be essentially the same as previous samples analyzed using method USEPA 300.0 and reported as nitrate as nitrogen.
- 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 C-51
NITRATE as NITROGEN
IN MW-60 CLUSTER, MW-61-110, AND MW-62 CLUSTER
 FOURTH QUARTER 2017 AND ANNUAL INTERIM MEASURES
 PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER
 AND SURFACE WATER MONITORING REPORT,
 PG&E TOPOCK COMPRESSOR STATION,
 NEEDLES, CALIFORNIA



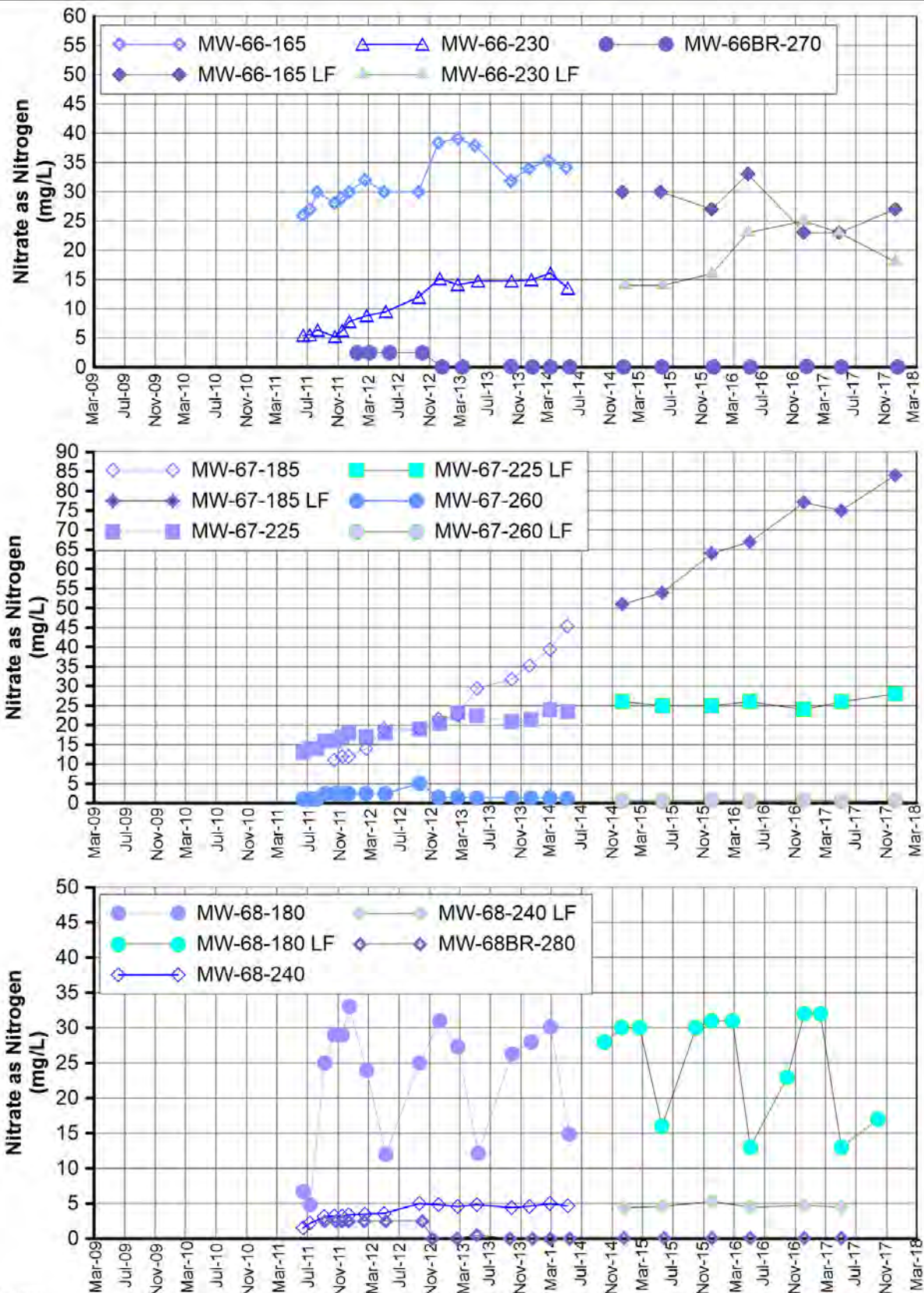


Notes:

- Starting in Fourth Quarter 2012 nitrate samples were analyzed using method USEPA 353.2, which reports a combination of nitrate and nitrite. The contribution of nitrite to the reported result of nitrate plus nitrite as nitrogen is expected to be negligible; therefore, sample results for method USEPA 353.2 are expected to be essentially the same as previous samples analyzed using method USEPA 300.0 and reported as nitrate as nitrogen.
- 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 C-52
NITRATE as NITROGEN
IN MW-63-065, MW-64 CLUSTER AND MW-65 CLUSTER
 FOURTH QUARTER 2017 AND ANNUAL INTERIM MEASURES
 PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER
 AND SURFACE WATER MONITORING REPORT,
 PG&E TOPOCK COMPRESSOR STATION,
 NEEDLES, CALIFORNIA





Notes:

1. Starting in Fourth Quarter 2012 nitrate samples were analyzed using method USEPA 353.2, which reports a combination of nitrate and nitrite. The contribution of nitrite to the reported result of nitrate plus nitrite as nitrogen is expected to be negligible; therefore, sample results for method USEPA 353.2 are expected to be essentially the same as previous samples analyzed using method USEPA 300.0 and reported as nitrate as nitrogen.
2. 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.

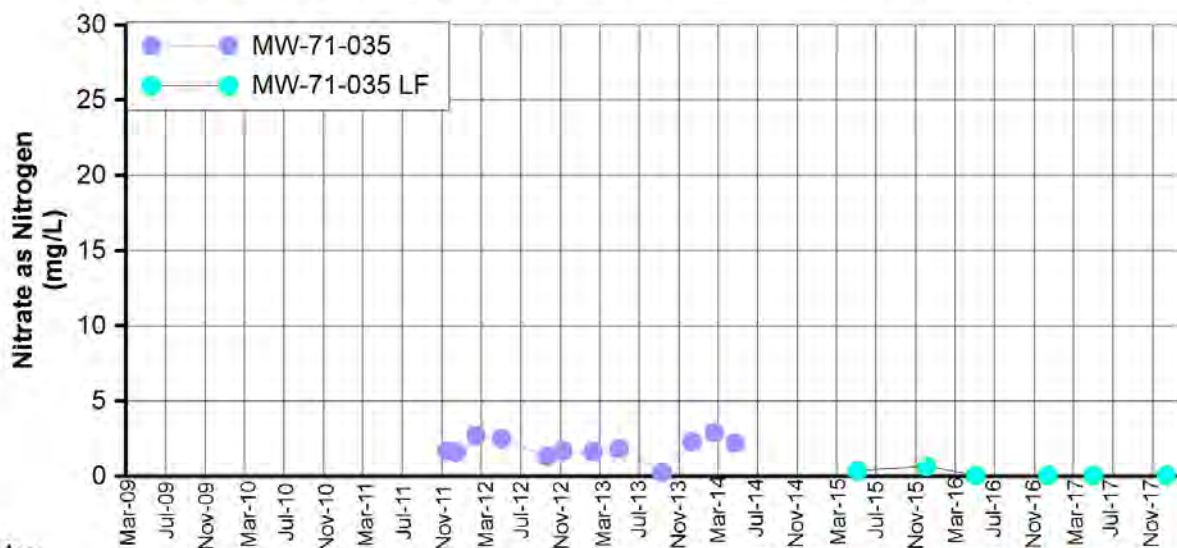
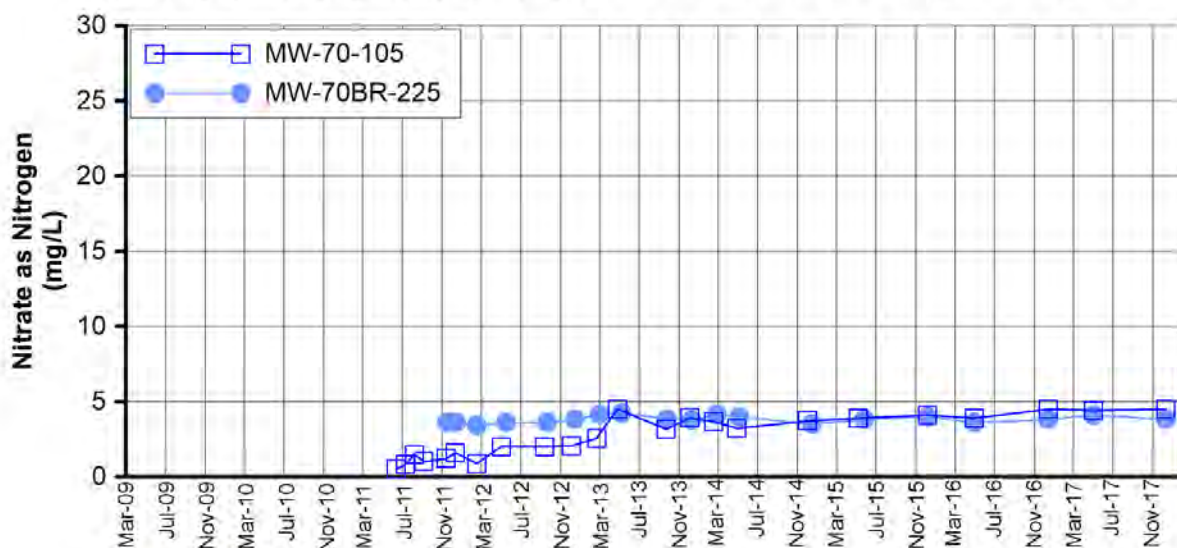
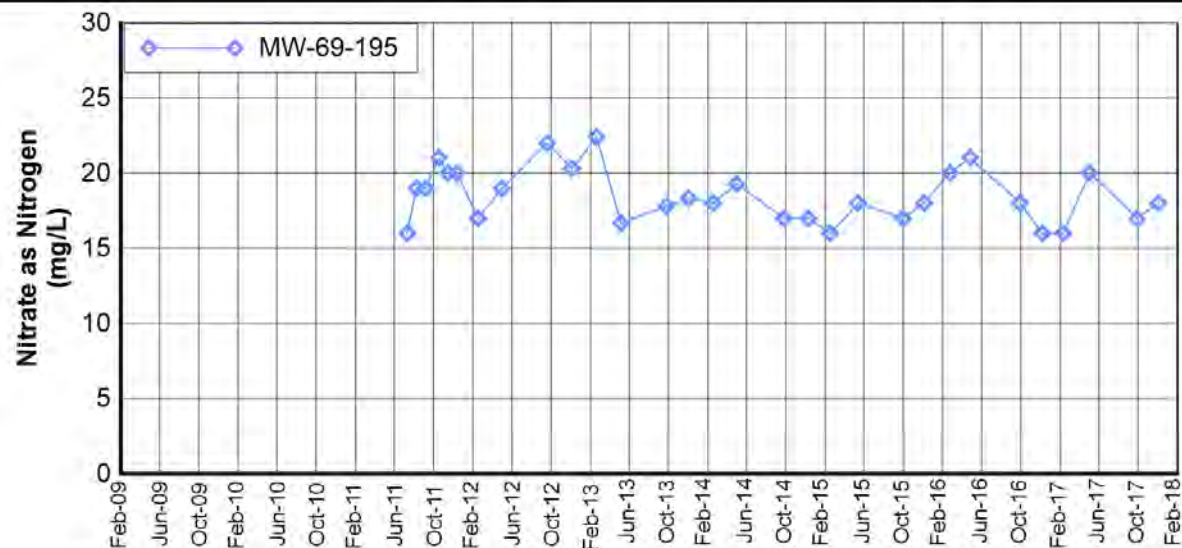
FIGURE C-53

NITRATE as NITROGEN

IN MW-66, MW-67, AND MW-68 CLUSTERS

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



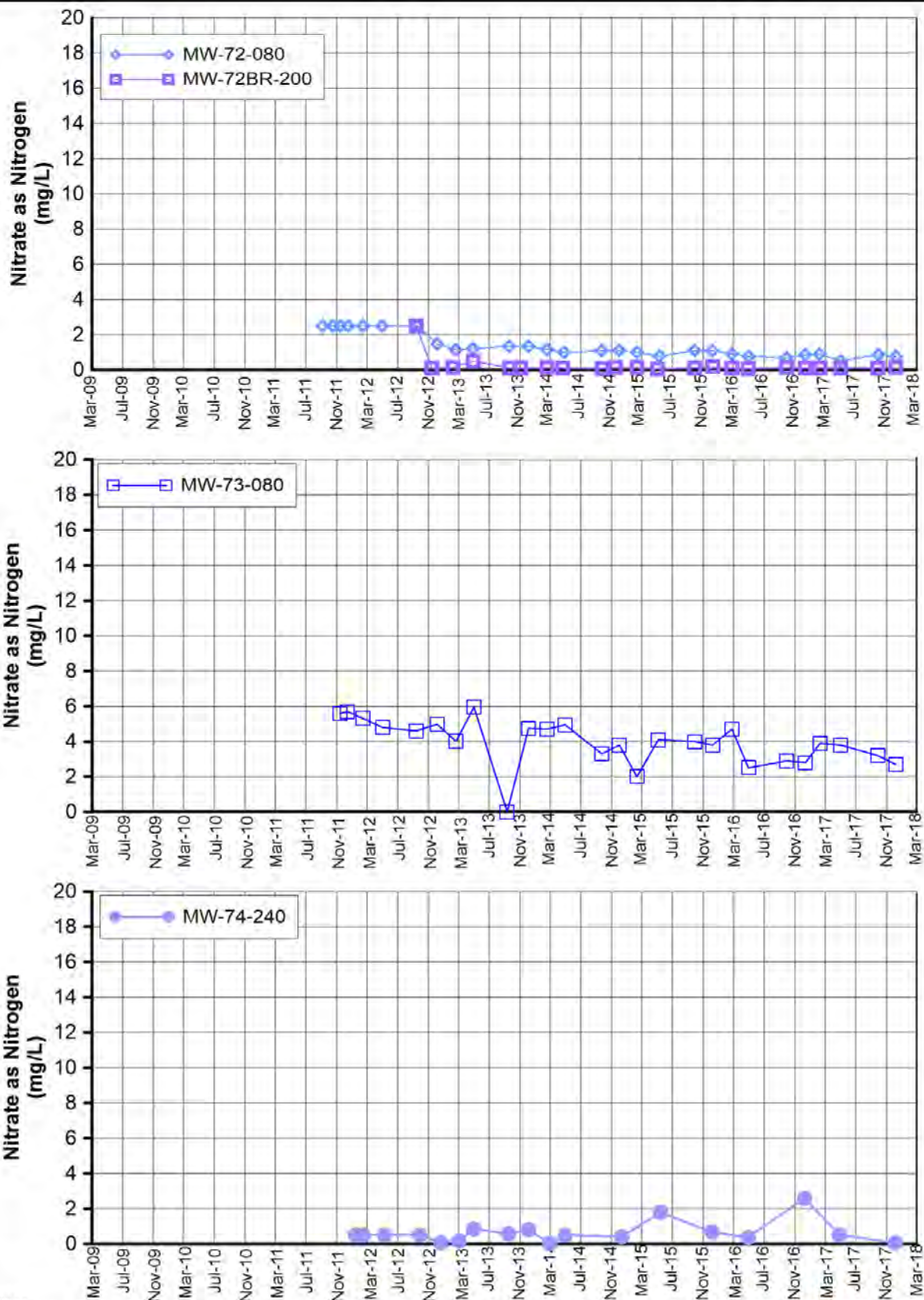


Notes:

- Starting in Fourth Quarter 2012 nitrate samples were analyzed using method USEPA 353.2, which reports a combination of nitrate and nitrite. The contribution of nitrite to the reported result of nitrate plus nitrite as nitrogen is expected to be negligible; therefore, sample results for method USEPA 353.2 are expected to be essentially the same as previous samples analyzed using method USEPA 300.0 and reported as nitrate as nitrogen.
- 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 C-54
NITRATE as NITROGEN
IN MW-69-195, THE MW-70 CLUSTER, AND MW-71-035
 FOURTH QUARTER 2017 AND ANNUAL INTERIM MEASURES
 PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER
 AND SURFACE WATER MONITORING REPORT,
 PG&E TOPOCK COMPRESSOR STATION,
 NEEDLES, CALIFORNIA





Notes:

1. Starting in Fourth Quarter 2012 nitrate samples were analyzed using method USEPA 353.2, which reports a combination of nitrate and nitrite. The contribution of nitrite to the reported result of nitrate plus nitrite as nitrogen is expected to be negligible; therefore, sample results for method USEPA 353.2 are expected to be essentially the same as previous samples analyzed using method USEPA 300.0 and reported as nitrate as nitrogen.
2. 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.

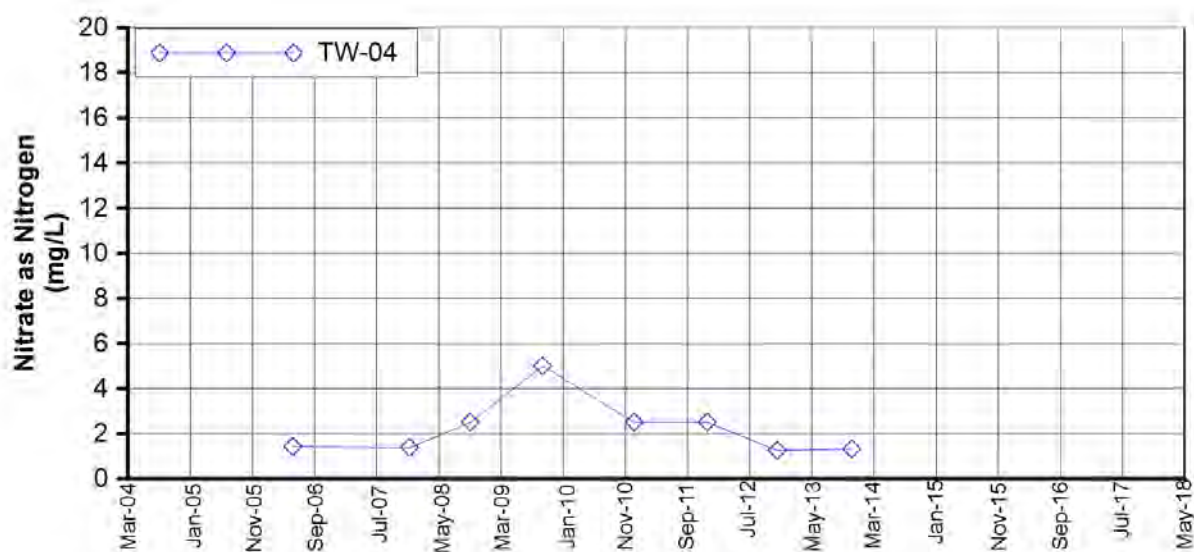
FIGURE C-55

NITRATE as NITROGEN

IN MW-72 CLUSTER, MW-73-080, AND MW-74-240

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





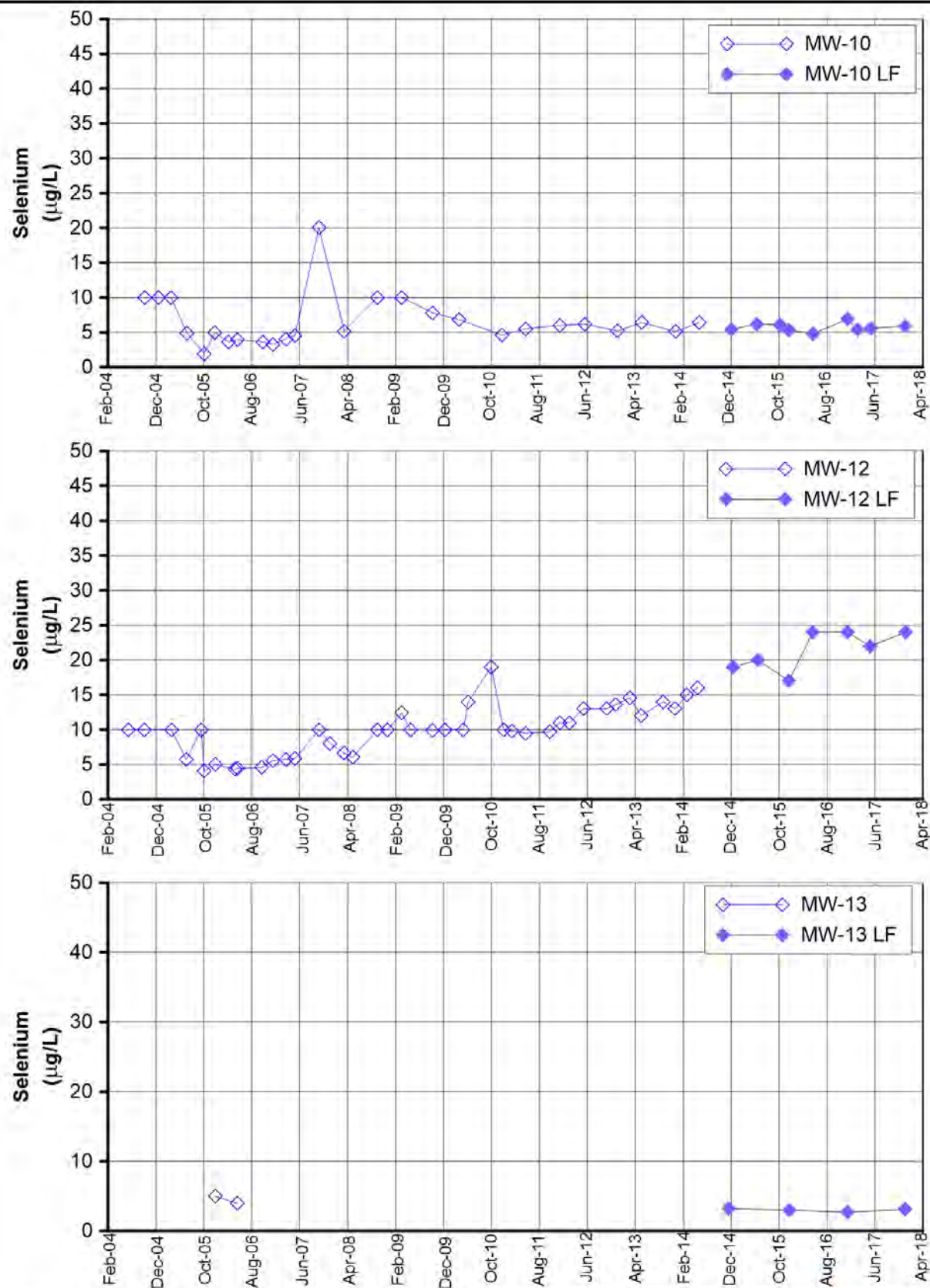
Notes:

1. Starting in Fourth Quarter 2012 nitrate samples were analyzed using method USEPA 353.2, which reports a combination of nitrate and nitrite. The contribution of nitrite to the reported result of nitrate plus nitrite as nitrogen is expected to be negligible; therefore, sample results for method USEPA 353.2 are expected to be essentially the same as previous samples analyzed using method USEPA 300.0 and reported as nitrate as nitrogen.

FIGURE C-56
NITRATE as NITROGEN
IN TW-04



FOURTH QUARTER 2017 AND ANNUAL 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.

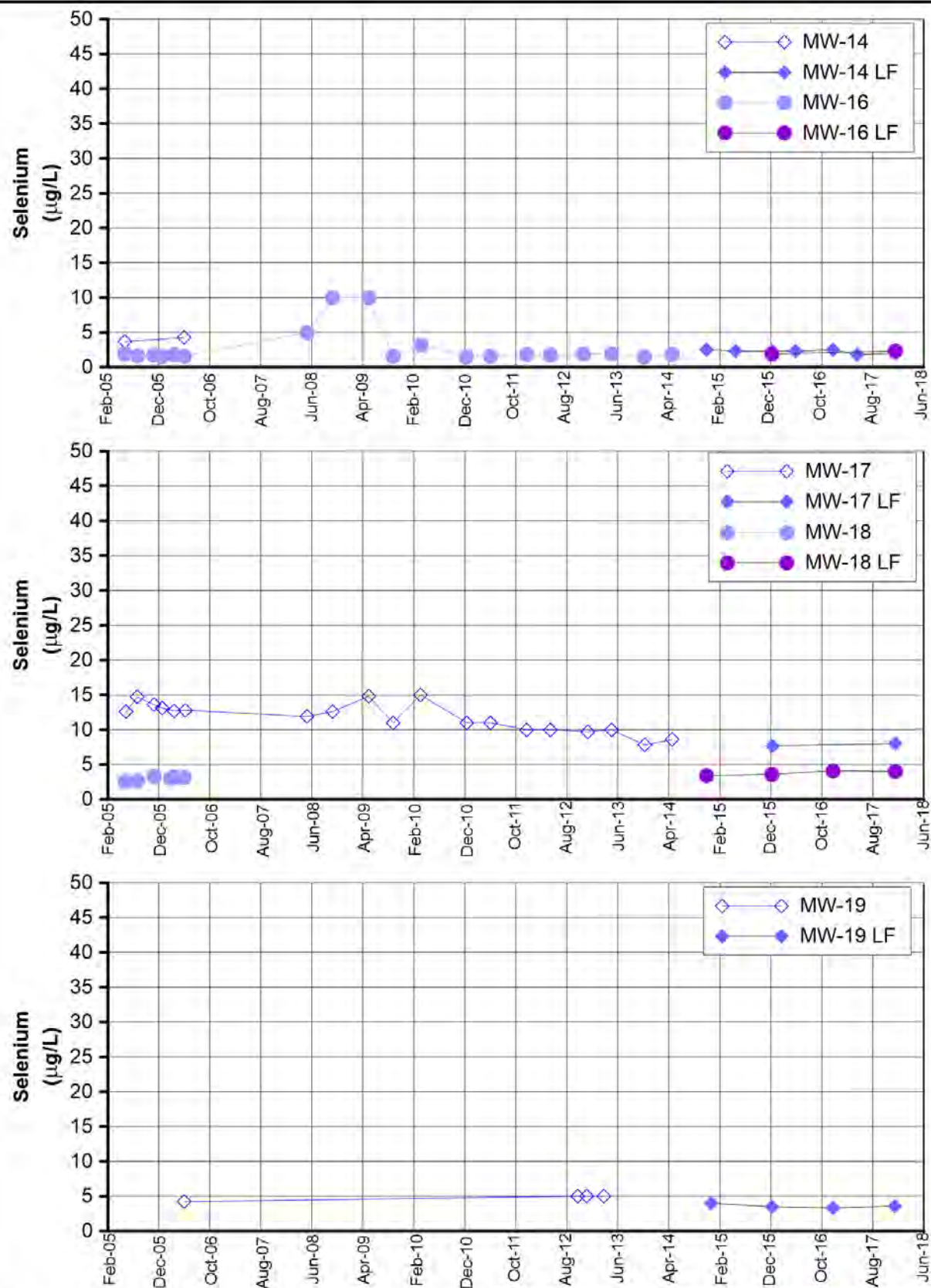
FIGURE C-57

SELENIUM

IN MW-10, MW-12, AND MW-13

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





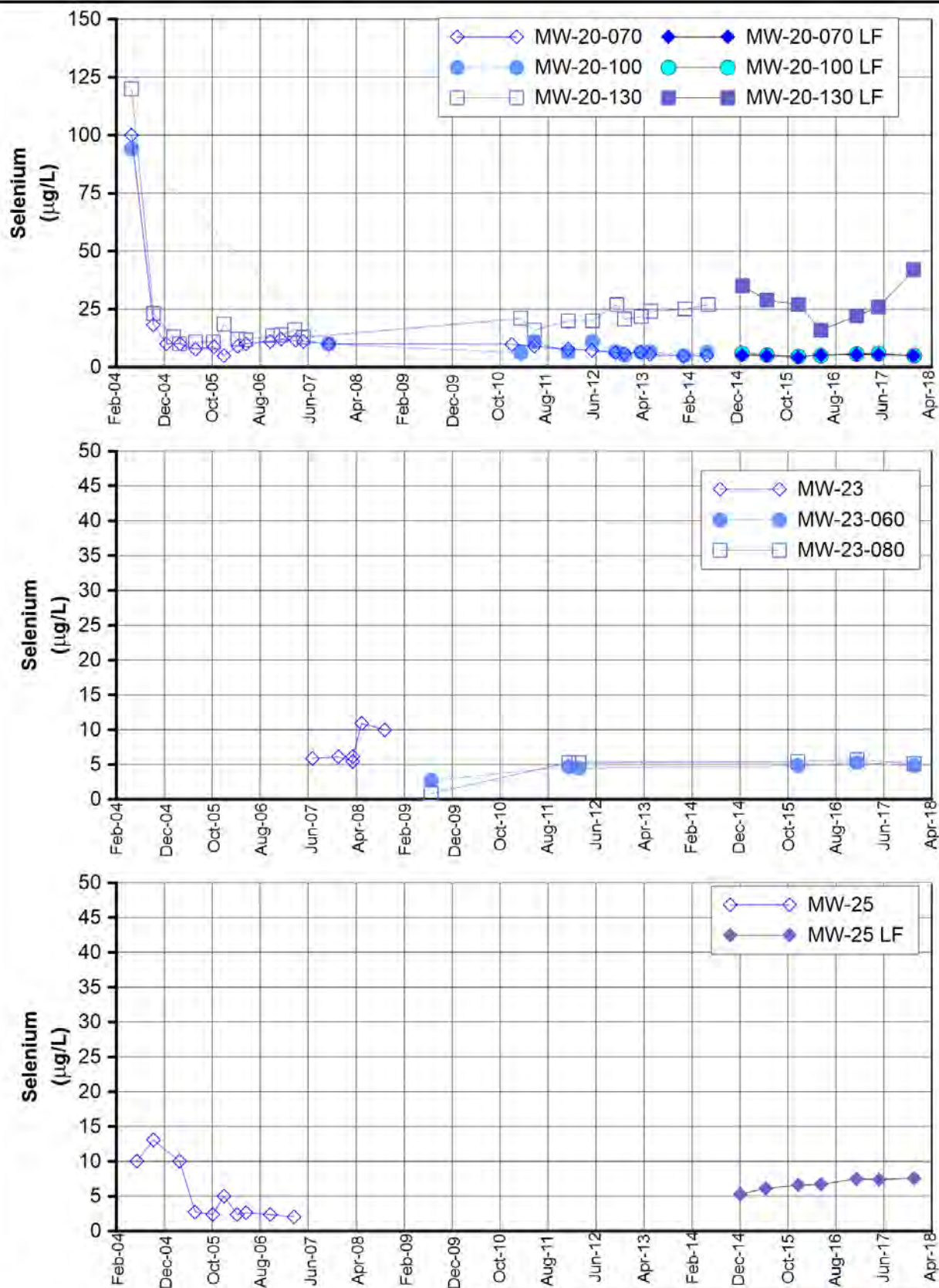
Notes:

1. 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 C-58
SELENIUM**

IN MW-14, MW-16, MW-17, MW-18, AND MW-19
FOURTH QUARTER 2017 AND ANNUAL INTERIM MEASURES
PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER
AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA





Notes:

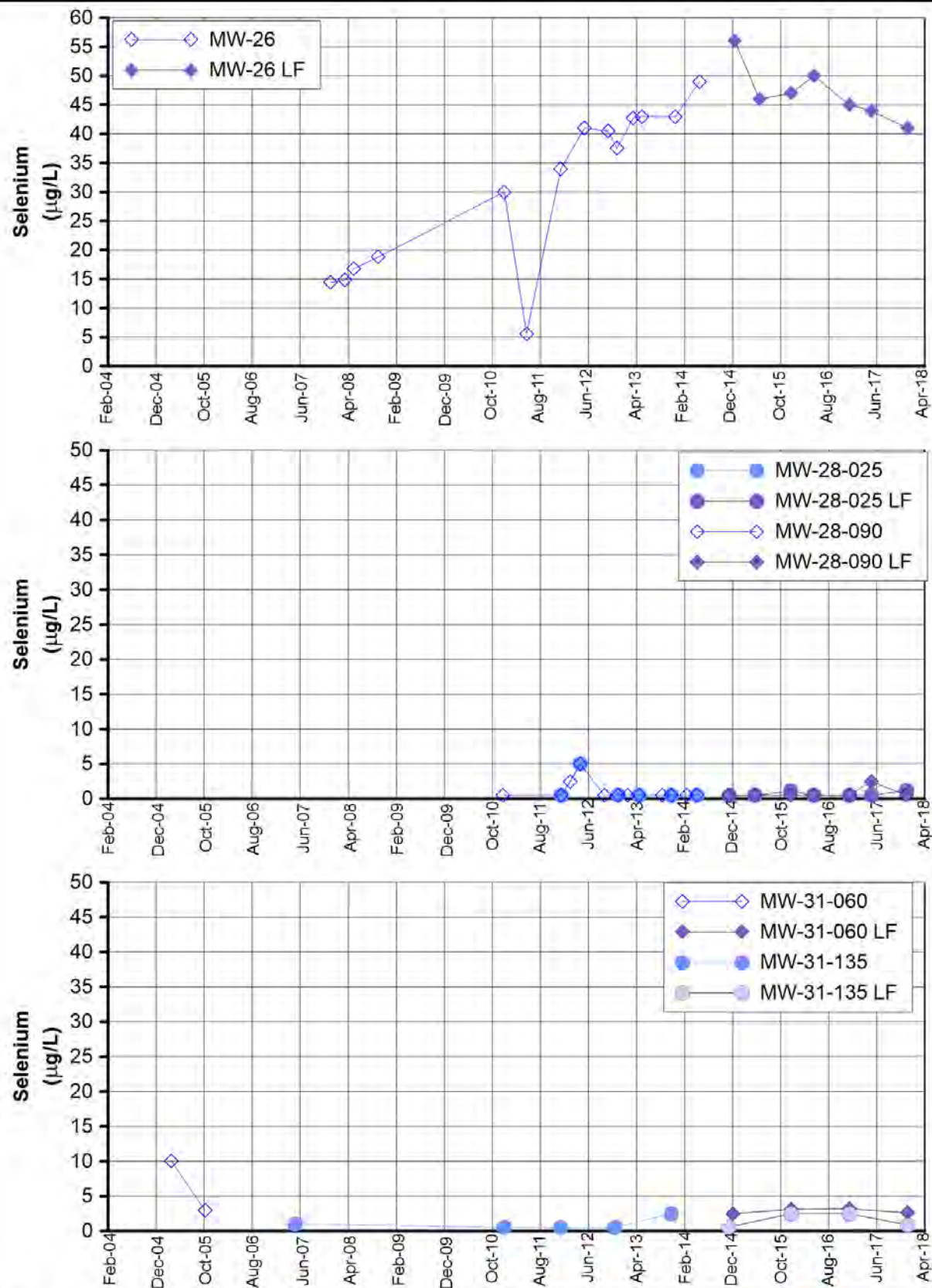
LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

**FIGURE C-59
SELENIUM**

IN MW-20 AND MW-23 CLUSTERS AND MW-25

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





Notes:

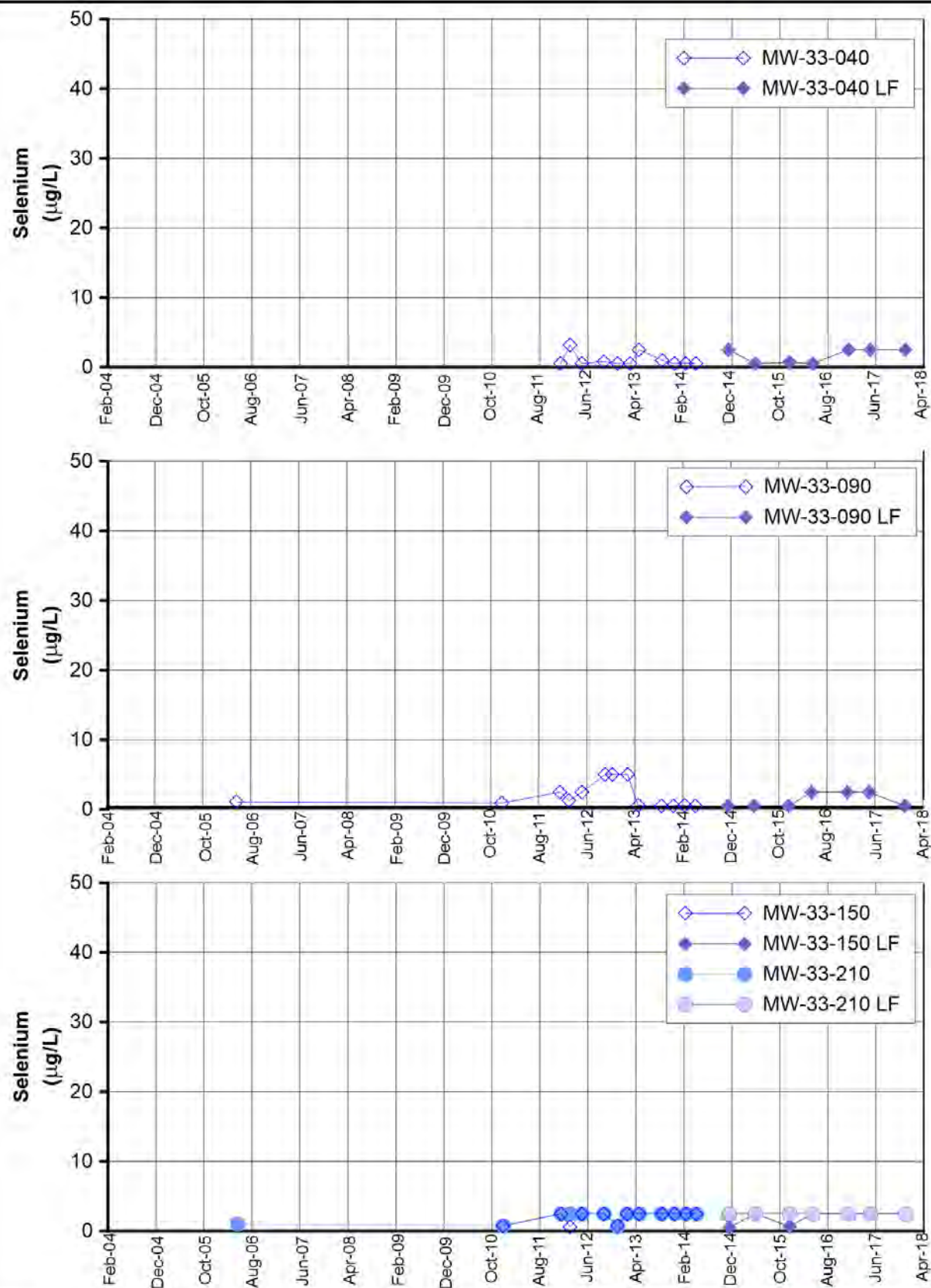
LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

**FIGURE C-60
SELENIUM**

IN MW-26, MW-28, AND MW-31 CLUSTERS

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





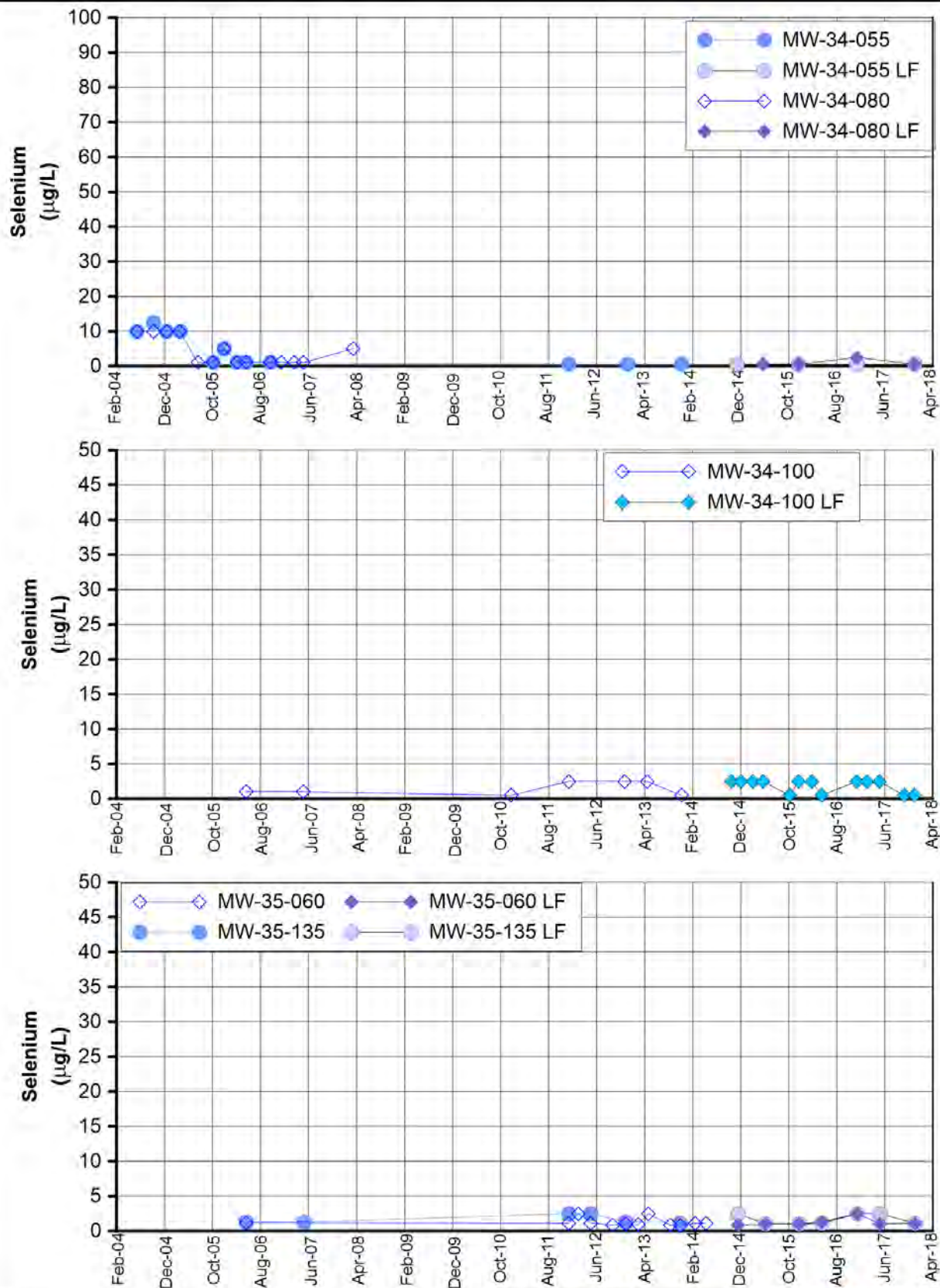
Notes:

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 C-61
SELENIUM
IN MW-33 CLUSTER**

FOURTH QUARTER 2017 AND ANNUAL 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.

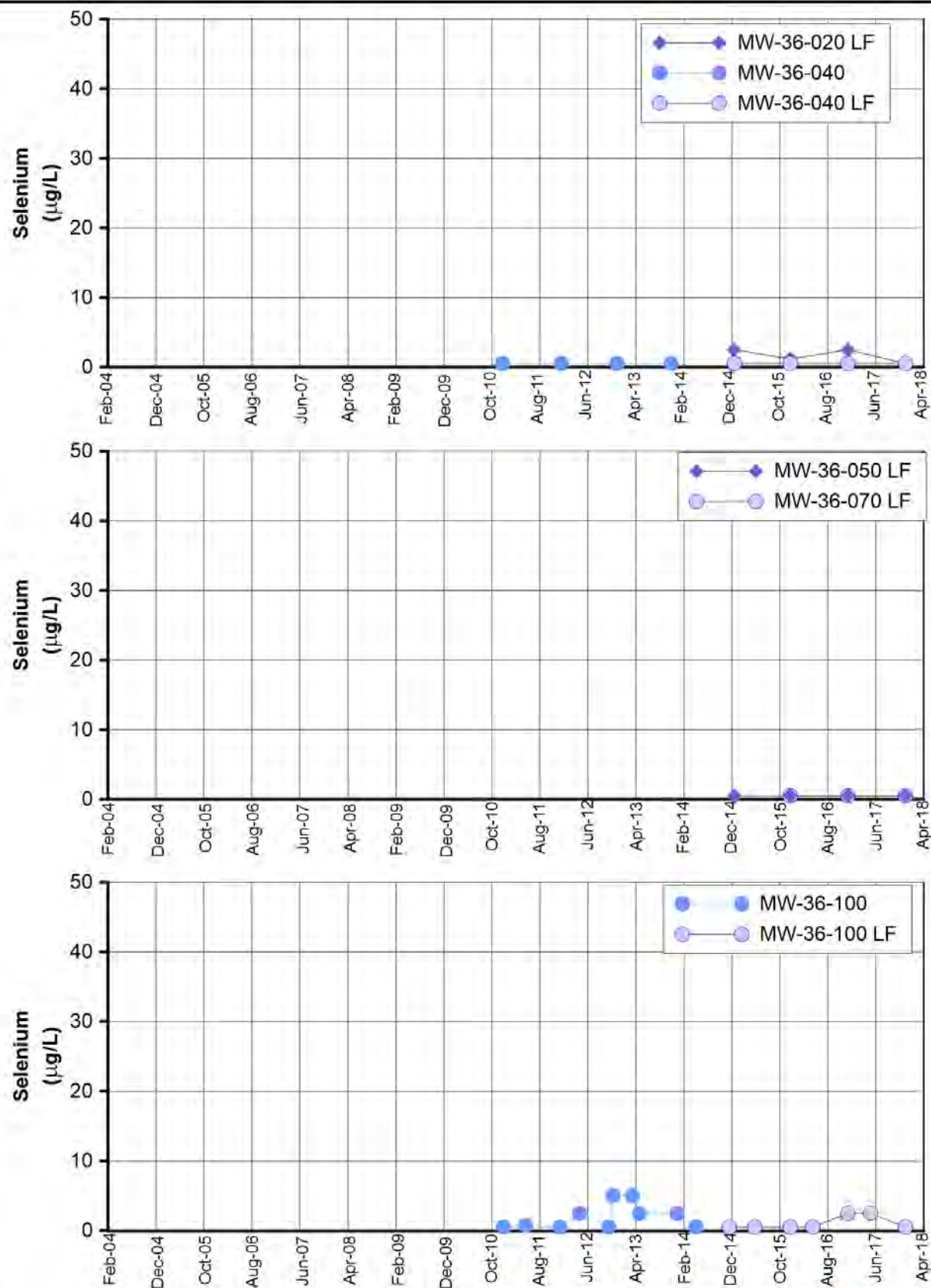
FIGURE C-62

SELENIUM

IN MW-34 AND MW-35 CLUSTERS

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





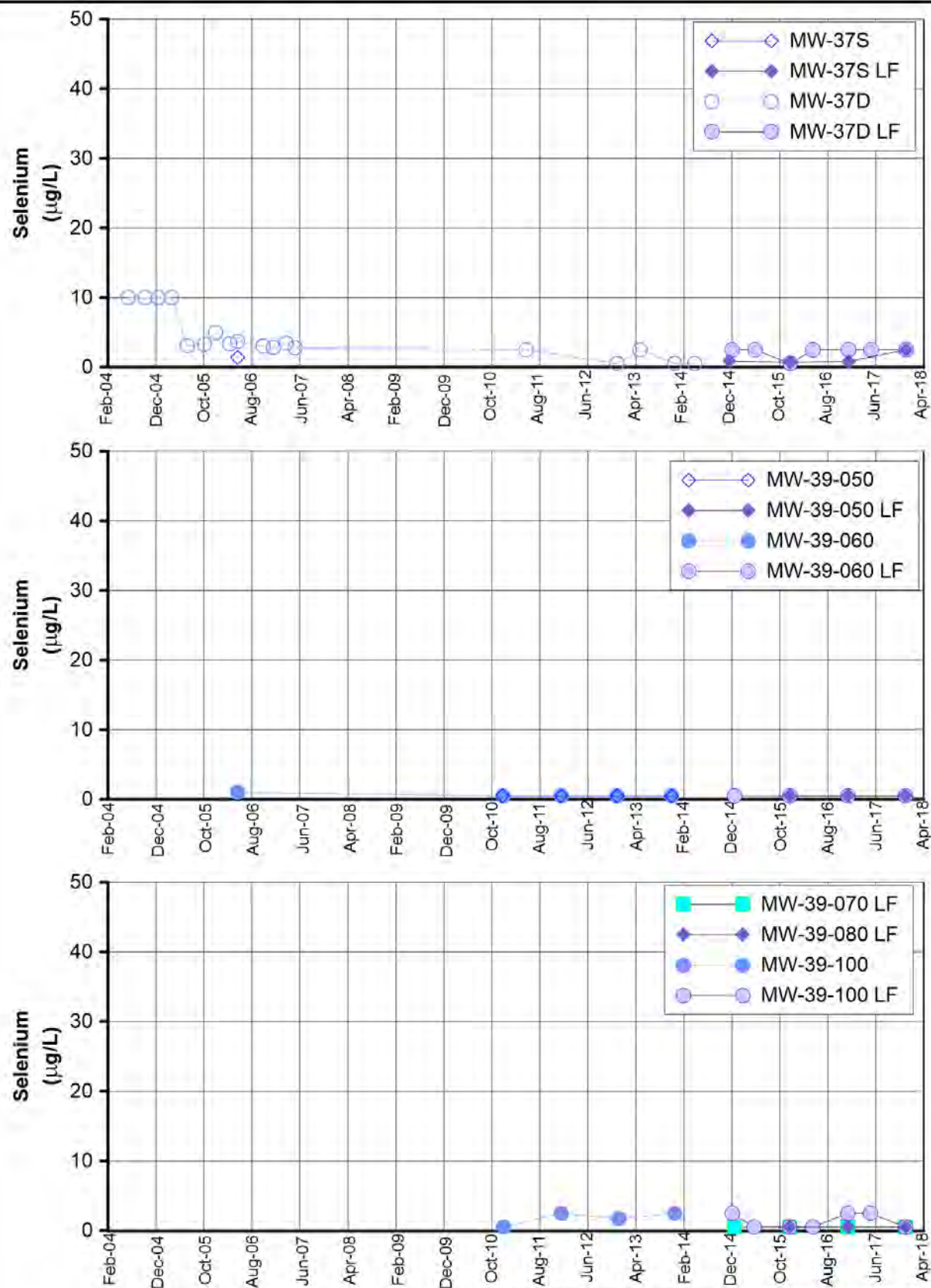
Notes:

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 C-63
SELENIUM
IN MW-36 CLUSTER**

FOURTH QUARTER 2017 AND ANNUAL 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.

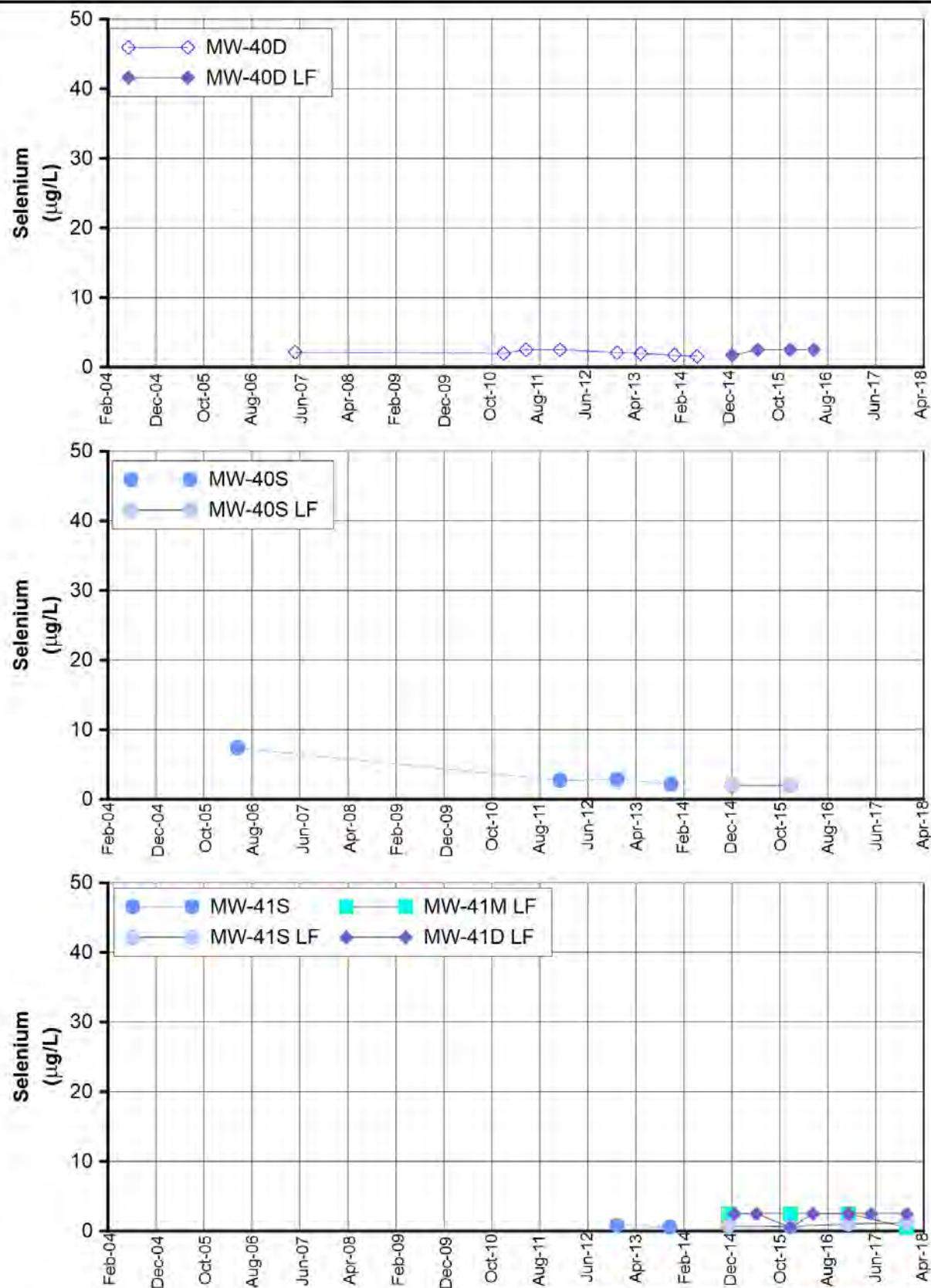
FIGURE C-64

SELENIUM

IN MW-37 AND MW-39 CLUSTERS

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





Notes:

1. 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.
2. MW-40D and MW-40S were not sampled during 4th Quarter 2017 due to traffic control issues.

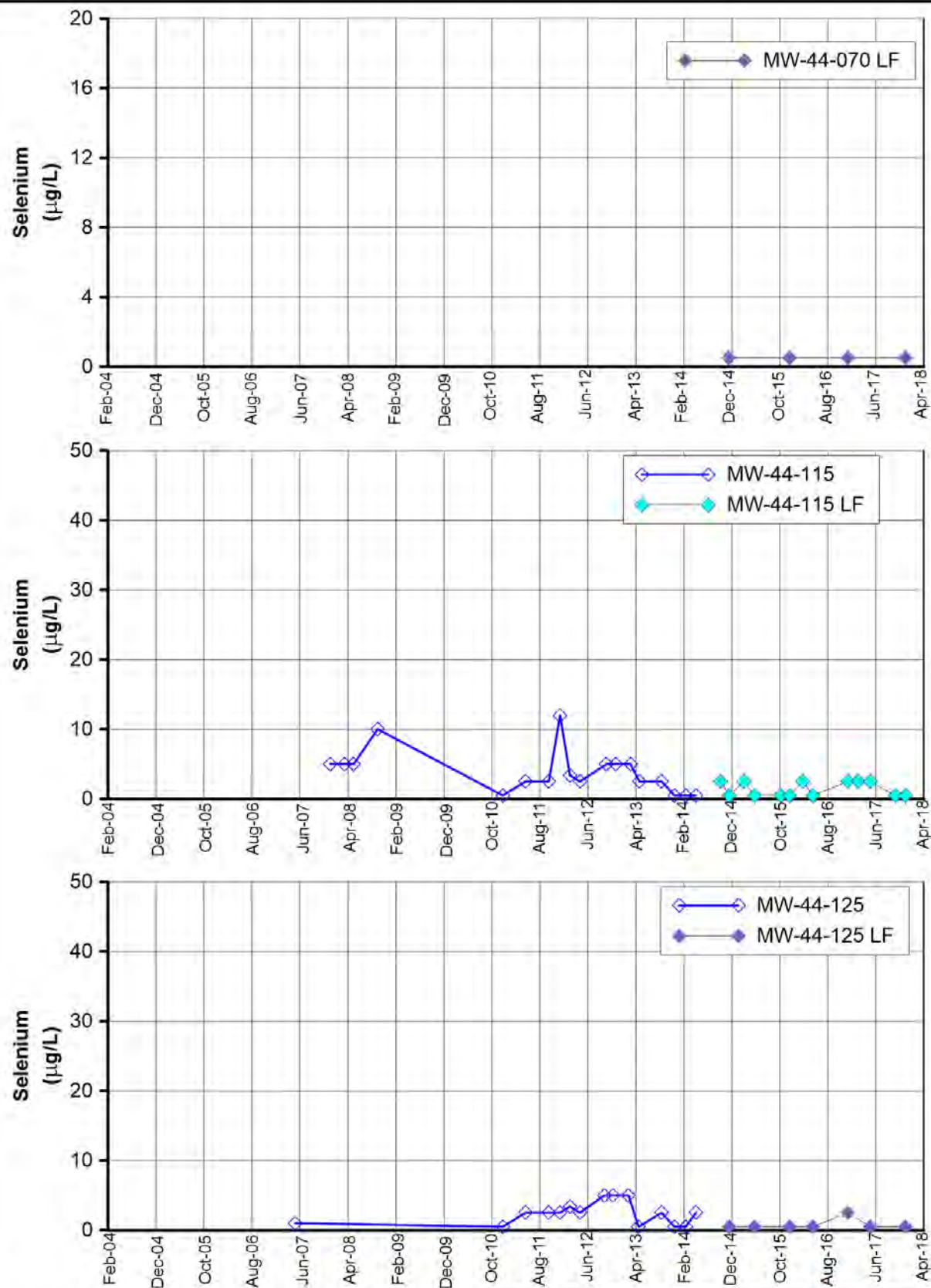
FIGURE C-65

SELENIUM

IN MW-40 AND MW-41 CLUSTERS

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





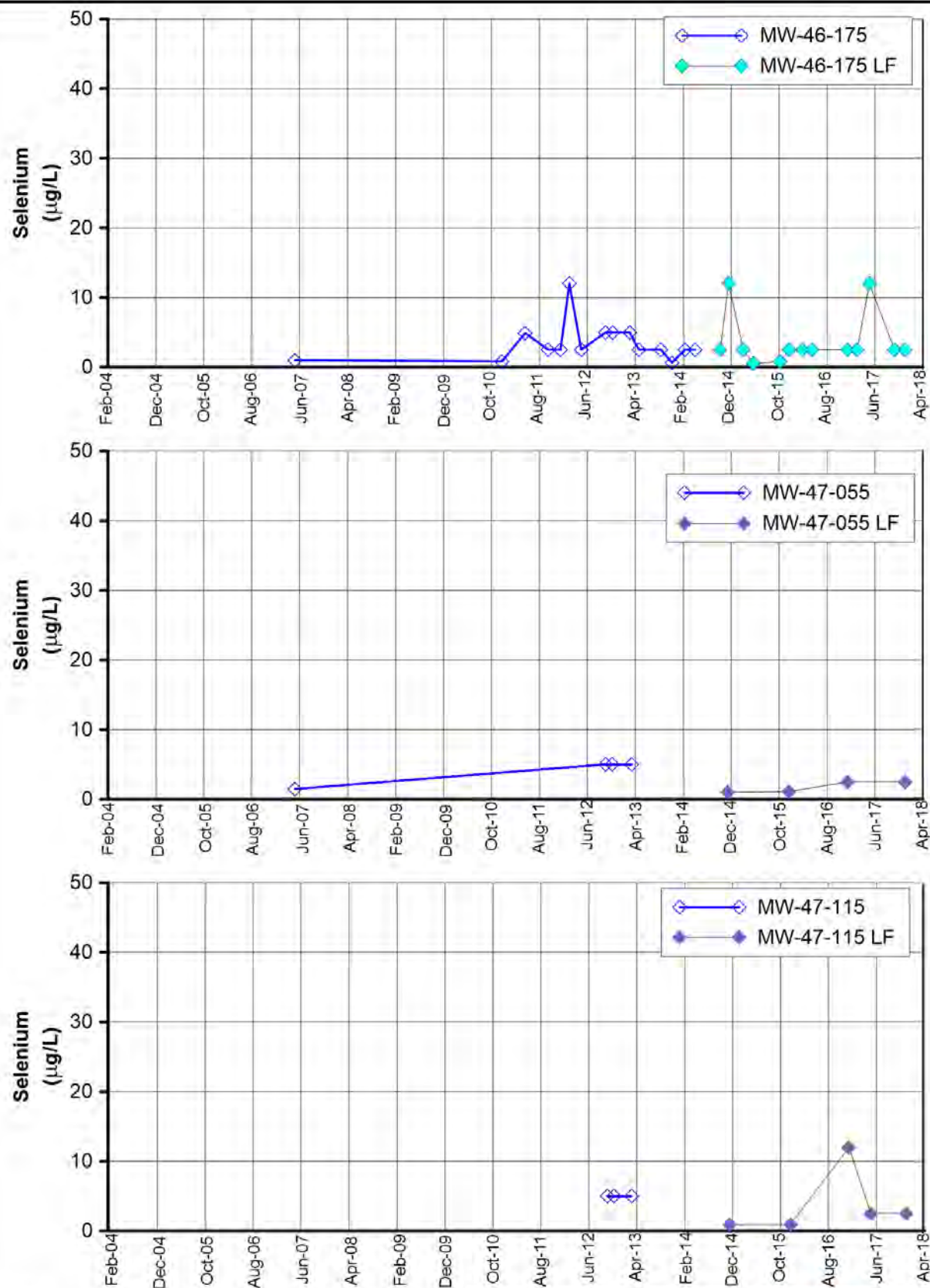
Notes:

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 C-66
SELENIUM
IN MW-44 CLUSTER**

FOURTH QUARTER 2017 AND ANNUAL 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.

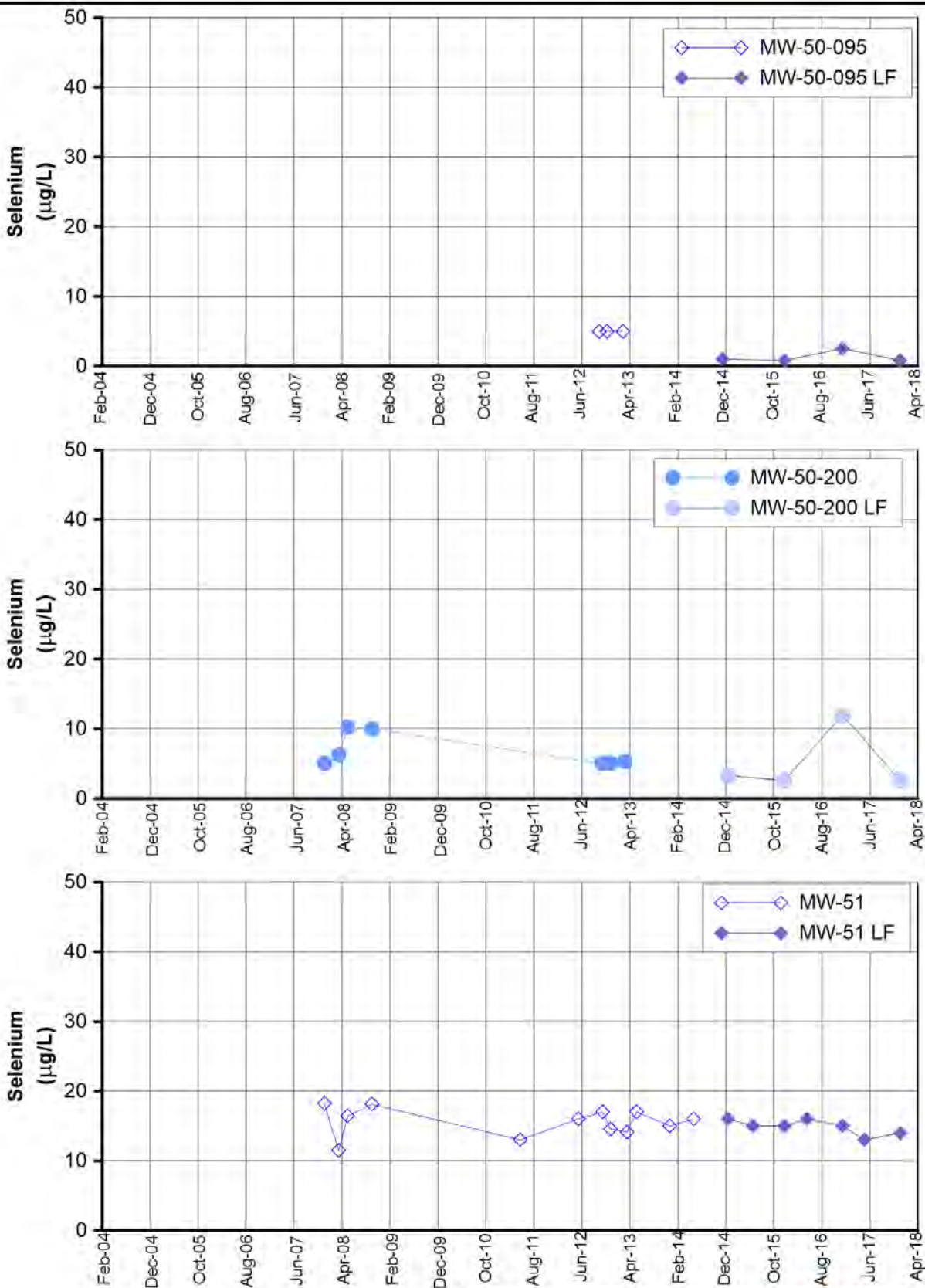
FIGURE C-67

SELENIUM

IN MW-46 AND MW-47 CLUSTERS

FOURTH QUARTER 2017 AND ANNUAL 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.

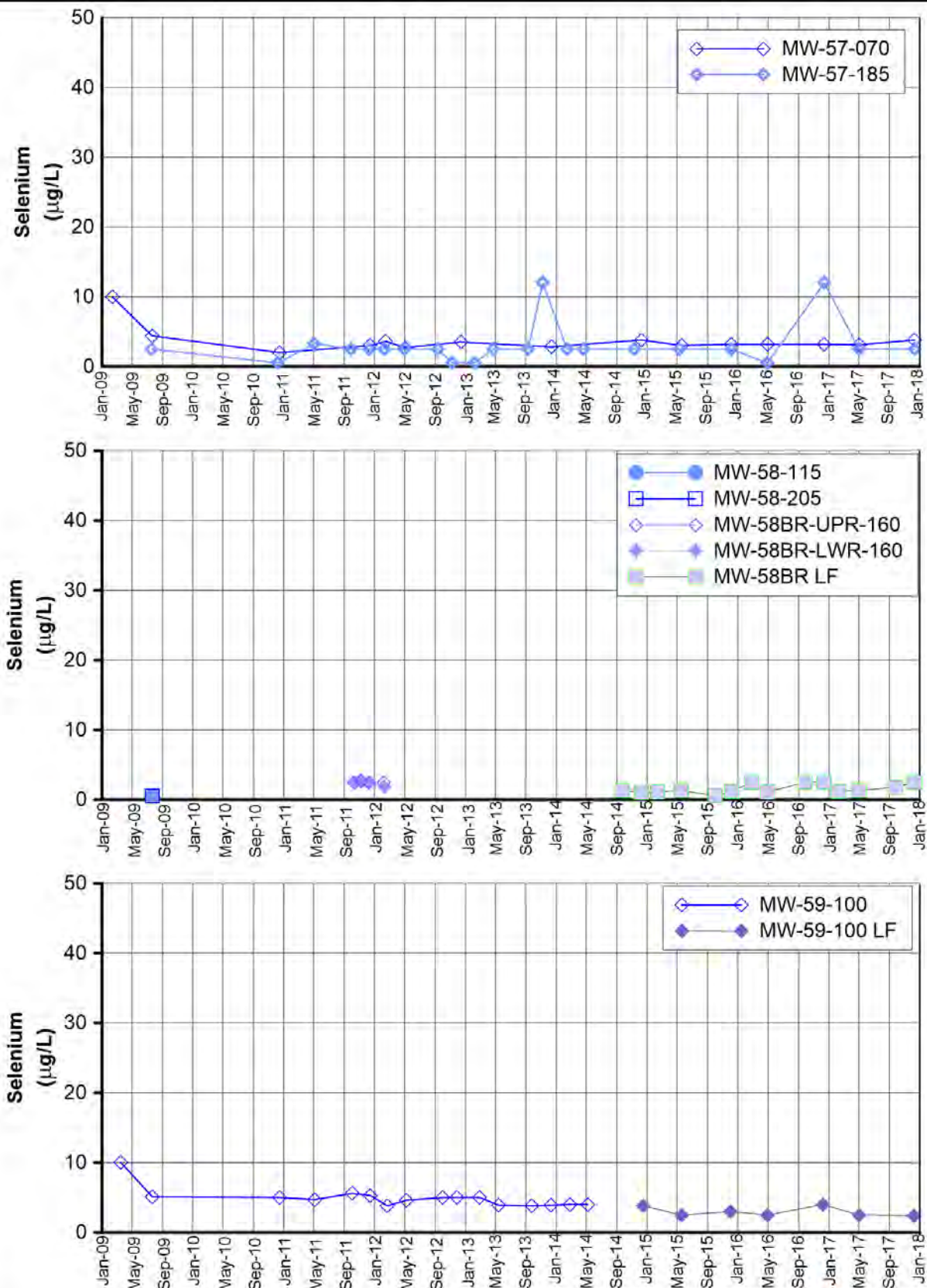
FIGURE C-68

SELENIUM

IN MW-50 AND MW-51 CLUSTERS

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





Note:

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

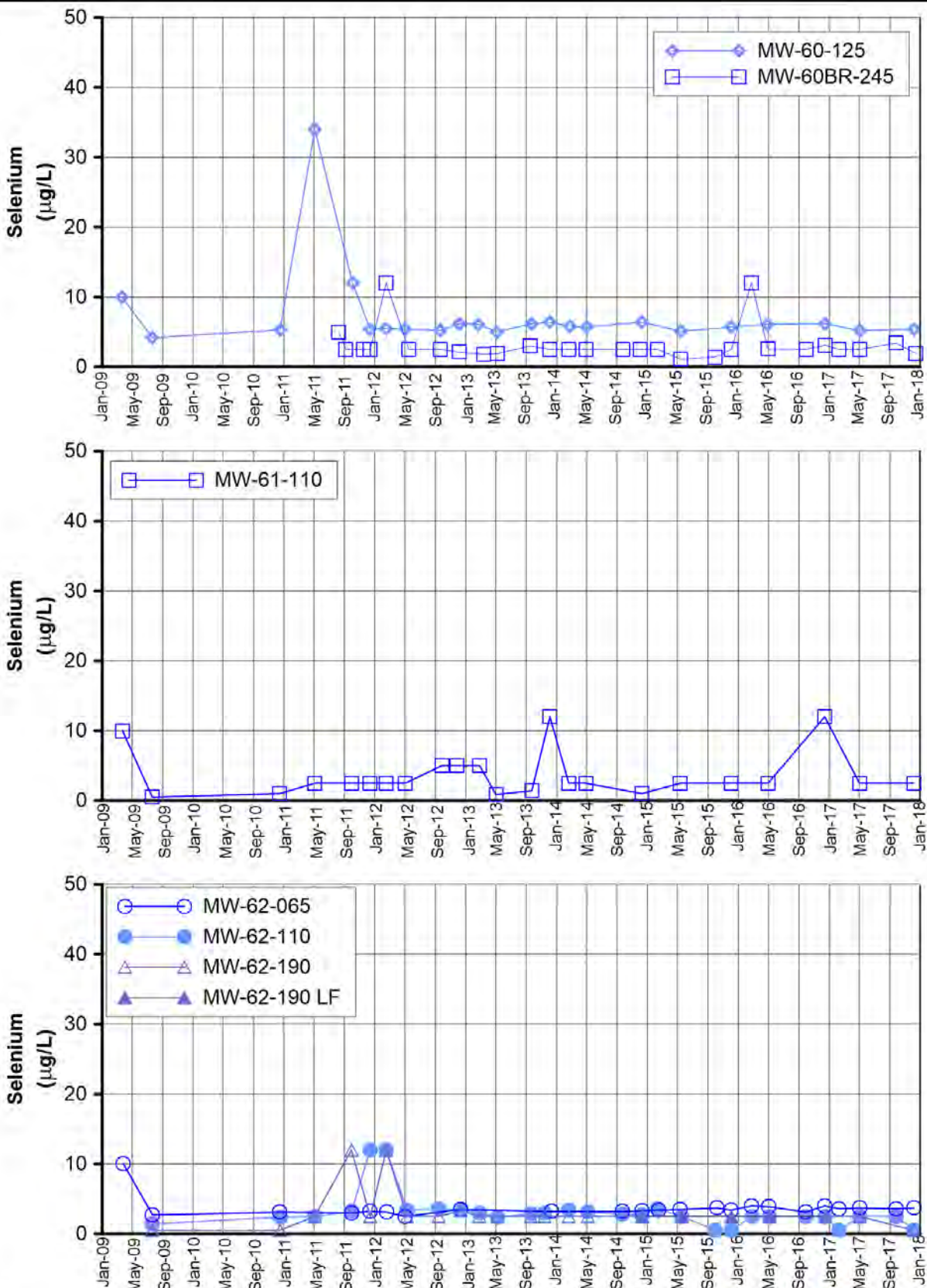
FIGURE C-69

SELENIUM

IN MW-57 CLUSTER, MW-58 CLUSTER AND MW-59-100

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





Notes:

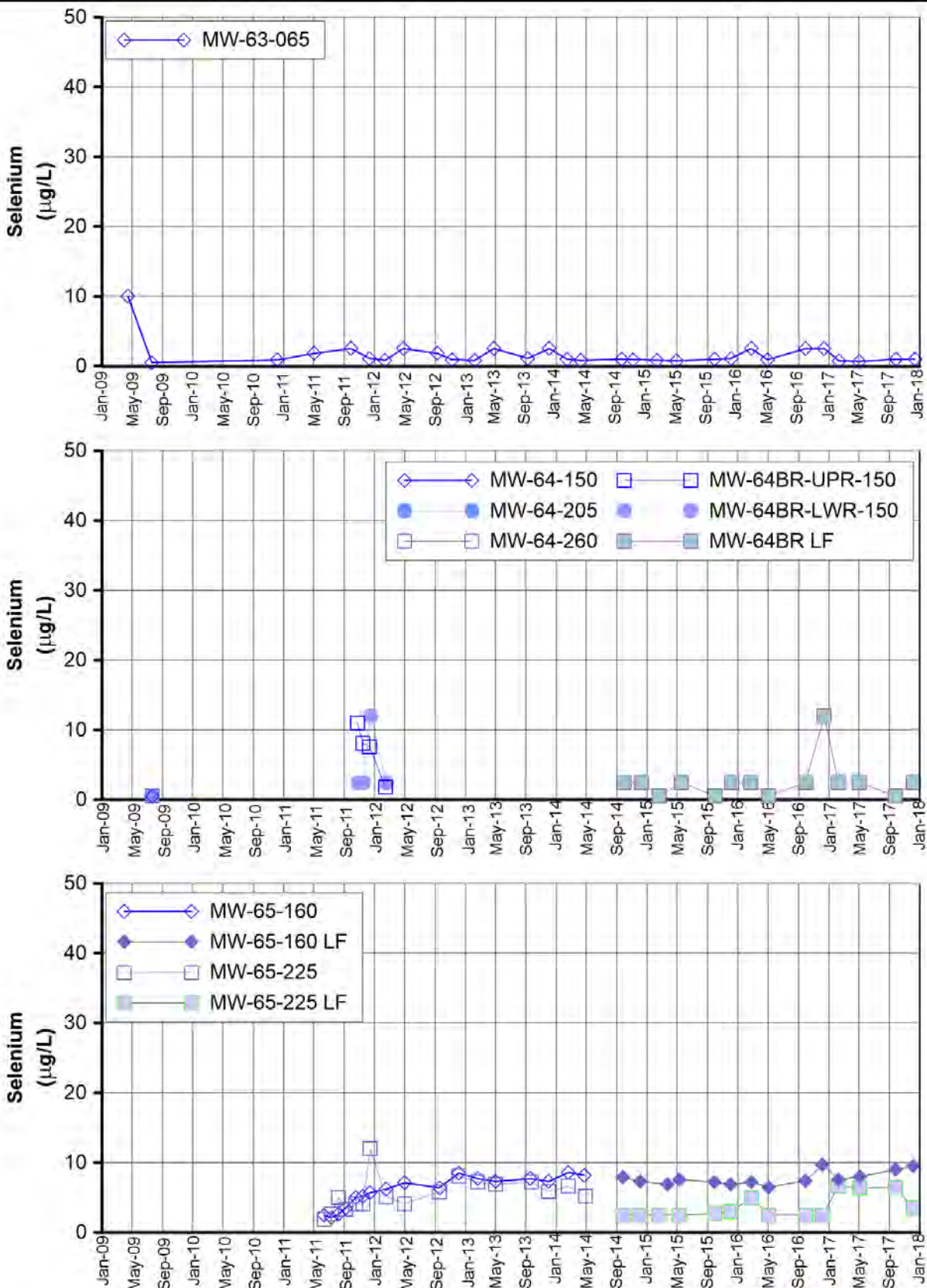
LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

1. MW-60-125 sampled using LF method on 5/02/2017 & 12/06/2017.
2. MW-62-065 sampled using LF method on 5/02/2017, 9/25/2017, & 12/06/2017.

**FIGURE C-70
SELENIUM**

IN MW-60 CLUSTER, MW-61-110, AND MW-62 CLUSTER
FOURTH QUARTER 2017 AND ANNUAL 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.

1. MW-63-065 sampled using LF method on 5/02/2017, 9/28/2017, & 12/12/2017.

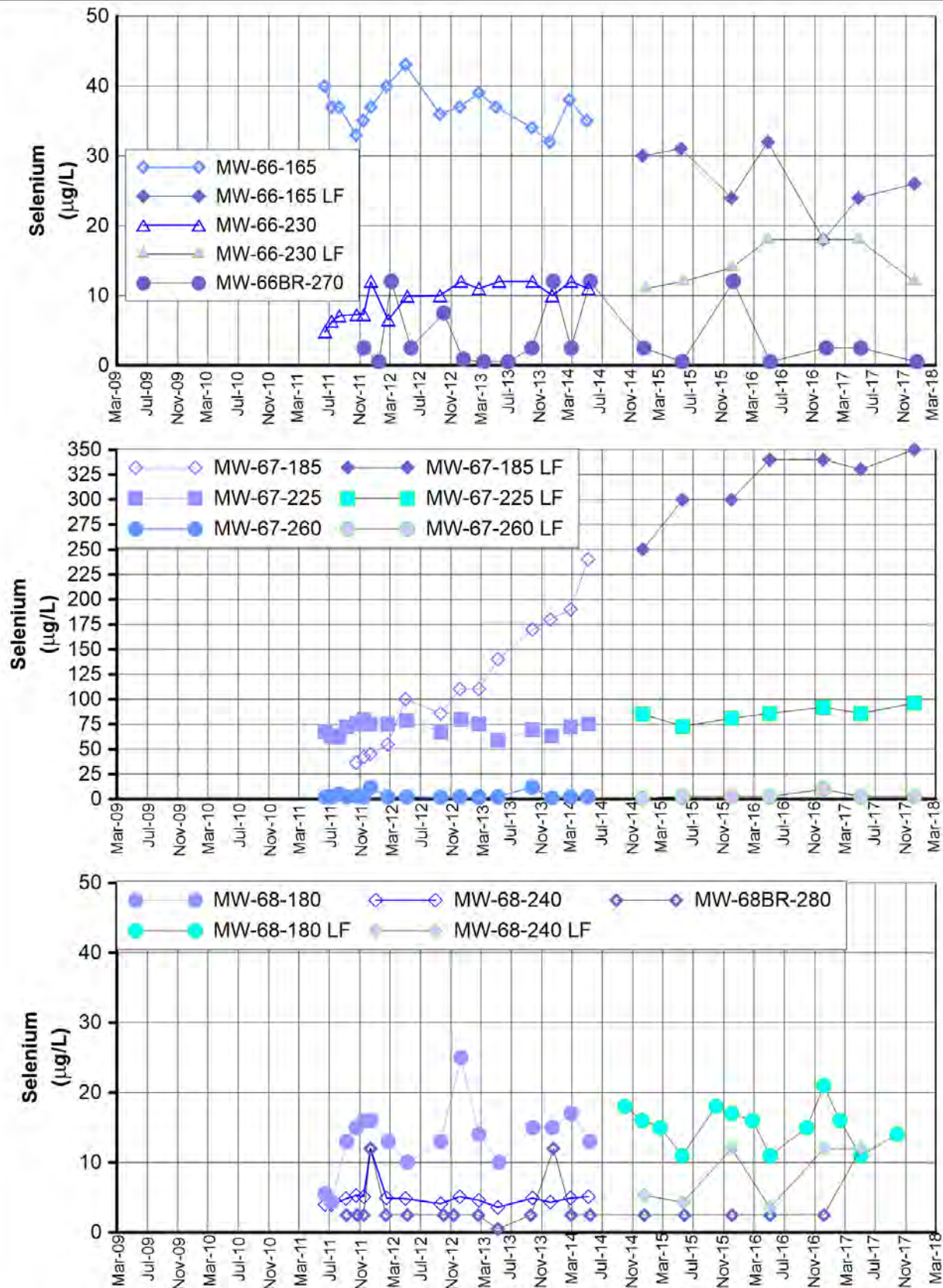
FIGURE C-71

SELENIUM

IN MW-63-065, MW-64 CLUSTER AND MW-65 CLUSTER

FOURTH QUARTER 2017 AND ANNUAL 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.

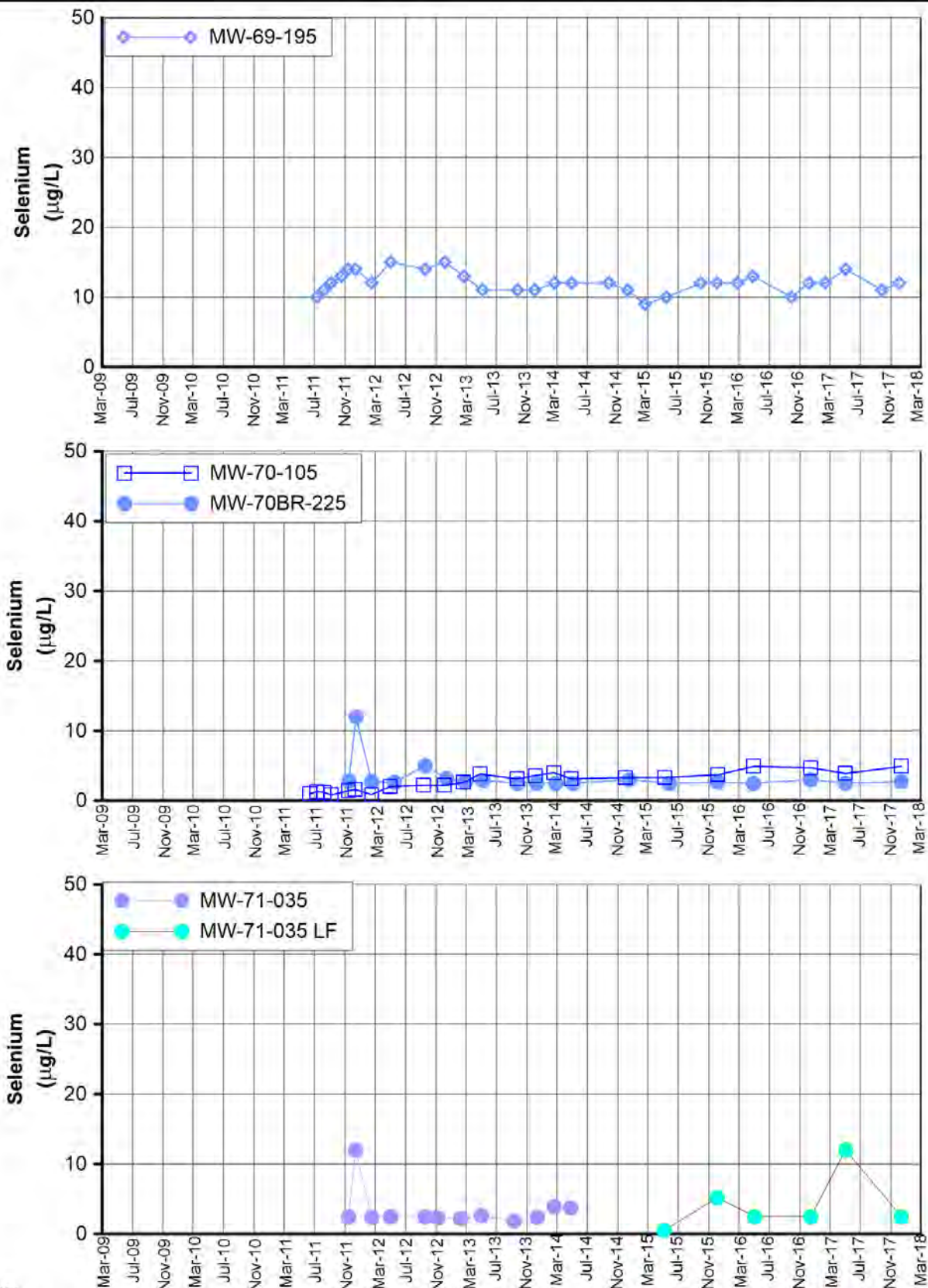
FIGURE C-72

SELENIUM

IN MW-66, MW-67, AND MW-68 CLUSTERS

FOURTH QUARTER 2017 AND ANNUAL 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.

1. MW-69-195 sampled using LF method on 2/09/2017, 5/03/2017, 9/26/2017, & 12/04/2017.
2. MW-70-105 sampled using LF method on 5/02/2017 & 12/11/2017.

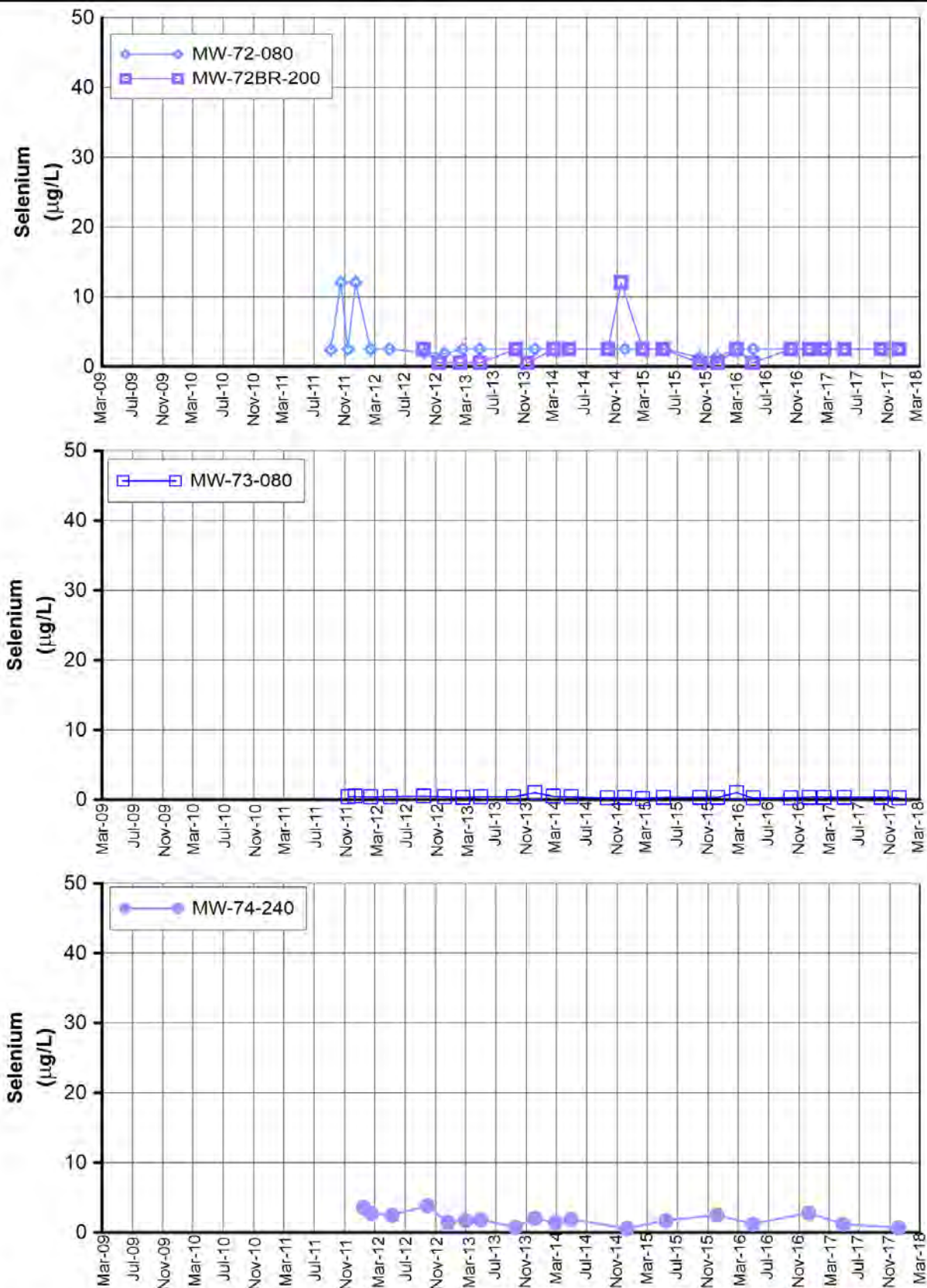
FIGURE C-73

SELENIUM

IN MW-69-195, THE MW-70 CLUSTER, AND MW-71-035

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





Notes:

1. MW-72-080 sampled using low flow sampling method on 5/02/2017 & 12/07/2017.
2. MW-73-080 sampled using low flow sampling method on 5/02/2017, 9/27/2017, & 12/06/2017
3. MW-74-240 sampled using low flow sampling method on 4/27/2017 & 12/06/2017.

**FIGURE C-74
SELENIUM**

IN MW-72 CLUSTER, MW-73-080, AND MW-74-240

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



Table C-1

Chromium Concentrations of Wells within Approximately 800 feet of TW-3D Compared to the Maximum Detected Chromium Concentrations from 2014

*Fourth Quarter 2017 and Annual 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 Fourth Quarter Hexavalent Chromium Result (µg/L)	Maximum 2014 Total Dissolved Chromium Concentration and New Trigger Levels (µg/L)	2017 Fourth Quarter Total Dissolved Chromium Result (µg/L)	Trigger Level Exceeded (Yes if triggered - blank if not)
Shallow Zone Wells					
MW-20-070	2,200	1,800	2,400	1,900	
MW-26	2,400	2,400	2,300	2,500	Y
MW-27-020	ND (0.20)	ND (0.2)	ND (1.0)	ND (1)	
MW-28-025	ND (0.20)	ND (0.2)	ND (1.0)	ND (1)	
MW-30-030	0.21	1.2	ND (1.0)	78	Y
MW-31-060	600	390	660	410	
MW-32-020	ND (1.0)	ND (1)	ND (5.0)	ND (5)	
MW-32-035	ND (1.0)	ND (1)	ND (1.0)	ND (1)	
MW-33-040	0.28	ND (1)	ND (1.0)	1.7	Y
MW-36-020	ND (0.20)	ND (0.2)	ND (1.0)	ND (1)	
MW-36-040	0.34	ND (0.2)	ND (1.0)	ND (1)	
MW-39-040	ND (0.20)	ND (0.2)	ND (1.0)	ND (1)	
MW-42-030	0.54	ND (0.2)	ND (1.0)	ND (1)	
MW-47-055	16	19	16	20	Y
Middle Zone Wells					
MW-20-100	2,900	1,500	2,900	1,400	
MW-27-060	ND (0.20)	ND (0.2)	ND (1.0)	ND (1)	
MW-30-050	ND (0.20)	ND (0.2)	ND (1.0)	ND (1)	
MW-33-090	13.3	5.5	15.5	5	Y
MW-34-055	ND (0.20)	ND (0.2)	ND (1.0)	ND (1)	
MW-36-050	ND (0.20)	ND (0.2)	ND (1.0)	ND (1)	
MW-36-070	ND (0.20)	ND (0.2)	ND (1.0)	ND (1)	
MW-39-050	ND (0.20)	ND (0.2)	ND (1.0)	ND (1)	
MW-39-060	ND (0.20)	ND (0.2)	ND (1.0)	1.8	Y
MW-39-070	ND (0.20)	ND (0.2)	ND (1.0)	ND (1)	
MW-42-055	0.35	ND (0.2)	2.8	1.3	
MW-42-065	ND (0.20)	ND (0.2)	ND (1.0)	ND (1)	
MW-44-070	ND (0.20)	ND (0.2)	ND (1.0)	ND (1)	
MW-51	4,800	3,700	4,800	4,100	
Deep Zone Wells					
MW-20-130	9,100	4,100	9,000	4,400	
MW-27-085	ND (1.0)	ND (1)	ND (1.0)	ND (1)	
MW-28-090	ND (0.20)	ND (0.2)	ND (1.0)	ND (1)	
MW-31-135	12	13	12	13	Y
MW-33-150	12 J	7	10.8	7.2	
MW-33-210	13	14	13.5	15	Y
MW-34-080	ND (0.20)	ND (0.2)	ND (1.0)	ND (1)	
MW-34-100	263	ND (1)	270	ND (1)	
MW-36-090	ND (0.20)	ND (0.2)	ND (1.0)	ND (1)	
MW-36-100	65	12	62	15	

Table C-1**Chromium Concentrations of Wells within Approximately 800 feet of TW-3D Compared to the Maximum Detected Chromium Concentrations from 2014**

*Fourth Quarter 2017 and Annual 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 Fourth Quarter Hexavalent Chromium Result (µg/L)	Maximum 2014 Total Dissolved Chromium Concentration and New Trigger Levels (µg/L)	2017 Fourth Quarter Total Dissolved Chromium Result (µg/L)	Trigger Level Exceeded (Yes if triggered - blank if not)
MW-39-080	ND (0.20)	0.26	ND (1.0)	1.2	Y
MW-39-100	57	71	49	66	Y
MW-44-115	41.6	14	42.9	13	
MW-44-125	4.0 J	2.9	5.9	4.8	
MW-45-095a	13.7 (a)	--	14.2 (a)	---	
MW-46-175	46.3	11	46.1	11	
MW-46-205	5.5	ND (1)	4.8	ND (1)	
MW-47-115	24	18	20	16	
PE-01	5.6	0.52	6	ND (1)	
TW-04	7.4	2.8	6.5	4	

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 D

Other Groundwater Monitoring Results



Table D-1

In Situ Byproducts and Geochemical Indicator Parameter Analytical Results, Fourth Quarter 2017

Fourth Quarter 2017 and Annual 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)	Manganese, Dissolved (µg/L)	Iron, Dissolved (µg/L)	Nitrate/Nitrite as N (mg/L)	Sulfate (mg/L)	Fluoride (mg/L)	Field ORP (mV)
MW-09	12/7/2017	1.5	ND (0.5)	ND (20)	11	230	--	8.8
MW-10	12/7/2017	2.5	0.58	ND (20)	12	260	--	--
MW-10	12/7/2017	2.6	0.53	26	13	250	--	-2.1
MW-11	12/7/2017	1.3	2.6	ND (20)	6	190	--	-0.10
MW-12	12/11/2017	38	2.2	ND (20)	15	480	--	68
MW-13	12/8/2017	2.2	160	4,000	--	150	--	-28
MW-14	12/13/2017	0.78	1.9	48	3.4	130	--	73
MW-15	12/12/2017	--	8.3	180	--	140	--	160
MW-16	12/12/2017	--	33	1,400	--	170	--	140
MW-17	12/12/2017	--	0.92	30	--	310	--	150
MW-18	12/12/2017	--	0.62	38	--	96	--	140
MW-19	12/8/2017	--	ND (0.5)	40	--	170	--	170
MW-20-070	12/7/2017	--	ND (0.5)	46	9	240	--	-6.4
MW-20-100	12/8/2017	FD	--	ND (0.5)	390 J	8.4	270	--
MW-20-100	12/8/2017	--	--	ND (0.5)	67 J	8.3	240	--
MW-20-130	12/7/2017	3.6	1.6	ND (20)	15	1,000	--	35
MW-21	12/12/2017	--	11	39	0.46	2,600	--	83
MW-22	12/6/2017	17	6,000	9,300	--	2,100	--	-59
MW-23-060	12/8/2017	4	3.5	25	--	660	--	110
MW-23-080	12/8/2017	4.9	4.2	33	--	970	--	54
MW-24A	12/7/2017	FD	0.22	21	--	ND (0.05)	--	--
MW-24A	12/7/2017	0.14	19	--	ND (0.05)	--	--	-30
MW-24B	12/7/2017	3.1	98	--	1.7	--	--	-59
MW-24BR	12/8/2017	0.37	140	280	ND (0.05)	460	--	-260
MW-25	12/8/2017	1.2	ND (0.5)	64	12	200	--	190
MW-26	12/11/2017	FD	1.9	0.96 J	110	20	510	--
MW-26	12/11/2017	2	3.6 J	99	21	500	--	76
MW-27-020	12/4/2017	1.2	65	65	ND (0.05)	240	--	46
MW-27-060	12/4/2017	11	240	470	ND (0.05)	190	0.55	-120
MW-27-085	12/4/2017	1.7	81	230	ND (0.05)	870	2	-32
MW-28-025	12/7/2017	0.71	ND (0.5)	ND (20)	ND (0.05)	270	--	79
MW-28-090	12/7/2017	1.7	130	500	ND (0.05)	570	1.9	-56
MW-29	12/7/2017	9.2	200	1,000	ND (0.05)	140	--	-120
MW-30-030	12/6/2017	2	230	1,200	ND (0.1)	2,700	--	-170
MW-30-050	12/6/2017	FD	2.9	170	78	ND (0.05)	200	--
MW-30-050	12/6/2017	2.9	170	48	ND (0.05)	200	--	77
MW-31-060	12/12/2017	1.1	ND (0.5)	36	3.4	210	--	150
MW-31-135	12/12/2017	FD	3.6	1.5	ND (20)	490	--	--
MW-31-135	12/12/2017	3.5	1.5	38	--	500	--	69
MW-32-020	12/4/2017	3.4	250	6,100	--	5,800	--	-130
MW-32-035	12/4/2017	20	900	7,000	ND (0.05)	1,100	--	-120
MW-33-040	12/7/2017	9.7	14	140	0.3	1,500	12	180
MW-33-090	12/7/2017	1.1	5.4	20	1.1	730	2.2	200
MW-33-150	12/7/2017	1.8	3.8	ND (20)	1.6	840	2.4	46
MW-33-210	12/7/2017	1	18	68	1.8	1,200	1.8	140
MW-34-055	12/6/2017	2.5	82	ND (100)	ND (0.05)	230	--	-62
MW-34-080	12/6/2017	1.4	42	130	ND (0.05)	670	--	-10
MW-34-100	12/6/2017	1.3	120	33	ND (0.05)	1,000	--	--
MW-35-060	12/8/2017	0.99	ND (0.5)	ND (20)	2.3	330	--	120
MW-35-135	12/8/2017	0.84	4.9	62	2.7	760	--	130
MW-36-020	12/6/2017	2.3	180	1,200	--	1,200	--	-140
MW-36-040	12/6/2017	4.8	99	340	ND (0.05)	160	--	-160
MW-36-050	12/6/2017	4.7	230	140	--	190	--	-85
MW-36-070	12/6/2017	2.3	230	24	--	240	--	-25
MW-36-090	12/6/2017	4.6	140	ND (20)	--	470	--	-38

Table D-1

In Situ Byproducts and Geochemical Indicator Parameter Analytical Results, Fourth Quarter 2017

Fourth Quarter 2017 and Annual 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)	Manganese, Dissolved (µg/L)	Iron, Dissolved (µg/L)	Nitrate/Nitrite as N (mg/L)	Sulfate (mg/L)	Fluoride (mg/L)	Field ORP (mV)
MW-36-100	12/6/2017	FD	4.5	330	140	ND (0.05)	630	--	--
MW-36-100	12/6/2017		4.3	310	140	ND (0.05)	630	--	-31
MW-37D	12/8/2017		--	5.9	45	0.33	660	--	-56
MW-37S	12/8/2017		1.8	ND (0.5)	35	--	310	--	-46
MW-38D	12/7/2017		7.3	22	ND (20)	ND (0.05)	730	--	-46
MW-38S	12/7/2017		7.3	70	ND (20)	3	160	--	-24
MW-39-040	12/5/2017	FD	18	130	--	--	--	--	--
MW-39-040	12/5/2017		18	130	--	--	--	--	-190
MW-39-050	12/5/2017		2.1	160	ND (20)	--	210	--	-54
MW-39-060	12/5/2017		4	83	71	0.3	220	--	-63
MW-39-070	12/5/2017		--	1.9	26	--	240	--	7.0
MW-39-080	12/5/2017		--	4.4	ND (20)	--	470	--	-78
MW-39-100	12/5/2017		2.1	7.9	ND (20)	ND (0.05)	1,100	--	91
MW-41D	12/13/2017	FD	2.8	66	39	0.49	760	--	--
MW-41D	12/13/2017		2.8	68	37	0.47	760	--	-60
MW-41M	12/13/2017		2.2	7.3	220	0.66	550	--	3.5
MW-41S	12/13/2017		1.6	0.5	ND (20)	1.6	330	--	31
MW-42-030	12/4/2017	FD	2.6	48	--	0.051	--	--	--
MW-42-030	12/4/2017		2.6	48	--	0.053	--	--	-180
MW-42-055	12/4/2017		28	20	100	--	170	--	-99
MW-42-065	12/4/2017		14	280	ND (20)	--	260	--	59
MW-43-025	12/5/2017		25	300	2,900	--	280	--	-150
MW-43-075	12/5/2017		12	740	4,400	--	940	--	-120
MW-43-090	12/5/2017		3.1	750	1,400	--	1,200	--	-68
MW-44-070	12/6/2017		4.6	150	390 J	--	230	--	-130
MW-44-115	12/6/2017		5.9	5.7	ND (20)	0.097	850	--	--
MW-44-125	12/6/2017		4.8	380	95	ND (0.05)	640	--	-52
MW-46-175	12/7/2017		--	17	70	1.1	900	--	--
MW-46-205	12/7/2017		--	39	ND (20)	--	900	--	140
MW-47-055	12/7/2017	FD	1.2	1.4	70	--	240	--	--
MW-47-055	12/7/2017		1.2	2	80	--	240	--	99
MW-47-115	12/7/2017		--	4.3	63	--	770	--	59
MW-48	12/13/2017		--	14	ND (20)	--	560	--	82
MW-49-135	12/7/2017		1.8	260	34	--	820	--	-39
MW-49-275	12/7/2017		--	340 J	53 J	--	1,400	--	-130
MW-49-365	12/7/2017		--	300	240	--	1,300	--	-110
MW-50-095	12/8/2017		--	1.1	36	--	290	--	100
MW-50-200	12/8/2017		--	4.6	110	--	890	--	170
MW-51	12/11/2017		3.8	4.1	ND (20)	8.7	690	--	66
MW-52D	12/5/2017		2.6	280	610	--	980	--	-92
MW-52M	12/5/2017	FD	0.74	210	1,200	--	660	--	--
MW-52M	12/5/2017		0.83	210	1,200	--	650	--	-69
MW-52S	12/5/2017		0.4	1,500	12,000	--	1,100	--	-80
MW-53D	12/5/2017		2.9	1,300	240	--	1,200	--	-100
MW-53M	12/5/2017		0.63	330	310	--	640	--	-140
MW-54-085	12/13/2017		4.22	745	16.4 U	--	580	--	-55
MW-54-140	12/13/2017		3.51	89.3	18.9 U	--	554	--	-80
MW-54-195	12/13/2017		1.36	268	149	--	1,300	--	-160
MW-55-045	12/13/2017		--	845	47.5 U	--	90.2	--	-110
MW-55-120	12/13/2017		--	ND (10)	12.3 U	--	292	--	78
MW-56D	12/13/2017		--	674	727	--	1,500	--	-41
MW-56M	12/13/2017		--	784	3,280	--	1,140	--	-97
MW-56S	12/13/2017		--	780	8,180	--	695	--	-120
MW-57-070	12/11/2017		1.5	ND (0.5)	ND (20)	9.5	90	--	-96
MW-57-185	12/11/2017		11	160	ND (20)	0.15	750	--	100

Table D-1

In Situ Byproducts and Geochemical Indicator Parameter Analytical Results, Fourth Quarter 2017

Fourth Quarter 2017 and Annual 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)	Manganese, Dissolved (µg/L)	Iron, Dissolved (µg/L)	Nitrate/Nitrite as N (mg/L)	Sulfate (mg/L)	Fluoride (mg/L)	Field ORP (mV)
MW-58BR	12/11/2017	1.8	330	230	1.2	520	--	130
MW-59-100	12/7/2017	1.8	7.3	78	2.3	720	--	-5.8
MW-60-125	12/6/2017	1.6	11	230	4	490	--	-37
MW-60BR-245	12/13/2017	6.3	21	94	0.072	780	--	110
MW-60BR-245	12/14/2017	2.9	42	560	0.82	740	--	70
MW-61-110	12/6/2017	3.4	250	ND (20)	0.83	730	--	-42
MW-62-065	12/6/2017	1.7	2	ND (20)	4.5	420	--	-25
MW-62-110	12/7/2017	20	220	52	ND (0.05)	520	--	-180
MW-62-190	12/7/2017	FD 5.2 J	1,200	45	0.054	720	--	--
MW-62-190	12/7/2017	3.4 J	1,200	53	ND (0.05)	710	--	-200
MW-63-065	12/12/2017	1.5	1.3	26	1.2	560	--	73
MW-64BR	12/6/2017	4.2	1,000	330	ND (0.05)	590	--	-83
MW-65-160	12/5/2017	0.74	9.1 J	67	14	470	--	-3.2
MW-65-225	12/5/2017	2.3	160	ND (20)	4.4	780	--	-37
MW-66-165	12/5/2017	1.2	ND (0.5)	ND (20)	27	460	--	74
MW-66-230	12/5/2017	7.2	8.1	ND (20)	18	1,100	--	66
MW-66BR-270	12/14/2017	0.13	50	27	ND (0.05)	68	--	-160
MW-67-185	12/4/2017	0.94	ND (0.5)	ND (20)	84	530	--	100
MW-67-225	12/4/2017	3.4	7.1	79	28	1,200	--	77
MW-67-260	12/4/2017	6.9	2.3	ND (20)	0.54	760	--	-53
MW-69-195	12/4/2017	2.5	0.79	ND (20)	18	610	--	-5.0
MW-70-105	12/11/2017	3.9	11	37	4.5	260	--	140
MW-70BR-225	12/11/2017	2.2	5.7	110	3.8	800	--	180
MW-71-035	12/12/2017	2.5	2,200	1,300 J	ND (0.05)	1,300	--	79
MW-72-080	12/7/2017	11	46	ND (20)	0.75	700	--	-10
MW-72BR-200	12/6/2017	15	100	39	0.16	700	--	-170
MW-73-080	12/6/2017	1.4	34	140	2.7	460	--	-35
MW-74-240	12/6/2017	13	43	3,300	ND (0.05)	74	--	-18
OW-03D	12/8/2017	FD --	1.9	43	--	410	--	--
OW-03D	12/8/2017	--	2	60	--	410	--	72
OW-03M	12/8/2017	--	2	54	--	330	--	85
OW-03S	12/8/2017	--	ND (0.5)	49	--	81	--	75
PE-01	11/2/2017	--	280	ND (20)	ND (0.05)	410	--	110
PE-01	12/7/2017	--	310	630	ND (0.05)	400	--	--
PE-1	12/7/2017	--	--	--	--	--	--	-54
PGE-07BR	12/8/2017	--	3,800	42,000	--	470	--	-230
PGE-08	12/14/2017	--	630	67	ND (0.05)	1,800	--	-85
PM-03	12/14/2017	--	ND (0.5)	ND (20)	3.1	62	--	-80.8
PM-04	12/14/2017	FD --	ND (0.5)	ND (20)	2.1	120	--	--
PM-04	12/14/2017	--	ND (0.5)	ND (20)	2.3	110	--	-79.5
TW-01	12/13/2017	FD --	ND (0.5)	ND (20)	15	700	--	--
TW-01	12/13/2017	--	ND (0.5)	ND (20)	16	710	--	-77
TW-02D	12/7/2017	--	24	ND (20)	--	370	--	--
TW-02S	12/7/2017	--	ND (0.5)	23	4.5	170	--	-44
TW-03D	11/2/2017	--	10	ND (20)	3	510	--	100
TW-03D	12/7/2017	--	12	ND (20)	2.8	500	--	-34
TW-04	12/14/2017	--	86	68	--	1,100	--	150
TW-05	12/14/2017	--	19	260	--	550	--	41

Notes:

--- = data were not collected, was not available, were rejected or there was a field instrument malfunction.

FD = field duplicate sample.

J = concentration or RL estimated by laboratory or data validation.

mg/L = milligrams per liter.

mV = millivolts.

Table D-1

In Situ Byproducts and Geochemical Indicator Parameter Analytical Results, Fourth Quarter 2017

Fourth Quarter 2017 and Annual 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,	Manganese,	Iron,	Nitrate/Nitrite as N (mg/L)	Sulfate (mg/L)	Fluoride (mg/L)	Field ORP (mV)
		Dissolved (µg/L)	Dissolved (µg/L)	Dissolved (µg/L)				

ND = not detected at listed reporting limit (RL).

ORP = oxidation-reduction potential.

µg/L = micrograms per liter.

ORP is reported to two significant figures.

Starting in Fourth Quarter 2012, nitrate samples were analyzed using USEPA Method 353.2, except for TW-3D and PE-1, which were still analyzed using USEPA Method 300.0. USEPA Method 353.2 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 353.2 are expected to be essentially the same as previous samples analyzed using USEPA Method 300.0 and reported as nitrate as nitrogen.

Table D-2

Manual Water Level Measurements, January 2017 through December 2017

Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide

Groundwater and Surface Water Monitoring Report,

PG&E Topock Compressor Station, Needles, California

Location ID	Well Depth (feet BMP)	Measuring Point Elevation (feet amsl)	Monitoring Date	Water Level Measurement (feet BMP)	Salinity (percent)	Groundwater Elevation Adjusted for Salinity (feet amsl)
I-3	--	460.30	1/3/2017	7.58	--	452.72
I-3	--	460.30	2/7/2017	6.42	--	453.88
I-3	--	460.30	3/6/2017	5.13	--	455.17
I-3	--	460.30	4/3/2017	3.54	--	456.75
I-3	--	460.30	5/1/2017	2.82	--	457.46
I-3	--	460.30	6/5/2017	4.65	--	455.63
I-3	--	460.30	7/5/2017	5.04	--	455.24
I-3	--	460.30	8/1/2017	4.99	--	455.29
I-3	--	460.30	8/2/2017	4.15	--	456.12
I-3	--	460.30	9/5/2017	5.83	--	454.45
I-3	--	460.30	10/3/2017	4.62	--	455.66
I-3	--	460.30	11/1/2017	5.55	--	454.74
I-3	--	460.30	12/4/2017	7.24	--	453.05
MW-10	97	530.65	2/8/2017	75.95	0.17	454.63
MW-10	97	530.65	3/8/2017	75.82	0.17	454.76
MW-10	97	530.65	5/3/2017	74.73	0.17	455.84
MW-10	97	530.65	8/3/2017	74.43	0.17	456.15
MW-10	97	530.65	10/31/2017	74.96	0.17	455.62
MW-11	86	522.54	2/9/2017	67.59	0.15	454.88
MW-11	86	522.54	3/8/2017	67.58	0.15	454.89
MW-11	86	522.54	5/3/2017	66.37	0.15	456.09
MW-11	86	522.54	8/3/2017	66.21	0.15	456.25
MW-11	86	522.54	10/31/2017	66.78	0.15	455.69
MW-20-070	70	500.07	1/5/2017	48.23	0.12	451.77
MW-20-070	70	500.07	2/9/2017	47.78	0.12	452.21
MW-20-070	70	500.07	3/7/2017	47.04	0.12	452.95
MW-20-070	70	500.07	4/4/2017	44.98	0.12	455.00
MW-20-070	70	500.07	5/2/2017	45.58	0.12	454.42
MW-20-070	70	500.07	6/7/2017	45.77	0.12	454.23
MW-20-070	70	500.07	7/6/2017	45.44	0.12	454.56
MW-20-070	70	500.07	8/2/2017	46.15	0.12	453.85
MW-20-070	70	500.07	8/3/2017	45.98	0.12	454.02
MW-20-070	70	500.07	8/3/2017	45.98	0.12	454.02
MW-20-070	70	500.07	9/5/2017	46.44	0.12	453.56
MW-20-070	70	500.07	10/3/2017	46.47	0.12	453.53
MW-20-070	70	500.07	11/1/2017	47.14	0.12	452.86
MW-20-070	70	500.07	12/6/2017	47.56	0.12	452.44
MW-20-100	101	500.58	1/5/2017	49.22	0.16	451.22
MW-20-100	101	500.58	2/9/2017	48.62	0.15	451.81
MW-20-100	101	500.58	3/7/2017	47.92	0.15	452.51
MW-20-100	101	500.58	4/4/2017	45.03	0.15	455.39
MW-20-100	101	500.58	4/27/2017	46.67	0.15	453.76
MW-20-100	101	500.58	6/7/2017	46.72	0.15	453.71
MW-20-100	101	500.58	7/6/2017	46.67	0.15	453.76
MW-20-100	101	500.58	8/2/2017	47.30	0.15	453.13
MW-20-100	101	500.58	9/6/2017	47.48	0.15	452.95
MW-20-100	101	500.58	10/3/2017	47.43	0.15	453.00
MW-20-100	101	500.58	11/1/2017	48.11	0.15	452.32
MW-20-100	101	500.58	12/6/2017	48.61	0.15	451.82
MW-20-130	132	500.66	1/5/2017	50.13	0.77	450.66
MW-20-130	132	500.66	2/9/2017	49.46	0.77	451.34
MW-20-130	132	500.66	3/7/2017	48.73	0.77	452.07
MW-20-130	132	500.66	4/4/2017	45.17	0.77	455.63
MW-20-130	132	500.66	5/2/2017	47.29	0.77	453.51
MW-20-130	132	500.66	6/7/2017	47.61	0.77	453.19
MW-20-130	132	500.66	7/6/2017	47.58	0.77	453.22
MW-20-130	132	500.66	8/2/2017	48.28	0.79	452.53

Table D-2

Manual Water Level Measurements, January 2017 through December 2017

Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide

Groundwater and Surface Water Monitoring Report,

PG&E Topock Compressor Station, Needles, California

Location ID	Well Depth (feet BMP)	Measuring Point Elevation (feet amsl)	Monitoring Date	Water Level Measurement (feet BMP)	Salinity (percent)	Groundwater Elevation Adjusted for Salinity (feet amsl)
MW-20-130	132	500.66	9/5/2017	48.44	0.79	452.37
MW-20-130	132	500.66	10/3/2017	48.33	0.79	452.48
MW-20-130	132	500.66	11/1/2017	49.04	0.79	451.77
MW-20-130	132	500.66	12/4/2017	49.61	0.79	451.20
MW-22	12	460.72	1/4/2017	7.23	1.31	453.54
MW-22	12	460.72	2/7/2017	7.24	1.33	453.53
MW-22	12	460.72	3/7/2017	6.72	1.33	454.05
MW-22	12	460.72	4/4/2017	5.74	1.33	455.04
MW-22	12	460.72	5/2/2017	5.18	1.33	455.61
MW-22	12	460.72	6/6/2017	5.26	1.33	455.53
MW-22	12	460.72	7/6/2017	5.40	1.33	455.39
MW-22	12	460.72	8/2/2017	5.62	1.20	455.16
MW-22	12	460.72	9/6/2017	5.87	1.20	454.90
MW-22	12	460.72	10/4/2017	5.86	1.20	454.91
MW-22	12	460.72	11/2/2017	6.48	1.20	454.29
MW-22	12	460.72	12/5/2017	6.82	1.20	453.95
MW-25	107	542.90	1/4/2017	88.82	0.15	454.01
MW-25	107	542.90	2/9/2017	88.96	0.12	453.87
MW-25	107	542.90	3/8/2017	88.47	0.12	454.36
MW-25	107	542.90	4/4/2017	87.54	0.12	455.28
MW-25	107	542.90	4/27/2017	87.04	0.12	455.78
MW-25	107	542.90	6/7/2017	86.97	0.12	455.85
MW-25	107	542.90	7/6/2017	86.81	0.12	456.01
MW-25	107	542.90	8/3/2017	87.20	0.12	455.62
MW-25	107	542.90	10/3/2017	87.59	0.12	455.23
MW-25	107	542.90	11/1/2017	88.00	0.12	454.82
MW-25	107	542.90	12/6/2017	88.37	0.12	454.45
MW-26	70	502.22	1/5/2017	48.52	0.28	453.66
MW-26	70	502.22	2/9/2017	48.59	0.28	453.59
MW-26	70	502.22	3/8/2017	48.13	0.28	454.04
MW-26	70	502.22	4/5/2017	47.05	0.28	455.12
MW-26	70	502.22	5/3/2017	46.61	0.28	455.56
MW-26	70	502.22	6/7/2017	46.67	0.27	455.50
MW-26	70	502.22	7/6/2017	46.58	0.27	455.59
MW-26	70	502.22	8/3/2017	46.90	0.26	455.27
MW-26	70	502.22	9/8/2017	47.12	0.26	455.05
MW-26	70	502.22	10/4/2017	47.19	0.26	454.98
MW-26	70	502.22	11/2/2017	47.67	0.26	454.50
MW-27-020	14	460.56	1/3/2017	7.98	0.06	452.57
MW-27-020	14	460.56	2/7/2017	6.89	0.06	453.66
MW-27-020	14	460.56	3/6/2017	5.71	0.06	454.84
MW-27-020	14	460.56	4/3/2017	4.23	0.06	456.31
MW-27-020	14	460.56	5/1/2017	3.29	0.06	457.25
MW-27-020	14	460.56	6/6/2017	4.78	0.06	455.76
MW-27-020	14	460.56	7/5/2017	4.39	0.06	456.15
MW-27-020	14	460.56	8/2/2017	5.20	0.06	455.35
MW-27-020	14	460.56	9/5/2017	5.23	0.06	455.32
MW-27-020	14	460.56	10/4/2017	4.46	0.06	456.08
MW-27-020	14	460.56	11/1/2017	6.35	0.06	454.20
MW-27-020	14	460.56	12/5/2017	6.78	0.06	453.77
MW-27-060	59	461.49	1/3/2017	8.92	0.06	452.52
MW-27-060	59	461.49	2/7/2017	7.92	0.06	453.52
MW-27-060	59	461.49	3/6/2017	6.72	0.06	454.72
MW-27-060	59	461.49	4/3/2017	5.13	0.06	456.31
MW-27-060	59	461.49	4/27/2017	5.36	0.06	456.08
MW-27-060	59	461.49	5/1/2017	4.29	0.06	457.15
MW-27-060	59	461.49	6/6/2017	6.16	0.06	455.28

Table D-2

Manual Water Level Measurements, January 2017 through December 2017

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

Location ID	Well Depth (feet BMP)	Measuring Point Elevation (feet amsl)	Monitoring Date	Water Level Measurement (feet BMP)	Salinity (percent)	Groundwater Elevation Adjusted for Salinity (feet amsl)
MW-27-060	59	461.49	7/5/2017	5.46	0.06	455.98
MW-27-060	59	461.49	8/2/2017	6.29	0.06	455.15
MW-27-060	59	461.49	9/5/2017	6.33	0.06	455.11
MW-27-060	59	461.49	10/4/2017	5.33	0.06	456.11
MW-27-060	59	461.49	11/1/2017	7.21	0.06	454.23
MW-27-060	59	461.49	12/5/2017	7.77	0.06	453.67
MW-27-085	80	460.99	1/3/2017	8.79	0.73	452.47
MW-27-085	80	460.99	2/7/2017	7.82	0.73	453.45
MW-27-085	80	460.99	3/6/2017	6.63	0.73	454.64
MW-27-085	80	460.99	4/3/2017	5.04	0.74	456.25
MW-27-085	80	460.99	5/1/2017	4.11	0.74	457.17
MW-27-085	80	460.99	6/5/2017	5.65	0.74	455.63
MW-27-085	80	460.99	7/5/2017	5.41	0.74	455.87
MW-27-085	80	460.99	8/1/2017	6.48	0.76	454.80
MW-27-085	80	460.99	8/2/2017	6.15	0.76	455.13
MW-27-085	80	460.99	9/5/2017	6.24	0.76	455.04
MW-27-085	80	460.99	10/2/2017	5.82	0.76	455.47
MW-27-085	80	460.99	11/1/2017	7.08	0.73	454.19
MW-27-085	80	460.99	12/4/2017	7.85	0.73	453.41
MW-28-025	21	466.77	1/4/2017	14.07	0.07	452.68
MW-28-025	21	466.77	2/7/2017	13.18	0.07	453.57
MW-28-025	21	466.77	3/7/2017	12.10	0.07	454.65
MW-28-025	21	466.77	4/4/2017	10.42	0.07	456.32
MW-28-025	21	466.77	4/28/2017	10.29	0.07	456.45
MW-28-025	21	466.77	6/6/2017	10.66	0.07	456.08
MW-28-025	21	466.77	7/5/2017	11.15	0.07	455.59
MW-28-025	21	466.77	8/2/2017	11.55	0.07	455.19
MW-28-025	21	466.77	9/6/2017	11.69	0.07	455.05
MW-28-025	21	466.77	10/3/2017	12.39	0.07	454.35
MW-28-025	21	466.77	11/1/2017	12.43	0.07	454.32
MW-28-025	21	466.77	12/6/2017	13.57	0.07	453.18
MW-28-090	98	467.53	1/4/2017	14.79	0.38	452.83
MW-28-090	98	467.53	2/7/2017	14.01	0.34	453.59
MW-28-090	98	467.53	3/7/2017	13.09	0.34	454.51
MW-28-090	98	467.53	4/4/2017	11.18	0.34	456.42
MW-28-090	98	467.53	5/1/2017	10.78	0.34	456.79
MW-28-090	98	467.53	6/6/2017	11.61	0.34	455.96
MW-28-090	98	467.53	7/5/2017	12.41	0.34	455.16
MW-28-090	98	467.53	8/2/2017	12.36	0.32	455.20
MW-28-090	98	467.53	9/6/2017	12.77	0.32	454.79
MW-28-090	98	467.53	10/3/2017	12.45	0.32	455.11
MW-28-090	98	467.53	11/1/2017	13.21	0.32	454.35
MW-28-090	98	467.53	12/6/2017	14.54	0.32	453.02
MW-30-050	53	468.81	1/4/2017	16.14	0.07	452.62
MW-30-050	53	468.81	2/8/2017	15.59	0.07	453.17
MW-30-050	53	468.81	3/7/2017	14.49	0.07	454.27
MW-30-050	53	468.81	4/4/2017	12.73	0.07	456.02
MW-30-050	53	468.81	5/3/2017	13.14	0.07	455.61
MW-30-050	53	468.81	6/6/2017	13.44	0.07	455.32
MW-30-050	53	468.81	7/6/2017	13.02	0.07	455.73
MW-30-050	53	468.81	8/3/2017	13.55	0.07	455.21
MW-30-050	53	468.81	9/6/2017	13.74	0.07	455.02
MW-30-050	53	468.81	10/4/2017	13.42	0.07	455.34
MW-30-050	53	468.81	11/1/2017	15.09	0.07	453.67
MW-30-050	53	468.81	12/5/2017	15.86	0.07	452.90
MW-31-060	64	496.81	1/4/2017	43.62	0.20	453.15
MW-31-060	64	496.81	2/8/2017	43.58	0.20	453.19

Table D-2

Manual Water Level Measurements, January 2017 through December 2017

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

Location ID	Well Depth (feet BMP)	Measuring Point Elevation (feet amsl)	Monitoring Date	Water Level Measurement (feet BMP)	Salinity (percent)	Groundwater Elevation Adjusted for Salinity (feet amsl)
MW-31-060	64	496.81	3/6/2017	42.76	0.20	454.01
MW-31-060	64	496.81	4/4/2017	41.24	0.20	455.52
MW-31-060	64	496.81	4/27/2017	41.19	0.20	455.57
MW-31-060	64	496.81	5/2/2017	41.13	0.19	455.62
MW-31-060	64	496.81	6/7/2017	41.39	0.19	455.36
MW-31-060	64	496.81	7/6/2017	41.39	0.19	455.36
MW-31-060	64	496.81	8/2/2017	41.79	0.19	454.96
MW-31-060	64	496.81	9/6/2017	42.07	0.19	454.68
MW-31-060	64	496.81	10/4/2017	41.98	0.19	454.77
MW-31-060	64	496.81	11/1/2017	42.85	0.19	453.91
MW-31-060	64	496.81	12/6/2017	43.28	0.19	453.48
MW-31-135	135	498.11	1/3/2017	46.38	0.71	451.93
MW-31-135	135	498.11	2/7/2017	45.68	0.71	452.63
MW-31-135	135	498.11	3/6/2017	44.94	0.71	453.37
MW-31-135	135	498.11	4/3/2017	42.57	0.73	455.76
MW-31-135	135	498.11	5/1/2017	43.17	0.73	455.16
MW-31-135	135	498.11	6/5/2017	43.70	0.73	454.63
MW-31-135	135	498.11	7/5/2017	43.79	0.73	454.54
MW-31-135	135	498.11	8/1/2017	44.16	0.72	454.16
MW-31-135	135	498.11	9/5/2017	44.49	0.72	453.83
MW-31-135	135	498.11	10/2/2017	44.32	0.72	454.00
MW-31-135	135	498.11	11/1/2017	45.05	0.73	453.27
MW-31-135	135	498.11	12/4/2017	45.66	0.73	452.66
MW-32-035	37	461.63	1/4/2017	8.92	0.75	452.79
MW-32-035	37	461.63	2/8/2017	8.56	0.71	453.15
MW-32-035	37	461.63	3/7/2017	7.22	0.71	454.49
MW-32-035	37	461.63	4/4/2017	5.78	0.71	455.93
MW-32-035	37	461.63	5/2/2017	5.42	0.71	456.30
MW-32-035	37	461.63	6/6/2017	6.38	0.71	455.34
MW-32-035	37	461.63	7/6/2017	6.09	0.71	455.63
MW-32-035	37	461.63	8/2/2017	6.80	0.72	454.92
MW-32-035	37	461.63	9/6/2017	6.78	0.72	454.94
MW-32-035	37	461.63	10/4/2017	6.12	0.72	455.60
MW-32-035	37	461.63	11/2/2017	7.65	0.72	454.06
MW-32-035	37	461.63	12/5/2017	8.05	0.72	453.66
MW-33-040	42	487.38	1/4/2017	34.29	0.69	453.11
MW-33-040	42	487.38	2/7/2017	33.87	0.79	453.53
MW-33-040	42	487.38	3/7/2017	32.96	0.79	454.45
MW-33-040	42	487.38	4/3/2017	31.62	0.79	455.79
MW-33-040	42	487.38	4/28/2017	31.36	0.79	456.04
MW-33-040	42	487.38	6/6/2017	31.52	0.79	455.88
MW-33-040	42	487.38	7/5/2017	31.83	0.79	455.57
MW-33-040	42	487.38	8/2/2017	32.18	0.84	455.22
MW-33-040	42	487.38	9/6/2017	32.48	0.84	454.92
MW-33-040	42	487.38	10/3/2017	32.28	0.84	455.12
MW-33-040	42	487.38	11/1/2017	33.08	0.84	454.32
MW-33-040	42	487.38	12/6/2017	33.79	0.84	453.61
MW-33-090	88	487.55	1/4/2017	34.53	0.63	453.09
MW-33-090	88	487.55	2/7/2017	33.94	0.61	453.68
MW-33-090	88	487.55	3/6/2017	33.03	0.61	454.59
MW-33-090	88	487.55	4/3/2017	31.61	0.61	456.01
MW-33-090	88	487.55	5/1/2017	30.98	0.61	456.63
MW-33-090	88	487.55	6/6/2017	31.57	0.61	456.04
MW-33-090	88	487.55	7/5/2017	31.99	0.61	455.62
MW-33-090	88	487.55	8/2/2017	32.21	0.64	455.41
MW-33-090	88	487.55	10/3/2017	32.46	0.64	455.16
MW-33-090	88	487.55	11/1/2017	33.21	0.64	454.41

Table D-2

Manual Water Level Measurements, January 2017 through December 2017

Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide

Groundwater and Surface Water Monitoring Report,

PG&E Topock Compressor Station, Needles, California

Location ID	Well Depth (feet BMP)	Measuring Point Elevation (feet amsl)	Monitoring Date	Water Level Measurement (feet BMP)	Salinity (percent)	Groundwater Elevation Adjusted for Salinity (feet amsl)
MW-33-090	88	487.55	12/6/2017	34.04	0.64	453.58
MW-33-150	155	487.77	1/3/2017	35.27	1.06	453.04
MW-33-150	155	487.77	2/7/2017	34.41	1.06	453.90
MW-33-150	155	487.77	3/6/2017	33.67	1.06	454.65
MW-33-150	155	487.77	4/3/2017	32.13	1.10	456.23
MW-33-150	155	487.77	5/1/2017	31.68	1.10	456.63
MW-33-150	155	487.77	6/5/2017	32.11	1.10	456.20
MW-33-150	155	487.77	7/5/2017	32.63	1.10	455.68
MW-33-150	155	487.77	8/1/2017	33.01	1.09	455.29
MW-33-150	155	487.77	8/2/2017	32.75	1.09	455.55
MW-33-150	155	487.77	9/5/2017	33.36	1.09	454.94
MW-33-150	155	487.77	10/3/2017	33.04	1.09	455.26
MW-33-150	155	487.77	11/1/2017	33.68	1.05	454.58
MW-33-150	155	487.77	12/4/2017	34.47	1.05	453.79
MW-34-055	57	460.95	1/3/2017	8.47	0.06	452.42
MW-34-055	57	460.95	2/7/2017	7.58	0.06	453.31
MW-34-055	57	460.95	3/6/2017	6.23	0.06	454.66
MW-34-055	57	460.95	4/3/2017	4.58	0.06	456.30
MW-34-055	57	460.95	5/1/2017	3.97	0.06	456.91
MW-34-055	57	460.95	6/6/2017	5.77	0.06	455.12
MW-34-055	57	460.95	7/5/2017	5.12	0.06	455.77
MW-34-055	57	460.95	8/2/2017	5.97	0.06	454.92
MW-34-055	57	460.95	9/5/2017	6.08	0.06	454.81
MW-34-055	57	460.95	10/2/2017	5.34	0.06	455.55
MW-34-055	57	460.95	11/1/2017	6.72	0.06	454.17
MW-34-055	57	460.95	12/5/2017	7.37	0.06	453.52
MW-34-080	84	461.20	1/3/2017	8.94	0.36	452.33
MW-34-080	84	461.20	2/7/2017	7.89	0.38	453.39
MW-34-080	84	461.20	3/6/2017	6.59	0.38	454.69
MW-34-080	84	461.20	4/3/2017	4.77	0.38	456.51
MW-34-080	84	461.20	5/1/2017	3.92	0.38	457.37
MW-34-080	84	461.20	6/6/2017	5.94	0.38	455.35
MW-34-080	84	461.20	7/5/2017	5.32	0.38	455.97
MW-34-080	84	461.20	8/2/2017	6.12	0.44	455.20
MW-34-080	84	461.20	9/5/2017	6.27	0.44	455.05
MW-34-080	84	461.20	10/2/2017	5.56	0.44	455.76
MW-34-080	84	461.20	11/1/2017	6.92	0.44	454.40
MW-34-080	84	461.20	12/7/2017	7.32	0.44	454.01
MW-34-100	117	460.96	1/3/2017	8.82	0.80	452.60
MW-34-100	117	460.96	2/7/2017	8.21	0.80	453.21
MW-34-100	117	460.96	3/6/2017	6.97	0.80	454.46
MW-34-100	117	460.96	4/3/2017	5.04	0.79	456.39
MW-34-100	117	460.96	5/1/2017	4.23	0.79	457.20
MW-34-100	117	460.96	6/5/2017	5.79	0.79	455.63
MW-34-100	117	460.96	7/5/2017	5.52	0.79	455.90
MW-34-100	117	460.96	8/1/2017	6.54	0.72	454.82
MW-34-100	117	460.96	9/5/2017	6.42	0.72	454.94
MW-34-100	117	460.96	10/2/2017	5.86	0.72	455.50
MW-34-100	117	460.96	11/1/2017	7.11	0.73	454.28
MW-34-100	117	460.96	12/4/2017	7.86	0.73	453.53
MW-35-060	57	484.33	1/4/2017	31.06	0.43	453.26
MW-35-060	57	484.33	2/8/2017	30.56	0.45	453.77
MW-35-060	57	484.33	3/7/2017	29.32	0.45	455.01
MW-35-060	57	484.33	4/4/2017	27.95	0.45	456.38
MW-35-060	57	484.33	5/2/2017	27.80	0.45	456.51
MW-35-060	57	484.33	6/7/2017	28.03	0.45	456.28
MW-35-060	57	484.33	7/5/2017	28.23	0.45	456.08

Table D-2

Manual Water Level Measurements, January 2017 through December 2017

Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide

Groundwater and Surface Water Monitoring Report,

PG&E Topock Compressor Station, Needles, California

Location ID	Well Depth (feet BMP)	Measuring Point Elevation (feet amsl)	Monitoring Date	Water Level Measurement (feet BMP)	Salinity (percent)	Groundwater Elevation Adjusted for Salinity (feet amsl)
MW-35-060	57	484.33	8/2/2017	28.79	0.44	455.51
MW-35-060	57	484.33	9/7/2017	28.68	0.44	455.62
MW-35-060	57	484.33	10/4/2017	28.42	0.44	455.88
MW-35-060	57	484.33	11/1/2017	29.61	0.44	454.69
MW-35-060	57	484.33	12/6/2017	30.21	0.44	454.09
MW-35-135	159	484.24	1/4/2017	30.52	0.71	453.97
MW-35-135	159	484.24	2/8/2017	30.23	0.71	454.26
MW-35-135	159	484.24	3/7/2017	29.34	0.71	455.15
MW-35-135	159	484.24	4/4/2017	28.14	0.71	456.35
MW-35-135	159	484.24	4/27/2017	27.81	0.71	456.68
MW-35-135	159	484.24	6/7/2017	27.96	0.71	456.47
MW-35-135	159	484.24	7/5/2017	27.84	0.71	456.59
MW-35-135	159	484.24	8/2/2017	28.45	0.73	456.00
MW-35-135	159	484.24	9/7/2017	28.54	0.73	455.91
MW-35-135	159	484.24	10/4/2017	28.46	0.73	455.99
MW-35-135	159	484.24	11/1/2017	29.22	0.73	455.23
MW-35-135	159	484.24	12/6/2017	29.78	0.73	454.67
MW-36-020	20	469.33	1/3/2017	16.87	0.64	452.47
MW-36-020	20	469.33	2/8/2017	15.83	0.64	453.52
MW-36-020	20	469.33	3/7/2017	14.90	0.64	454.45
MW-36-020	20	469.33	4/4/2017	13.47	0.64	455.88
MW-36-020	20	469.33	4/27/2017	13.36	0.64	455.99
MW-36-020	20	469.33	5/2/2017	13.24	0.69	456.12
MW-36-020	20	469.33	6/6/2017	13.67	0.69	455.68
MW-36-020	20	469.33	7/6/2017	13.71	0.69	455.64
MW-36-020	20	469.33	8/3/2017	14.35	0.69	455.00
MW-36-020	20	469.33	9/6/2017	14.09	0.69	455.26
MW-36-020	20	469.33	10/3/2017	14.33	0.69	455.02
MW-36-020	20	469.33	11/1/2017	15.30	0.69	454.05
MW-36-020	20	469.33	12/5/2017	15.88	0.69	453.47
MW-36-040	40	469.59	1/3/2017	17.29	0.08	452.26
MW-36-040	40	469.59	2/8/2017	16.13	0.08	453.42
MW-36-040	40	469.59	3/7/2017	15.07	0.08	454.48
MW-36-040	40	469.59	4/4/2017	13.48	0.08	456.07
MW-36-040	40	469.59	5/2/2017	13.63	0.08	455.92
MW-36-040	40	469.59	6/6/2017	14.04	0.07	455.51
MW-36-040	40	469.59	7/6/2017	13.97	0.07	455.58
MW-36-040	40	469.59	8/3/2017	14.85	0.07	454.70
MW-36-040	40	469.59	9/6/2017	14.22	0.07	455.33
MW-36-040	40	469.59	10/3/2017	14.59	0.07	454.96
MW-36-040	40	469.59	11/1/2017	15.72	0.07	453.83
MW-36-040	40	469.59	12/5/2017	16.47	0.07	453.08
MW-36-050	108	469.62	1/3/2017	17.31	0.07	452.18
MW-36-050	108	469.62	2/8/2017	16.14	0.07	453.35
MW-36-050	108	469.62	3/7/2017	15.08	0.07	454.41
MW-36-050	108	469.62	4/4/2017	13.48	0.07	456.00
MW-36-050	108	469.62	5/2/2017	13.64	0.07	455.84
MW-36-050	108	469.62	7/6/2017	14.08	0.07	455.40
MW-36-050	108	469.62	8/3/2017	14.92	0.07	454.57
MW-36-050	108	469.62	9/6/2017	14.23	0.07	455.25
MW-36-050	108	469.62	10/3/2017	14.57	0.07	454.92
MW-36-050	108	469.62	11/1/2017	15.72	0.07	453.77
MW-36-050	108	469.62	12/5/2017	16.52	0.07	452.97
MW-36-070	70	469.27	1/3/2017	16.63	0.06	452.56
MW-36-070	70	469.27	2/8/2017	15.82	0.06	453.37
MW-36-070	70	469.27	3/7/2017	14.73	0.06	454.46
MW-36-070	70	469.27	4/4/2017	13.12	0.06	456.06

Table D-2

Manual Water Level Measurements, January 2017 through December 2017

Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide

Groundwater and Surface Water Monitoring Report,

PG&E Topock Compressor Station, Needles, California

Location ID	Well Depth (feet BMP)	Measuring Point Elevation (feet amsl)	Monitoring Date	Water Level Measurement (feet BMP)	Salinity (percent)	Groundwater Elevation Adjusted for Salinity (feet amsl)
MW-36-070	70	469.27	5/2/2017	13.31	0.06	455.87
MW-36-070	70	469.27	6/6/2017	13.76	0.06	455.42
MW-36-070	70	469.27	7/6/2017	13.65	0.06	455.53
MW-36-070	70	469.27	8/3/2017	14.50	0.06	454.69
MW-36-070	70	469.27	9/6/2017	13.87	0.06	455.31
MW-36-070	70	469.27	10/3/2017	14.25	0.06	454.94
MW-36-070	70	469.27	11/1/2017	15.36	0.06	453.83
MW-36-070	70	469.27	12/5/2017	16.12	0.06	453.07
MW-36-090	90	469.64	1/3/2017	17.72	0.11	451.85
MW-36-090	90	469.64	2/8/2017	17.03	0.11	452.54
MW-36-090	90	469.64	3/7/2017	16.05	0.11	453.52
MW-36-090	90	469.64	4/4/2017	13.59	0.11	455.98
MW-36-090	90	469.64	5/2/2017	14.33	0.11	455.18
MW-36-090	90	469.64	6/6/2017	14.65	0.11	454.86
MW-36-090	90	469.64	7/6/2017	14.60	0.11	454.91
MW-36-090	90	469.64	8/3/2017	15.65	0.19	453.91
MW-36-090	90	469.64	9/6/2017	14.91	0.19	454.65
MW-36-090	90	469.64	10/3/2017	15.18	0.19	454.38
MW-36-090	90	469.64	11/1/2017	16.26	0.19	453.30
MW-36-090	90	469.64	12/5/2017	16.91	0.19	452.65
MW-36-100	108	469.65	1/3/2017	17.72	0.48	452.08
MW-36-100	108	469.65	2/8/2017	17.05	0.49	452.76
MW-36-100	108	469.65	3/7/2017	16.07	0.49	453.74
MW-36-100	108	469.65	4/4/2017	13.67	0.49	456.14
MW-36-100	108	469.65	5/2/2017	14.32	0.49	455.47
MW-36-100	108	469.65	6/6/2017	14.61	0.49	455.18
MW-36-100	108	469.65	7/6/2017	14.61	0.49	455.18
MW-36-100	108	469.65	8/3/2017	15.71	0.49	454.08
MW-36-100	108	469.65	9/6/2017	14.87	0.49	454.92
MW-36-100	108	469.65	10/3/2017	15.22	0.49	454.57
MW-36-100	108	469.65	11/1/2017	16.25	0.49	453.54
MW-36-100	108	469.65	12/5/2017	16.97	0.49	452.82
MW-37S	85	485.97	2/9/2017	32.22	0.49	453.76
MW-37S	85	485.97	3/8/2017	31.72	0.49	454.26
MW-37S	85	485.97	5/3/2017	30.22	0.49	455.76
MW-37S	85	485.97	8/3/2017	30.52	0.49	455.46
MW-37S	85	485.97	10/31/2017	81.22	0.49	404.75
MW-38S	98	526.59	2/8/2017	71.77	0.49	454.79
MW-38S	98	526.59	3/8/2017	71.57	0.49	454.99
MW-38S	98	526.59	5/3/2017	70.41	0.49	456.15
MW-38S	98	526.59	8/3/2017	70.16	0.49	456.41
MW-38S	98	526.59	10/31/2017	70.73	0.49	455.84
MW-39-040	42	468.02	1/4/2017	15.43	0.09	452.55
MW-39-040	42	468.02	2/8/2017	14.92	0.08	453.06
MW-39-040	42	468.02	3/7/2017	13.82	0.08	454.16
MW-39-040	42	468.02	4/4/2017	12.01	0.08	455.97
MW-39-040	42	468.02	4/28/2017	12.17	0.08	455.81
MW-39-040	42	468.02	6/6/2017	12.85	0.08	455.13
MW-39-040	42	468.02	7/6/2017	12.25	0.08	455.73
MW-39-040	42	468.02	8/3/2017	12.78	0.08	455.20
MW-39-040	42	468.02	9/6/2017	13.09	0.08	454.89
MW-39-040	42	468.02	10/4/2017	12.82	0.08	455.16
MW-39-040	42	468.02	11/2/2017	14.16	0.08	453.82
MW-39-040	42	468.02	12/6/2017	14.62	0.08	453.36
MW-39-050	55	467.93	1/4/2017	15.43	0.08	452.44
MW-39-050	55	467.93	2/8/2017	14.89	0.07	452.98
MW-39-050	55	467.93	3/7/2017	13.83	0.07	454.04

Table D-2

Manual Water Level Measurements, January 2017 through December 2017

Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide

Groundwater and Surface Water Monitoring Report,

PG&E Topock Compressor Station, Needles, California

Location ID	Well Depth (feet BMP)	Measuring Point Elevation (feet amsl)	Monitoring Date	Water Level Measurement (feet BMP)	Salinity (percent)	Groundwater Elevation Adjusted for Salinity (feet amsl)
MW-39-050	55	467.93	4/4/2017	11.93	0.07	455.94
MW-39-050	55	467.93	5/2/2017	12.35	0.07	455.52
MW-39-050	55	467.93	6/6/2017	12.81	0.07	455.06
MW-39-050	55	467.93	7/6/2017	12.21	0.07	455.66
MW-39-050	55	467.93	8/3/2017	12.68	0.07	455.19
MW-39-050	55	467.93	9/6/2017	13.08	0.07	454.79
MW-39-050	55	467.93	10/4/2017	12.81	0.07	455.06
MW-39-050	55	467.93	11/2/2017	14.15	0.07	453.72
MW-39-050	55	467.93	12/6/2017	14.59	0.07	453.28
MW-39-060	66	468.00	1/4/2017	15.64	0.09	452.29
MW-39-060	66	468.00	2/8/2017	15.12	0.08	452.81
MW-39-060	66	468.00	3/7/2017	14.08	0.08	453.85
MW-39-060	66	468.00	4/4/2017	12.03	0.08	455.89
MW-39-060	66	468.00	5/2/2017	12.62	0.08	455.30
MW-39-060	66	468.00	6/6/2017	13.02	0.08	454.90
MW-39-060	66	468.00	7/6/2017	12.28	0.08	455.64
MW-39-060	66	468.00	8/3/2017	12.72	0.08	455.20
MW-39-060	66	468.00	9/6/2017	13.36	0.08	454.57
MW-39-060	66	468.00	10/4/2017	13.11	0.08	454.82
MW-39-060	66	468.00	11/2/2017	14.39	0.08	453.54
MW-39-060	66	468.00	12/6/2017	14.82	0.08	453.12
MW-39-070	72	468.02	1/4/2017	16.27	0.15	451.71
MW-39-070	72	468.02	2/8/2017	15.69	0.12	452.27
MW-39-070	72	468.02	3/7/2017	14.73	0.12	453.23
MW-39-070	72	468.02	4/4/2017	12.19	0.12	455.77
MW-39-070	72	468.02	5/2/2017	13.31	0.12	454.65
MW-39-070	72	468.02	6/6/2017	13.71	0.12	454.25
MW-39-070	72	468.02	7/6/2017	12.35	0.12	455.61
MW-39-070	72	468.02	8/3/2017	12.82	0.12	455.14
MW-39-070	72	468.02	9/6/2017	14.13	0.12	453.83
MW-39-070	72	468.02	10/4/2017	13.94	0.12	454.02
MW-39-070	72	468.02	11/2/2017	15.05	0.12	452.91
MW-39-070	72	468.02	12/6/2017	15.51	0.12	452.46
MW-39-080	83	467.92	1/4/2017	16.22	0.35	451.75
MW-39-080	83	467.92	2/8/2017	15.59	0.35	452.38
MW-39-080	83	467.92	3/7/2017	14.65	0.35	453.32
MW-39-080	83	467.92	4/4/2017	12.11	0.35	455.86
MW-39-080	83	467.92	5/2/2017	13.24	0.35	454.73
MW-39-080	83	467.92	6/6/2017	13.60	0.27	454.33
MW-39-080	83	467.92	7/6/2017	12.29	0.27	455.64
MW-39-080	83	467.92	8/3/2017	12.75	0.27	455.18
MW-39-080	83	467.92	9/6/2017	13.97	0.27	453.96
MW-39-080	83	467.92	10/4/2017	13.82	0.27	454.11
MW-39-080	83	467.92	11/2/2017	14.94	0.27	452.99
MW-39-080	83	467.92	12/6/2017	15.41	0.27	452.51
MW-39-100	118	468.12	1/4/2017	16.21	0.99	452.44
MW-39-100	118	468.12	2/8/2017	15.72	1.00	452.94
MW-39-100	118	468.12	3/7/2017	14.82	1.00	453.85
MW-39-100	118	468.12	4/4/2017	12.28	1.00	456.40
MW-39-100	118	468.12	5/2/2017	13.37	1.00	455.26
MW-39-100	118	468.12	6/6/2017	13.70	1.00	454.93
MW-39-100	118	468.12	7/6/2017	12.48	1.00	456.15
MW-39-100	118	468.12	8/3/2017	12.81	0.99	455.81
MW-39-100	118	468.12	9/6/2017	13.98	0.99	454.64
MW-39-100	118	468.12	10/4/2017	13.79	0.99	454.83
MW-39-100	118	468.12	11/2/2017	14.93	0.99	453.68
MW-39-100	118	468.12	12/6/2017	15.43	0.99	453.22

Table D-2

Manual Water Level Measurements, January 2017 through December 2017

Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide

Groundwater and Surface Water Monitoring Report,

PG&E Topock Compressor Station, Needles, California

Location ID	Well Depth (feet BMP)	Measuring Point Elevation (feet amsl)	Monitoring Date	Water Level Measurement (feet BMP)	Salinity (percent)	Groundwater Elevation Adjusted for Salinity (feet amsl)
MW-41S	60	480.07	2/8/2017	25.56	0.99	454.64
MW-41S	60	480.07	3/8/2017	24.92	0.99	455.28
MW-41S	60	480.07	5/3/2017	23.43	0.99	456.77
MW-41S	60	480.07	6/7/2017	23.60	0.99	456.60
MW-41S	60	480.07	8/4/2017	23.90	0.99	456.30
MW-41S	60	480.07	10/31/2017	24.80	0.99	455.40
MW-42-030	30	463.74	1/4/2017	11.29	0.23	452.43
MW-42-030	30	463.74	2/8/2017	10.72	0.23	453.00
MW-42-030	30	463.74	3/8/2017	9.51	0.23	454.21
MW-42-030	30	463.74	4/4/2017	7.98	0.23	455.74
MW-42-030	30	463.74	5/2/2017	8.03	0.23	455.69
MW-42-030	30	463.74	6/6/2017	8.65	0.20	455.06
MW-42-030	30	463.74	7/6/2017	8.40	0.20	455.31
MW-42-030	30	463.74	8/3/2017	8.66	0.20	455.05
MW-42-030	30	463.74	9/6/2017	8.98	0.20	454.73
MW-42-030	30	463.74	10/4/2017	8.37	0.20	455.34
MW-42-030	30	463.74	11/2/2017	9.82	0.20	453.89
MW-42-030	30	463.74	12/5/2017	10.39	0.20	453.33
MW-42-065	80	463.37	1/4/2017	10.79	0.41	452.65
MW-42-065	80	463.37	2/8/2017	10.26	0.41	453.18
MW-42-065	80	463.37	3/8/2017	8.98	0.41	454.46
MW-42-065	80	463.37	4/4/2017	7.53	0.41	455.91
MW-42-065	80	463.37	4/27/2017	7.76	0.41	455.68
MW-42-065	80	463.37	5/2/2017	7.52	0.34	455.89
MW-42-065	80	463.37	6/6/2017	8.22	0.34	455.19
MW-42-065	80	463.37	7/6/2017	7.94	0.34	455.47
MW-42-065	80	463.37	8/3/2017	8.29	0.30	455.10
MW-42-065	80	463.37	9/6/2017	8.54	0.30	454.85
MW-42-065	80	463.37	10/4/2017	7.92	0.30	455.47
MW-42-065	80	463.37	11/2/2017	9.37	0.30	454.02
MW-42-065	80	463.37	12/5/2017	9.98	0.30	453.42
MW-43-025	25	462.54	1/4/2017	9.62	0.09	452.90
MW-43-025	25	462.54	2/8/2017	8.69	0.09	453.83
MW-43-025	25	462.54	3/7/2017	7.58	0.09	454.94
MW-43-025	25	462.54	4/4/2017	6.78	0.09	455.73
MW-43-025	25	462.54	5/2/2017	6.79	0.09	455.72
MW-43-025	25	462.54	6/6/2017	7.31	0.09	455.20
MW-43-025	25	462.54	7/6/2017	6.64	0.09	455.87
MW-43-025	25	462.54	8/2/2017	7.78	0.09	454.74
MW-43-025	25	462.54	9/6/2017	7.36	0.09	455.15
MW-43-025	25	462.54	10/4/2017	6.29	0.09	456.22
MW-43-025	25	462.54	11/2/2017	8.46	0.09	454.06
MW-43-025	25	462.54	12/5/2017	8.81	0.09	453.71
MW-43-025	25	462.54	12/7/2017	8.72	0.09	453.80
MW-43-090	97	462.76	1/4/2017	10.19	1.05	453.09
MW-43-090	97	462.76	2/8/2017	9.23	0.99	454.02
MW-43-090	97	462.76	3/7/2017	8.05	0.99	455.20
MW-43-090	97	462.76	4/4/2017	6.74	0.99	456.52
MW-43-090	97	462.76	5/2/2017	6.31	0.99	456.95
MW-43-090	97	462.76	6/6/2017	7.84	0.99	455.42
MW-43-090	97	462.76	7/6/2017	7.08	0.99	456.18
MW-43-090	97	462.76	8/2/2017	8.25	0.99	455.00
MW-43-090	97	462.76	9/6/2017	7.91	0.99	455.35
MW-43-090	97	462.76	10/4/2017	6.81	0.99	456.45
MW-43-090	97	462.76	11/2/2017	9.03	0.99	454.22
MW-43-090	97	462.76	12/5/2017	9.36	0.99	453.89
MW-44-070	70	471.84	1/3/2017	19.56	0.12	452.24

Table D-2

Manual Water Level Measurements, January 2017 through December 2017

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

Location ID	Well Depth (feet BMP)	Measuring Point Elevation (feet amsl)	Monitoring Date	Water Level Measurement (feet BMP)	Salinity (percent)	Groundwater Elevation Adjusted for Salinity (feet amsl)
MW-44-070	70	471.84	2/7/2017	18.62	0.12	453.18
MW-44-070	70	471.84	3/7/2017	17.23	0.12	454.57
MW-44-070	70	471.84	4/3/2017	15.68	0.12	456.12
MW-44-070	70	471.84	5/1/2017	14.95	0.12	456.82
MW-44-070	70	471.84	6/6/2017	16.20	0.12	455.57
MW-44-070	70	471.84	7/5/2017	16.36	0.12	455.41
MW-44-070	70	471.84	8/3/2017	17.01	0.12	454.77
MW-44-070	70	471.84	9/6/2017	16.42	0.12	455.36
MW-44-070	70	471.84	10/3/2017	16.78	0.12	455.00
MW-44-070	70	471.84	11/1/2017	17.94	0.12	453.84
MW-44-070	70	471.84	12/5/2017	18.72	0.12	453.06
MW-44-115	114	471.94	1/3/2017	20.18	0.71	452.08
MW-44-115	114	471.94	2/7/2017	19.43	0.71	452.83
MW-44-115	114	471.94	3/7/2017	18.27	0.71	453.99
MW-44-115	114	471.94	4/3/2017	16.28	0.71	455.99
MW-44-115	114	471.94	5/1/2017	16.09	0.71	456.15
MW-44-115	114	471.94	6/6/2017	17.08	0.71	455.16
MW-44-115	114	471.94	7/5/2017	17.16	0.71	455.08
MW-44-115	114	471.94	8/3/2017	17.81	0.69	454.42
MW-44-115	114	471.94	9/6/2017	17.35	0.69	454.88
MW-44-115	114	471.94	10/2/2017	17.52	0.69	454.71
MW-44-115	114	471.94	11/1/2017	18.70	0.69	453.56
MW-44-115	114	471.94	12/5/2017	19.32	0.69	452.94
MW-44-125	129	472.11	1/3/2017	19.74	0.54	452.60
MW-44-125	129	472.11	2/7/2017	18.97	0.55	453.38
MW-44-125	129	472.11	3/7/2017	17.78	0.55	454.57
MW-44-125	129	472.11	4/3/2017	15.89	0.55	456.46
MW-44-125	129	472.11	5/1/2017	15.64	0.55	456.66
MW-44-125	129	472.11	6/6/2017	16.62	0.55	455.68
MW-44-125	129	472.11	7/5/2017	16.73	0.55	455.57
MW-44-125	129	472.11	8/3/2017	17.33	0.48	454.91
MW-44-125	129	472.11	9/6/2017	16.91	0.48	455.33
MW-44-125	129	472.11	10/3/2017	17.23	0.48	455.01
MW-44-125	129	472.11	11/1/2017	18.22	0.48	454.02
MW-44-125	129	472.11	12/5/2017	18.91	0.48	453.33
MW-45-095a	97	468.27	1/3/2017	16.12	0.15	452.12
MW-45-095a	97	468.27	2/7/2017	17.42	0.15	450.82
MW-45-095a	97	468.27	3/6/2017	16.22	0.15	452.02
MW-45-095a	97	468.27	4/3/2017	12.23	0.18	456.03
MW-45-095a	97	468.27	5/1/2017	11.68	0.18	456.58
MW-45-095a	97	468.27	6/5/2017	13.15	0.18	455.11
MW-45-095a	97	468.27	7/5/2017	12.97	0.18	455.29
MW-45-095a	97	468.27	8/1/2017	13.82	0.12	454.40
MW-45-095a	97	468.27	8/2/2017	13.72	0.12	454.50
MW-45-095a	97	468.27	9/5/2017	13.88	0.12	454.34
MW-45-095a	97	468.27	10/2/2017	13.24	0.12	454.98
MW-45-095a	97	468.27	11/1/2017	14.52	0.07	453.67
MW-45-095a	97	468.27	12/4/2017	15.22	0.07	452.97
MW-46-175	176	482.16	1/4/2017	29.97	1.18	453.16
MW-46-175	176	482.16	2/7/2017	29.44	1.17	453.64
MW-46-175	176	482.16	3/7/2017	28.64	1.17	454.45
MW-46-175	176	482.16	4/4/2017	26.86	1.17	456.24
MW-46-175	176	482.16	5/1/2017	26.68	1.17	456.39
MW-46-175	176	482.16	6/6/2017	27.22	1.17	455.84
MW-46-175	176	482.16	7/5/2017	27.67	1.17	455.39
MW-46-175	176	482.16	8/2/2017	27.82	1.17	455.24
MW-46-175	176	482.16	9/6/2017	28.16	1.17	454.90

Table D-2

Manual Water Level Measurements, January 2017 through December 2017

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

Location ID	Well Depth (feet BMP)	Measuring Point Elevation (feet amsl)	Monitoring Date	Water Level Measurement (feet BMP)	Salinity (percent)	Groundwater Elevation Adjusted for Salinity (feet amsl)
MW-46-175	176	482.16	10/2/2017	27.82	1.17	455.24
MW-46-175	176	482.16	11/1/2017	28.72	1.17	454.40
MW-46-175	176	482.16	12/6/2017	29.62	1.17	453.50
MW-47-055	55	484.04	1/4/2017	30.66	0.31	453.36
MW-47-055	55	484.04	2/7/2017	30.22	0.31	453.80
MW-47-055	55	484.04	3/7/2017	29.24	0.31	454.77
MW-47-055	55	484.04	4/4/2017	28.03	0.31	455.98
MW-47-055	55	484.04	4/28/2017	27.60	0.31	456.38
MW-47-055	55	484.04	6/6/2017	27.88	0.31	456.10
MW-47-055	55	484.04	7/5/2017	28.01	0.31	455.98
MW-47-055	55	484.04	8/2/2017	28.30	0.32	455.69
MW-47-055	55	484.04	9/6/2017	28.62	0.32	455.37
MW-47-055	55	484.04	10/3/2017	28.52	0.32	455.47
MW-47-055	55	484.04	11/1/2017	29.35	0.32	454.64
MW-47-055	55	484.04	12/6/2017	29.92	0.32	454.07
MW-47-115	115	484.17	1/4/2017	30.89	0.88	453.56
MW-47-115	115	484.17	2/7/2017	30.57	0.88	453.88
MW-47-115	115	484.17	3/7/2017	29.72	0.88	454.73
MW-47-115	115	484.17	4/4/2017	28.47	0.88	455.98
MW-47-115	115	484.17	4/27/2017	28.10	0.88	456.23
MW-47-115	115	484.17	5/2/2017	28.19	0.83	456.11
MW-47-115	115	484.17	6/7/2017	28.26	0.83	456.04
MW-47-115	115	484.17	7/6/2017	28.56	0.83	455.73
MW-47-115	115	484.17	8/2/2017	28.70	0.85	455.61
MW-47-115	115	484.17	9/6/2017	29.03	0.85	455.28
MW-47-115	115	484.17	10/3/2017	28.97	0.85	455.34
MW-47-115	115	484.17	11/1/2017	29.67	0.85	454.63
MW-47-115	115	484.17	12/6/2017	30.33	0.85	453.97
MW-49-135	135	483.97	1/4/2017	30.94	0.88	453.42
MW-49-135	135	483.97	2/7/2017	30.42	0.89	453.94
MW-49-135	135	483.97	3/7/2017	29.52	0.89	454.85
MW-49-135	135	483.97	4/4/2017	28.05	0.89	456.32
MW-49-135	135	483.97	5/2/2017	28.03	0.89	456.34
MW-49-135	135	483.97	6/6/2017	28.12	0.89	456.25
MW-49-135	135	483.97	7/5/2017	28.55	0.89	455.82
MW-49-135	135	483.97	8/2/2017	28.72	0.88	455.65
MW-49-135	135	483.97	9/6/2017	29.12	0.88	455.25
MW-49-135	135	483.97	10/3/2017	28.87	0.88	455.50
MW-49-135	135	483.97	11/1/2017	29.61	0.88	454.76
MW-49-135	135	483.97	12/6/2017	30.62	0.88	453.74
MW-50-095	95	496.49	1/4/2017	43.22	0.36	453.21
MW-50-095	95	496.49	2/9/2017	42.94	0.36	453.49
MW-50-095	95	496.49	3/7/2017	42.23	0.36	454.20
MW-50-095	95	496.49	4/4/2017	40.93	0.36	455.50
MW-50-095	95	496.49	5/2/2017	40.65	0.36	455.79
MW-50-095	95	496.49	6/7/2017	40.96	0.35	455.48
MW-50-095	95	496.49	7/6/2017	40.71	0.35	455.73
MW-50-095	95	496.49	8/3/2017	41.05	0.35	455.39
MW-50-095	95	496.49	9/7/2017	41.36	0.35	455.08
MW-50-095	95	496.49	10/4/2017	41.36	0.35	455.08
MW-50-095	95	496.49	11/1/2017	42.06	0.35	454.38
MW-50-095	95	496.49	12/6/2017	42.49	0.35	453.95
MW-51	113	501.56	1/5/2017	48.18	0.77	453.46
MW-51	113	501.56	2/9/2017	48.04	0.80	453.61
MW-51	113	501.56	3/8/2017	47.68	0.80	453.97
MW-51	113	501.56	4/5/2017	46.52	0.80	455.14
MW-51	113	501.56	5/3/2017	46.15	0.80	455.55

Table D-2

Manual Water Level Measurements, January 2017 through December 2017

Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide

Groundwater and Surface Water Monitoring Report,

PG&E Topock Compressor Station, Needles, California

Location ID	Well Depth (feet BMP)	Measuring Point Elevation (feet amsl)	Monitoring Date	Water Level Measurement (feet BMP)	Salinity (percent)	Groundwater Elevation Adjusted for Salinity (feet amsl)
MW-51	113	501.56	6/7/2017	46.11	0.80	455.59
MW-51	113	501.56	7/6/2017	46.10	0.80	455.60
MW-51	113	501.56	8/3/2017	46.35	0.80	455.35
MW-51	113	501.56	9/8/2017	46.62	0.80	455.08
MW-51	113	501.56	10/4/2017	46.68	0.80	455.02
MW-51	113	501.56	11/2/2017	47.16	0.80	454.54
MW-51	113	501.56	12/6/2017	47.52	0.80	454.18
MW-54-085	93	466.10	1/5/2017	12.82	0.64	453.37
MW-54-085	93	466.10	2/8/2017	12.41	0.64	453.78
MW-54-085	93	466.10	3/7/2017	11.23	0.64	454.96
MW-54-085	93	466.10	4/5/2017	9.40	0.64	456.80
MW-54-085	93	466.10	6/8/2017	9.72	0.65	456.50
MW-54-085	93	466.10	7/6/2017	9.96	0.65	456.26
MW-54-085	93	466.10	8/4/2017	10.20	0.61	456.00
MW-54-085	93	466.10	9/7/2017	11.21	0.61	454.99
MW-54-085	93	466.10	10/4/2017	10.61	0.61	455.59
MW-54-085	93	466.10	11/2/2017	11.31	0.61	454.89
MW-54-085	93	466.10	12/7/2017	11.82	0.61	454.38
MW-54-140	138	465.98	1/5/2017	12.43	0.80	453.86
MW-54-140	138	465.98	2/8/2017	12.08	0.80	454.21
MW-54-140	138	465.98	3/7/2017	11.12	0.80	455.17
MW-54-140	138	465.98	4/5/2017	9.58	0.80	456.72
MW-54-140	138	465.98	4/27/2017	9.71	0.80	456.59
MW-54-140	138	465.98	6/8/2017	9.81	0.82	456.55
MW-54-140	138	465.98	7/6/2017	10.04	0.82	456.32
MW-54-140	138	465.98	8/4/2017	10.26	0.80	456.08
MW-54-140	138	465.98	9/7/2017	11.08	0.80	455.25
MW-54-140	138	465.98	10/4/2017	10.63	0.80	455.70
MW-54-140	138	465.98	11/2/2017	11.26	0.80	455.07
MW-54-140	138	465.98	12/7/2017	11.69	0.80	454.64
MW-54-195	195	466.32	1/5/2017	13.09	1.25	454.29
MW-54-195	195	466.32	2/8/2017	12.82	1.25	454.56
MW-54-195	195	466.32	3/7/2017	11.91	1.25	455.48
MW-54-195	195	466.32	4/5/2017	10.52	1.25	456.87
MW-54-195	195	466.32	4/27/2017	10.56	1.25	456.83
MW-54-195	195	466.32	6/8/2017	10.68	1.28	456.70
MW-54-195	195	466.32	7/6/2017	10.87	1.28	456.51
MW-54-195	195	466.32	8/4/2017	11.15	1.25	456.20
MW-54-195	195	466.32	9/7/2017	11.82	1.25	455.52
MW-54-195	195	466.32	10/4/2017	11.43	1.25	455.91
MW-54-195	195	466.32	11/2/2017	12.06	1.25	455.28
MW-54-195	195	466.32	12/7/2017	12.42	1.25	454.92
MW-55-045	54	465.84	1/5/2017	10.38	0.09	455.33
MW-55-045	54	465.84	2/8/2017	10.29	0.09	455.42
MW-55-045	54	465.84	3/8/2017	9.64	0.09	456.07
MW-55-045	54	465.84	4/5/2017	8.91	0.09	456.79
MW-55-045	54	465.84	5/3/2017	8.69	0.09	457.00
MW-55-045	54	465.84	6/8/2017	8.92	0.09	456.77
MW-55-045	54	465.84	7/6/2017	9.22	0.09	456.47
MW-55-045	54	465.84	8/4/2017	9.29	0.08	456.40
MW-55-045	54	465.84	10/4/2017	9.44	0.08	456.25
MW-55-045	54	465.84	11/2/2017	10.07	0.08	455.63
MW-55-045	54	465.84	12/7/2017	10.32	0.08	455.38
MW-55-120	120	465.82	1/5/2017	10.32	0.55	455.50
MW-55-120	120	465.82	2/8/2017	10.22	0.54	455.59
MW-55-120	120	465.82	3/8/2017	9.69	0.54	456.14
MW-55-120	120	465.82	4/5/2017	8.65	0.54	457.18

Table D-2

Manual Water Level Measurements, January 2017 through December 2017

Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide

Groundwater and Surface Water Monitoring Report,

PG&E Topock Compressor Station, Needles, California

Location ID	Well Depth (feet BMP)	Measuring Point Elevation (feet amsl)	Monitoring Date	Water Level Measurement (feet BMP)	Salinity (percent)	Groundwater Elevation Adjusted for Salinity (feet amsl)
MW-55-120	120	465.82	5/3/2017	8.72	0.54	457.09
MW-55-120	120	465.82	6/8/2017	8.93	0.54	456.88
MW-55-120	120	465.82	7/6/2017	9.07	0.54	456.74
MW-55-120	120	465.82	8/4/2017	9.33	0.52	456.46
MW-55-120	120	465.82	9/8/2017	9.58	0.52	456.21
MW-55-120	120	465.82	10/4/2017	9.48	0.52	456.31
MW-55-120	120	465.82	11/2/2017	10.02	0.52	455.77
MW-55-120	120	465.82	12/7/2017	10.23	0.52	455.56
OW-01S	114	550.21	1/4/2017	94.79	0.42	455.39
OW-01S	114	550.21	2/8/2017	94.91	0.48	455.28
OW-01S	114	550.21	3/8/2017	94.69	0.48	455.50
OW-01S	114	550.21	4/5/2017	94.03	0.48	456.16
OW-01S	114	550.21	4/27/2017	93.26	0.48	456.92
OW-01S	114	550.21	5/3/2017	93.24	0.48	456.94
OW-01S	114	550.21	6/7/2017	93.20	0.48	456.98
OW-01S	114	550.21	7/6/2017	93.12	0.48	457.06
OW-01S	114	550.21	8/3/2017	93.35	0.48	456.83
OW-01S	114	550.21	10/4/2017	93.92	0.44	456.26
OW-01S	114	550.21	10/31/2017	93.99	0.44	456.20
OW-01S	114	550.21	12/6/2017	94.46	0.48	455.74
OW-02S	104	548.88	1/4/2017	93.56	0.19	455.28
OW-02S	104	548.88	2/9/2017	93.62	0.21	455.22
OW-02S	104	548.88	3/8/2017	93.42	0.21	455.42
OW-02S	104	548.88	4/5/2017	92.71	0.21	456.13
OW-02S	104	548.88	5/2/2017	91.78	0.21	457.05
OW-02S	104	548.88	6/7/2017	91.85	0.21	456.98
OW-02S	104	548.88	7/6/2017	91.72	0.21	457.11
OW-02S	104	548.88	8/3/2017	91.99	0.21	456.84
OW-02S	104	548.88	9/7/2017	92.27	0.21	456.56
OW-02S	104	548.88	10/5/2017	92.42	0.21	456.41
OW-02S	104	548.88	10/31/2017	92.65	0.21	456.22
OW-02S	104	548.88	12/6/2017	93.11	0.20	455.76
OW-02S	104	548.88	12/7/2017	93.22	0.20	455.65
OW-05D	350	552.41	1/4/2017	96.02	0.48	456.19
OW-05D	350	552.41	2/8/2017	96.19	0.50	456.06
OW-05D	350	552.41	3/8/2017	96.02	0.50	456.23
OW-05D	350	552.41	4/5/2017	96.12	0.50	456.13
OW-05D	350	552.41	4/27/2017	94.67	0.50	457.58
OW-05D	350	552.41	6/7/2017	94.29	0.52	458.00
OW-05D	350	552.41	7/6/2017	94.39	0.52	457.90
OW-05D	350	552.41	8/3/2017	94.51	0.52	457.78
OW-05D	350	552.41	10/3/2017	94.98	0.51	457.30
OW-05D	350	552.41	10/31/2017	95.32	0.51	457.25
OW-05D	350	552.41	12/6/2017	95.28	0.53	457.32
OW-05D	350	552.41	12/7/2017	95.41	0.53	457.19
OW-05M	250	551.81	1/4/2017	95.53	0.48	456.17
OW-05M	250	551.81	2/9/2017	95.91	0.50	455.81
OW-05M	250	551.81	3/8/2017	95.53	0.50	456.19
OW-05M	250	551.81	4/5/2017	95.59	0.50	456.13
OW-05M	250	551.81	4/27/2017	93.71	0.50	458.01
OW-05M	250	551.81	6/7/2017	93.56	0.51	458.17
OW-05M	250	551.81	7/6/2017	93.57	0.51	458.16
OW-05M	250	551.81	8/3/2017	93.73	0.51	458.00
OW-05M	250	551.81	10/3/2017	94.51	0.50	457.21
OW-05M	250	551.81	10/31/2017	94.81	0.50	456.95
OW-05M	250	551.81	12/6/2017	94.68	0.52	457.10
OW-05M	250	551.81	12/7/2017	95.98	0.52	455.80

Table D-2

Manual Water Level Measurements, January 2017 through December 2017

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

Location ID	Well Depth (feet BMP)	Measuring Point Elevation (feet amsl)	Monitoring Date	Water Level Measurement (feet BMP)	Salinity (percent)	Groundwater Elevation Adjusted for Salinity (feet amsl)
OW-05S	110	551.83	1/4/2017	96.32	0.35	455.48
OW-05S	110	551.83	2/8/2017	96.31	0.34	455.49
OW-05S	110	551.83	3/8/2017	96.19	0.34	455.61
OW-05S	110	551.83	4/5/2017	95.69	0.34	456.11
OW-05S	110	551.83	5/2/2017	94.45	0.34	457.35
OW-05S	110	551.83	6/7/2017	94.69	0.38	457.11
OW-05S	110	551.83	7/6/2017	94.57	0.38	457.23
OW-05S	110	551.83	8/3/2017	94.83	0.38	456.97
OW-05S	110	551.83	10/3/2017	95.17	0.37	456.63
OW-05S	110	551.83	10/31/2017	95.41	0.37	456.39
OW-05S	110	551.83	12/6/2017	95.92	0.38	455.88
OW-05S	110	551.83	12/7/2017	94.82	0.38	456.98
PT2D	105	473.48	1/4/2017	22.18	0.80	451.58
PT2D	105	473.48	2/8/2017	21.59	0.80	452.17
PT2D	105	473.48	3/7/2017	20.72	0.80	453.04
PT2D	105	473.48	4/4/2017	17.82	0.80	455.95
PT2D	105	473.48	5/2/2017	19.41	0.80	454.36
PT2D	105	473.48	6/7/2017	17.97	0.80	455.82
PT2D	105	473.48	7/6/2017	18.08	0.80	455.71
PT2D	105	473.48	8/3/2017	19.69	0.80	454.10
PT2D	105	473.48	9/6/2017	19.92	0.80	453.87
PT2D	105	473.48	10/4/2017	19.91	0.80	453.88
PT2D	105	473.48	11/1/2017	21.05	0.80	452.73
PT2D	105	473.48	12/5/2017	21.78	0.80	452.00
PT5D	105	473.65	1/4/2017	21.83	1.02	452.29
PT5D	105	473.65	2/8/2017	21.42	1.02	452.70
PT5D	105	473.65	3/7/2017	20.41	1.02	453.73
PT5D	105	473.65	4/4/2017	17.91	1.02	456.24
PT5D	105	473.65	5/2/2017	18.89	1.02	455.26
PT5D	105	473.65	6/7/2017	18.14	1.02	456.02
PT5D	105	473.65	7/6/2017	18.18	1.02	455.99
PT5D	105	473.65	8/3/2017	19.11	1.02	455.06
PT5D	105	473.65	9/6/2017	19.54	1.02	454.63
PT5D	105	473.65	10/4/2017	18.57	1.02	455.61
PT5D	105	473.65	11/1/2017	20.75	1.02	453.42
PT5D	105	473.65	12/5/2017	21.42	1.02	452.75
PT6D	105	476.08	1/4/2017	24.28	0.71	452.06
PT6D	105	476.08	2/8/2017	23.69	0.71	452.65
PT6D	105	476.08	3/7/2017	22.80	0.71	453.54
PT6D	105	476.08	4/4/2017	20.22	0.71	456.12
PT6D	105	476.08	5/2/2017	21.37	0.71	454.98
PT6D	105	476.08	6/7/2017	20.41	0.71	456.05
PT6D	105	476.08	7/6/2017	20.71	0.71	455.65
PT6D	105	476.08	8/3/2017	21.87	0.71	454.48
PT6D	105	476.08	9/6/2017	21.92	0.71	454.43
PT6D	105	476.08	10/4/2017	22.11	0.71	454.24
PT6D	105	476.08	11/1/2017	23.10	0.71	453.23
PT6D	105	476.08	12/5/2017	23.81	0.71	452.52
RRB	--	458.67	2/7/2017	5.00	--	453.67
RRB	--	458.67	3/6/2017	3.75	--	454.92
RRB	--	458.67	4/28/2017	1.80	--	456.87
RRB	--	458.67	5/1/2017	1.34	--	457.33
RRB	--	458.67	6/5/2017	3.30	--	455.37
RRB	--	458.67	7/5/2017	3.65	--	455.02
RRB	--	458.67	8/1/2017	3.58	--	455.09
RRB	--	458.67	8/2/2017	2.74	--	455.93
RRB	--	458.67	9/5/2017	4.46	--	454.21

Table D-2**Manual Water Level Measurements, January 2017 through December 2017**

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

Location ID	Well Depth (feet BMP)	Measuring Point Elevation (feet amsl)	Monitoring Date	Water Level Measurement (feet BMP)	Salinity (percent)	Groundwater Elevation Adjusted for Salinity (feet amsl)
RRB	--	458.67	10/3/2017	3.22	--	455.45
RRB	--	458.67	11/1/2017	4.13	--	454.54
RRB	--	458.67	12/4/2017	5.12	--	453.55

Notes:

--- = data were not collected, were not available, were rejected or there was a field instrument malfunction.

amsl = above mean sea level

BMP = below well measuring point.

Well depths rounded off to whole foot.

Salinity used to adjust water level to freshwater equivalent. Salinity values have been averaged in accordance with the Performance Monitoring Program

Table D-3

Field Water Quality Measurements, January 2017 through December 2017

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

Location ID	Sample Date	Specific Conductance (µS/cm)	Temperature (deg C)	pH	ORP (mV)	Dissolved Oxygen (mg/L)
C-BNS	1/24/2017	964	11.4	8.5	32	9.06
C-BNS	2/21/2017	1,290	15.2	8.5	59	9.06
C-BNS	5/10/2017	969	17.5	8.3	-56	8.66
C-BNS	8/16/2017	1,020	22.5	7.9	120	7.02
C-BNS	11/15/2017	989	18.4	8.30	110	7.58
C-CON-D	1/25/2017	977	11.2	8.6	-120	10.42
C-CON-D	2/22/2017	1,280	14.5	8.6	64	10.42
C-CON-D	5/11/2017	968	18.9	8.3	-57	8.73
C-CON-D	11/16/2017	987	18.2	8.3	120	7.76
C-CON-S	1/25/2017	970	11.2	8.6	-120	9.95
C-CON-S	2/22/2017	1,280	14.5	8.6	52	9.95
C-CON-S	5/11/2017	968	19.1	8.2	-67	8.5
C-CON-S	11/16/2017	986	18.3	8.3	120	7.46
C-I-3-D	1/24/2017	972	11.2	8.5	57	9.65
C-I-3-D	2/21/2017	1,280	14.8	8.5	70	9.65
C-I-3-D	5/10/2017	969	17.5	8.3	20	8.53
C-I-3-D	8/16/2017	1,020	21.7	7.9	120	6.95
C-I-3-D	11/15/2017	987	18.1	8.3	110	7.75
C-I-3-S	1/24/2017	964	11.1	8.5	63	9.45
C-I-3-S	2/21/2017	1,290	15.3	8.5	63	9.45
C-I-3-S	5/10/2017	970	17.3	8.3	3.0	8.69
C-I-3-S	8/16/2017	1,020	21.8	7.9	120	7.01
C-I-3-S	11/15/2017	987	18.1	8.3	110	7.95
C-MAR-D	1/25/2017	1,010	10.4	8.2	-100	9.76
C-MAR-D	2/22/2017	1,820	14.6	8.2	36	9.76
C-MAR-D	5/11/2017	1,340	20.1	7.2	52	4.37
C-MAR-D	8/17/2017	1,030	22.4	7.9	110	7.65
C-MAR-D	11/16/2017	991	17.3	8.3	110	7.58
C-MAR-S	1/25/2017	1,010	10.2	7.8	-79	10.16
C-MAR-S	2/22/2017	2,470	14.9	8.0	50	10.16
C-MAR-S	5/11/2017	1,320	20.5	7.4	38	4.8
C-MAR-S	8/17/2017	1,020	22.9	8.1	95	7.63
C-MAR-S	11/16/2017	996	17.3	8.2	120	7.25
C-NR1-D	1/25/2017	972	11.3	8.6	-120	10.12
C-NR1-D	2/22/2017	1,280	14.9	8.6	61	10.12
C-NR1-D	5/11/2017	968	19.0	8.2	-73	8.67
C-NR1-D	11/16/2017	988	18.4	8.3	120	7.49
C-NR1-S	1/25/2017	969	11.4	8.6	-120	9.96
C-NR1-S	2/22/2017	1,280	15.1	8.6	63	9.96
C-NR1-S	5/11/2017	967	19.1	8.2	-78	8.18
C-NR1-S	11/16/2017	989	18.6	8.2	110	7.43
C-NR3-D	1/25/2017	976	11.5	8.6	-120	10.22
C-NR3-D	2/22/2017	1,280	15.3	8.6	66	10.22
C-NR3-D	5/11/2017	966	19.2	8.2	-84	8.33
C-NR3-D	11/16/2017	989	19.0	8.2	120	7.4
C-NR3-S	1/25/2017	966	11.6	8.5	-120	9.78
C-NR3-S	2/22/2017	1,280	14.7	8.5	64	9.78
C-NR3-S	5/11/2017	974	19.0	8.2	-94	8.49
C-NR3-S	11/16/2017	990	18.9	8.2	110	7.42

Table D-3**Field Water Quality Measurements, January 2017 through December 2017***Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide**Groundwater and Surface Water Monitoring Report,**PG&E Topock Compressor Station, Needles, California*

Location ID	Sample Date	Specific Conductance (µS/cm)	Temperature (deg C)	pH	ORP (mV)	Dissolved Oxygen (mg/L)
C-NR4-D	1/25/2017	967	11.8	8.6	-120	9.91
C-NR4-D	2/22/2017	1,280	16.0	8.6	59	9.91
C-NR4-D	5/11/2017	969	19.2	8.2	-95	8.84
C-NR4-D	11/16/2017	990	19.2	8.2	110	7.4
C-NR4-S	1/25/2017	969	11.5	8.5	-120	10.18
C-NR4-S	2/22/2017	1,280	16.3	8.5	65	10.18
C-NR4-S	5/11/2017	973	19.0	8.2	-97	8.86
C-NR4-S	11/16/2017	990	19.1	8.2	100	7.5
C-R22A-D	1/24/2017	964	11.4	8.4	47	9.79
C-R22A-D	2/21/2017	1,300	16.5	8.4	54	9.79
C-R22A-D	5/10/2017	978	17.8	8.4	-38	8.89
C-R22A-D	8/16/2017	1,030	22.6	8.0	120	7.26
C-R22A-D	11/15/2017	989	18.3	8.3	110	7.69
C-R22A-S	1/24/2017	962	11.5	8.4	43	9.89
C-R22A-S	2/21/2017	1,300	15.3	8.4	60	9.89
C-R22A-S	5/10/2017	969	17.7	8.3	-45	8.88
C-R22A-S	8/16/2017	1,030	22.4	8.0	120	7.37
C-R22A-S	11/15/2017	989	18.4	8.3	110	7.68
C-R27-D	1/24/2017	965	11.6	8.4	28	9.87
C-R27-D	2/21/2017	1,290	15.9	8.4	51	9.87
C-R27-D	5/10/2017	970	17.8	8.4	-60	8.78
C-R27-D	8/16/2017	1,020	22.5	8.0	120	7.44
C-R27-D	11/15/2017	990	18.4	8.2	120	8.11
C-R27-S	1/24/2017	965	11.8	8.5	11	9.56
C-R27-S	2/21/2017	1,290	15.4	8.5	57	9.56
C-R27-S	5/10/2017	970	18.0	8.3	-64	8.66
C-R27-S	8/16/2017	1,020	22.6	8.0	110	7.09
C-R27-S	11/15/2017	990	18.4	8.2	120	7.51
C-TAZ-D	1/24/2017	971	11.3	8.4	76	9.6
C-TAZ-D	2/21/2017	1,320	13.8	8.4	140	9.61
C-TAZ-D	5/10/2017	971	17.4	8.0	80	8.87
C-TAZ-D	8/16/2017	1,020	21.6	7.5	130	7.34
C-TAZ-D	11/15/2017	984	18.0	8.2	120	7.83
C-TAZ-S	1/24/2017	969	11.2	8.5	77	9.63
C-TAZ-S	2/21/2017	1,290	13.7	8.5	77	9.63
C-TAZ-S	5/10/2017	968	17.4	8.2	67	8.57
C-TAZ-S	8/16/2017	1,020	21.8	7.9	120	7.23
C-TAZ-S	11/15/2017	987	18.2	8.3	120	7.84
MW-09	2/9/2017	3,410	32.1	7.5	-65	3.94
MW-09	5/3/2017	2,840	31.0	8.0	3.3	4.08
MW-09	12/7/2017	3,990	31.1	7.5	8.8	4.17
MW-10	2/9/2017	2,990	30.8	7.4	-34	4.8
MW-10	5/3/2017	2,740	30.1	8.0	3.4	4.2
MW-10	12/7/2017	3,100	29.6	7.4	-2.1	4.74
MW-11	2/9/2017	2,520	31.2	7.5	-35	6.33
MW-11	5/3/2017	2,400	31.2	7.5	61	6.77
MW-11	12/7/2017	3,100	29.7	7.5	-0.10	5.75
MW-12	5/1/2017	7,110	28.7	8.4	-35	3.29
MW-12	12/11/2017	8,880	28.8	8.1	68	3.02

Table D-3**Field Water Quality Measurements, January 2017 through December 2017**

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

Location ID	Sample Date	Specific Conductance (µS/cm)	Temperature (deg C)	pH	ORP (mV)	Dissolved Oxygen (mg/L)
MW-13	12/8/2017	3,310	28.3	7.5	-28	3.9
MW-14	5/1/2017	2,680	31.1	7.6	67	6.26
MW-14	12/13/2017	3,720	32.0	7.6	73	5.29
MW-15	12/12/2017	2,010	31.6	7.3	160	6.76
MW-16	12/12/2017	1,240	30.7	7.6	140	6.21
MW-17	12/12/2017	1,380	31.1	7.6	150	5.88
MW-18	12/12/2017	1,600	31.0	7.2	140	5.75
MW-19	4/28/2017	2,230	28.2	8.0	37	5.65
MW-19	12/8/2017	2,320	27.5	7.7	170	8.41
MW-20-070	4/27/2017	1,960	28.5	8.1	12	8.29
MW-20-070	12/7/2017	2,580	29.1	7.7	-6.4	6.37
MW-20-100	4/27/2017	2,350	28.7	7.8	15	6.61
MW-20-100	12/8/2017	2,880	27.6	7.4	13	5.69
MW-20-130	4/27/2017	12,300	28.8	7.8	-9.7	0.84
MW-20-130	12/7/2017	9,790	28.5	7.3	35	0.2
MW-21	5/3/2017	12,400	30.9	7.2	150	2.72
MW-21	12/12/2017	19,200	24.6	7.4	83	2.71
MW-22	4/28/2017	13,800	23.8	6.9	-96	0.51
MW-22	12/6/2017	26,300	24.9	6.8	-59	1.44
MW-23-060	4/28/2017	17,400	28.6	9.3	-66	4.15
MW-23-060	12/8/2017	17,500	27.7	9.6	110	2.81
MW-23-080	4/28/2017	20,900	28.5	10	-180	0.6
MW-23-080	12/8/2017	17,800	27.9	10	54	0.27
MW-24A	5/3/2017	1,820	32.4	8.4	-210	0.08
MW-24A	12/7/2017	2,170	30.6	8.3	-30	0.53
MW-24B	5/3/2017	20,600	31.4	7.8	-66	0.12
MW-24B	12/7/2017	21,600	29.6	7.8	-59	0.22
MW-24BR	12/8/2017	15,700	31.4	8.1	-260	0.11
MW-25	5/1/2017	2,140	31.7	7.3	95	5.93
MW-25	12/8/2017	2,110	28.1	7.4	190	8.55
MW-26	12/11/2017	5,030	30.9	7.4	76	4.87
MW-27-020	12/4/2017	1,030	20.6	7.7	46	0.06
MW-27-060	12/4/2017	1,020	18.5	7.8	-120	0.32
MW-27-085	4/28/2017	10,600	19.6	7.4	-87	0.2
MW-27-085	12/4/2017	10,300	19.4	7.3	-32	0.17
MW-28-025	4/26/2017	1,260	23.2	7.4	-210	0.41
MW-28-025	12/7/2017	1,260	22.2	7.5	79	0.9
MW-28-090	4/26/2017	5,500	21.7	7.1	-170	0.5
MW-28-090	12/7/2017	6,920	19.8	7.2	-56	0.07
MW-29	4/26/2017	3,300	26.3	7.3	-180	0.71
MW-29	12/7/2017	1,790	24.3	7.4	-120	0.37
MW-30-030	12/6/2017	13,000	23.6	7.8	-170	0.01
MW-30-050	12/6/2017	1,110	20.5	7.8	77	0.82
MW-31-060	4/27/2017	3,400	28.4	7.9	11	4.99
MW-31-060	12/12/2017	3,510	29.2	7.1	150	3.98
MW-31-135	12/12/2017	13,200	29.5	7.3	69	0.3
MW-32-020	12/4/2017	31,800	26.1	7.1	-130	0.04
MW-32-035	4/27/2017	11,800	23.7	7.4	-150	1.69
MW-32-035	12/4/2017	9,810	23.8	7.3	-120	0.55

Table D-3

Field Water Quality Measurements, January 2017 through December 2017

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

Location ID	Sample Date	Specific Conductance (µS/cm)	Temperature (deg C)	pH	ORP (mV)	Dissolved Oxygen (mg/L)
MW-33-040	4/26/2017	8,900	29.1	8.0	200	0.23
MW-33-040	12/7/2017	14,900	24.9	8.0	180	1.18
MW-33-090	4/26/2017	11,700	27.0	7.1	170	0.33
MW-33-090	12/7/2017	10,400	24.1	7.5	200	1.09
MW-33-150	4/26/2017	15,200	27.6	7.5	140	0.17
MW-33-150	12/7/2017	15,000	26.1	7.4	46	0.43
MW-33-210	4/26/2017	19,800	27.5	7.4	140	0.24
MW-33-210	12/7/2017	19,800	25.5	7.4	140	0.2
MW-34-055	12/6/2017	1,020	18.9	7.8	-62	0.14
MW-34-080	4/27/2017	7,990	19.7	7.4	-250	0.72
MW-34-080	12/6/2017	7,910	19.3	7.3	-10	0.1
MW-34-100	2/6/2017	17,900	19.5	7.8	-47	0.12
MW-34-100	4/27/2017	12,700	19.7	7.4	-66	0.43
MW-34-100	10/2/2017	11,900	21.9	7.7	-33	0.8
MW-35-060	5/1/2017	6,270	28.8	7.5	-28	1.29
MW-35-060	12/8/2017	7,010	26.2	7.4	120	0.92
MW-35-135	5/1/2017	11,600	27.9	7.7	100	0.25
MW-35-135	12/8/2017	11,000	26.3	7.7	130	0.29
MW-36-020	12/6/2017	5,400	22.5	7.6	-140	0.05
MW-36-040	12/6/2017	1,070	20.8	7.9	-160	0.08
MW-36-050	12/6/2017	1,100	19.6	7.8	-85	1.14
MW-36-070	12/6/2017	1,040	20.6	7.7	-25	0.12
MW-36-090	4/27/2017	7,030	23.6	8.4	-1.0	0.18
MW-36-090	12/6/2017	5,720	19.7	7.7	-38	0.9
MW-36-100	4/27/2017	8,270	21.8	7.4	-170	0.39
MW-36-100	12/6/2017	8,180	20.0	7.5	-31	0.82
MW-37D	5/1/2017	15,700	29.7	7.7	3.9	0.14
MW-37D	12/8/2017	18,400	27.0	7.8	-56	0.32
MW-37S	12/8/2017	8,760	27.3	7.7	-46	1.07
MW-38D	5/3/2017	20,400	30.2	8.4	-65	0.15
MW-38D	12/7/2017	24,100	31.3	8.3	-46	0.17
MW-38S	2/9/2017	1,730	31.2	8.0	-100	0.14
MW-38S	5/3/2017	1,510	30.9	8.4	-25	0.31
MW-38S	9/26/2017	1,910	30.1	8.0	-160	0.1
MW-38S	12/7/2017	1,770	30.8	7.9	-24	0.26
MW-39-040	12/5/2017	1,250	20.8	8.2	-190	0.35
MW-39-050	12/5/2017	1,070	21.0	7.6	-54	0.05
MW-39-060	12/5/2017	1,210	20.3	7.9	-63	0.71
MW-39-070	12/5/2017	1,960	20.4	7.8	7.0	0.55
MW-39-080	12/5/2017	5,140	21.3	7.5	-78	0.05
MW-39-100	4/27/2017	14,800	23.2	6.9	-220	0.19
MW-39-100	12/5/2017	14,300	21.6	6.9	91	0.07
MW-41D	5/1/2017	22,200	29.4	7.7	69	0.11
MW-41D	12/13/2017	22,900	28.7	7.2	-60	0.13
MW-41M	12/13/2017	16,000	28.6	7.1	3.5	0.3
MW-41S	12/13/2017	6,970	28.5	7.8	31	2.34
MW-42-030	12/4/2017	2,770	22.9	8.0	-180	0.04
MW-42-055	4/28/2017	1,100	21.2	8.7	-110	0.25
MW-42-055	12/4/2017	1,090	20.0	8.6	-99	0.2

Table D-3

Field Water Quality Measurements, January 2017 through December 2017

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

Location ID	Sample Date	Specific Conductance (µS/cm)	Temperature (deg C)	pH	ORP (mV)	Dissolved Oxygen (mg/L)
MW-42-065	4/28/2017	3,690	21.1	7.4	92	0.68
MW-42-065	12/4/2017	2,060	20.2	7.9	59	0.26
MW-43-025	12/5/2017	1,390	21.1	7.6	-150	0.38
MW-43-075	12/5/2017	11,800	21.8	7.2	-120	0.05
MW-43-090	12/5/2017	18,000	20.9	7.2	-68	0.08
MW-44-070	4/27/2017	2,540	21.7	7.4	140	0.39
MW-44-070	12/6/2017	1,460	20.1	7.6	-130	0.11
MW-44-115	2/6/2017	12,400	20.3	7.9	-62	0.06
MW-44-115	4/27/2017	11,600	21.6	8.1	140	0.19
MW-44-115	10/2/2017	11,400	22.0	8.1	52	0.81
MW-44-125	4/27/2017	2,460	22.5	7.5	140	0.18
MW-44-125	12/6/2017	14,200	20.5	7.9	-52	0.26
MW-46-175	2/7/2017	20,500	21.8	8.4	-26	0.13
MW-46-175	4/26/2017	21,800	22.8	8.2	230	0.55
MW-46-175	10/2/2017	18,900	22.5	8.4	90	0.79
MW-46-205	4/26/2017	21,100	22.0	8.4	210	0.22
MW-46-205	12/7/2017	23,400	19.6	8.5	140	1.01
MW-47-055	4/26/2017	5,630	29.8	7.4	-31	1.74
MW-47-055	12/7/2017	4,810	26.0	7.7	99	3.12
MW-47-115	4/26/2017	15,200	30.9	7.4	-110	0.47
MW-47-115	12/7/2017	14,200	27.1	7.5	59	0.1
MW-48	5/3/2017	9,160	29.9	8.0	30	4.36
MW-48	12/13/2017	22,700	28.0	8.0	82	4.65
MW-49-135	12/7/2017	13,900	25.0	7.8	-39	0.04
MW-49-275	12/7/2017	26,200	23.1	8.2	-130	0.89
MW-49-365	12/7/2017	37,000	23.2	7.7	-110	0.76
MW-50-095	4/28/2017	5,260	26.7	8.3	30	1.63
MW-50-095	12/8/2017	6,060	27.0	8.0	100	1.27
MW-50-200	4/28/2017	22,700	26.8	8.2	39	2
MW-50-200	12/8/2017	22,000	27.8	7.9	170	1.88
MW-51	4/26/2017	13,200	27.6	7.7	-59	1.76
MW-51	12/11/2017	15,800	29.6	7.5	66	1.25
MW-52D	4/27/2017	25,300	22.6	7.8	-230	0.25
MW-52D	12/5/2017	20,800	18.5	7.5	-92	0.51
MW-52M	4/27/2017	19,100	23.6	6.6	-190	0.27
MW-52M	12/5/2017	16,400	19.6	6.8	-69	0.05
MW-52S	4/27/2017	12,900	21.7	6.9	-210	0.44
MW-52S	12/5/2017	10,700	19.2	6.9	-80	0.98
MW-53D	4/27/2017	26,400	22.7	7.8	-130	0.34
MW-53D	12/5/2017	26,000	17.7	7.4	-100	0.3
MW-53M	4/27/2017	19,300	20.8	7.9	-240	0.1
MW-53M	12/5/2017	5,770	18.8	7.8	-140	0.17
MW-54-085	5/4/2017	8,550	26.2	8.1	-77	0.29
MW-54-085	12/13/2017	10,700	26.1	7.6	-55	0.22
MW-54-140	5/4/2017	11,500	25.1	8.2	-14	0.25
MW-54-140	12/13/2017	13,700	25.5	7.9	-80	0.24
MW-54-195	5/4/2017	20,100	26.9	8.2	-220	0.03
MW-54-195	12/13/2017	20,300	26.0	7.6	-160	0.12
MW-55-045	5/2/2017	1,460	28.9	7.8	-130	0.05

Table D-3

Field Water Quality Measurements, January 2017 through December 2017

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

Location ID	Sample Date	Specific Conductance (µS/cm)	Temperature (deg C)	pH	ORP (mV)	Dissolved Oxygen (mg/L)
MW-55-045	12/13/2017	1,530	26.9	7.9	-110	0.22
MW-55-120	2/10/2017	8,700	28.1	8.1	-130	1.2
MW-55-120	5/2/2017	8,130	29.0	8.0	-1.2	1.08
MW-55-120	12/13/2017	8,600	28.0	7.5	78	1.07
MW-56D	5/4/2017	22,700	24.5	7.3	-160	0.28
MW-56D	12/13/2017	23,200	23.3	6.9	-41	0.58
MW-56M	5/4/2017	15,600	24.8	7.2	-110	0.34
MW-56M	12/13/2017	16,000	22.5	7.2	-97	0.39
MW-56S	5/4/2017	5,780	21.2	7.6	-110	7.01
MW-56S	12/13/2017	6,490	24.0	6.9	-120	0.42
MW-57-070	5/1/2017	2,580	31.2	7.3	-6.3	3.51
MW-57-070	12/11/2017	2,630	28.1	7.2	-96	3.69
MW-57-185	5/1/2017	17,300	28.0	9.4	-47	0.49
MW-57-185	12/11/2017	20,500	30.2	11	100	1.2
MW-58BR	2/7/2017	9,490	28.0	7.7	-24	0.06
MW-58BR	5/2/2017	7,790	26.8	8.1	-76	0.2
MW-58BR	9/27/2017	9,800	27.9	7.5	-150	0.11
MW-58BR	12/11/2017	9,290	27.1	8.0	130	0.24
MW-59-100	5/1/2017	14,900	31.8	7.1	120	5.29
MW-59-100	12/7/2017	18,100	29.7	7.1	-5.8	4.92
MW-60-125	5/2/2017	9,950	32.9	7.4	58	2.91
MW-60-125	12/6/2017	13,100	29.7	7.5	-37	1.21
MW-60BR-245	2/8/2017	20,000	29.1	8.1	-110	1.26
MW-60BR-245	5/3/2017	18,900	29.4	8.0	-200	0.03
MW-60BR-245	9/26/2017	18,200	23.5	6.7	-91	0.5
MW-60BR-245	12/13/2017	22,300	26.9	8.1	110	0.64
MW-60BR-245	12/14/2017	20,700	24.5	8.2	70	6.98
MW-61-110	5/2/2017	17,700	30.3	7.4	-23	0.16
MW-61-110	12/6/2017	21,300	29.7	7.5	-42	0.43
MW-62-065	2/9/2017	7,190	31.4	7.4	-52	2.6
MW-62-065	5/2/2017	6,770	30.5	7.4	62	3.22
MW-62-065	9/25/2017	7,610	29.7	7.4	-57	2.36
MW-62-065	12/6/2017	8,300	29.2	7.5	-25	2.14
MW-62-110	2/8/2017	10,900	27.7	7.9	-140	1.13
MW-62-110	5/3/2017	14,600	28.2	7.6	-270	0.05
MW-62-110	9/27/2017	12,500	27.1	7.2	-110	0.43
MW-62-110	12/7/2017	10,900	23.8	7.8	-180	1.05
MW-62-190	5/3/2017	20,000	28.3	7.6	-270	0.06
MW-62-190	12/7/2017	20,300	24.2	7.8	-200	0.7
MW-63-065	2/9/2017	7,700	26.9	7.2	-77	1.45
MW-63-065	5/2/2017	6,940	28.0	7.1	61	1.28
MW-63-065	9/28/2017	7,620	27.8	7.1	-28	2.15
MW-63-065	12/12/2017	6,940	27.5	6.9	73	1.73
MW-64BR	2/7/2017	15,300	28.0	7.4	-48	0.6
MW-64BR	5/2/2017	12,600	27.9	7.9	-110	0.26
MW-64BR	9/25/2017	15,900	29.6	7.3	-110	0.4
MW-64BR	12/6/2017	17,200	26.2	7.5	-83	0.19
MW-65-160	2/8/2017	4,320	27.9	7.2	-63	1.6
MW-65-160	5/4/2017	3,950	28.6	7.1	-69	2.59

Table D-3

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

Location ID	Sample Date	Specific Conductance (µS/cm)	Temperature (deg C)	pH	ORP (mV)	Dissolved Oxygen (mg/L)
MW-65-160	9/26/2017	4,410	28.1	7.0	-81	1.09
MW-65-160	12/5/2017	4,470	25.3	7.1	-3.2	3
MW-65-225	2/8/2017	9,180	31.5	7.3	-18	1.33
MW-65-225	5/4/2017	10,300	29.5	7.3	120	1.25
MW-65-225	9/26/2017	10,500	30.5	7.2	-83	1.12
MW-65-225	12/5/2017	18,300	26.0	7.6	-37	0.53
MW-66-165	12/5/2017	4,030	30.1	7.5	74	3.55
MW-66-230	4/25/2017	18,800	33.3	7.8	-110	0.82
MW-66-230	12/5/2017	20,300	29.0	8.1	66	0.9
MW-66BR-270	5/4/2017	18,200	30.5	9.2	-290	1.44
MW-66BR-270	12/14/2017	20,700	29.2	7.4	-160	1.03
MW-67-185	5/3/2017	8,240	34.8	7.2	96	4.28
MW-67-185	12/4/2017	8,090	34.2	7.0	100	2.84
MW-67-225	5/4/2017	7,490	33.9	7.5	67	2.2
MW-67-225	12/4/2017	7,670	33.0	7.5	77	2.04
MW-67-260	5/3/2017	18,800	32.9	11	-150	0.21
MW-67-260	12/4/2017	19,700	32.5	11	-53	0.28
MW-68-180	2/8/2017	5,400	28.5	7.5	0.20	5.63
MW-68-180	5/3/2017	3,940	30.7	7.4	-120	6.09
MW-68-180	9/26/2017	4,770	29.3	7.4	-60	4.6
MW-68-240	5/3/2017	17,500	34.0	7.3	-100	0.35
MW-68BR-280	5/4/2017	22,100	30.2	9.1	-170	0.72
MW-69-195	2/9/2017	3,980	31.5	7.3	-47	5.48
MW-69-195	5/3/2017	3,920	33.3	7.2	110	4.06
MW-69-195	9/26/2017	3,830	32.7	7.4	-69	3.37
MW-69-195	12/4/2017	3,850	32.1	7.3	-5.0	4.97
MW-70-105	5/2/2017	3,180	32.1	8.2	-45	1.36
MW-70-105	12/11/2017	3,860	31.6	7.6	140	1.17
MW-70BR-225	5/2/2017	125,000	28.5	7.9	-36	0.22
MW-70BR-225	12/11/2017	14,900	30.2	7.3	180	0.11
MW-71-035	5/3/2017	15,200	26.8	6.8	190	0.72
MW-71-035	12/12/2017	10,400	23.9	7.4	79	1.69
MW-72-080	2/7/2017	18,200	28.2	7.8	-0.60	0.63
MW-72-080	5/2/2017	16,900	29.7	7.7	30	0.32
MW-72-080	9/28/2017	18,900	28.5	7.7	-120	0.6
MW-72-080	12/7/2017	17,900	29.6	7.7	-10	0.46
MW-72BR-200	2/8/2017	17,300	27.4	8.3	-110	0.03
MW-72BR-200	5/2/2017	16,400	27.6	8.2	-170	0.05
MW-72BR-200	9/27/2017	18,700	27.1	8.3	-230	0.12
MW-72BR-200	12/6/2017	17,500	27.4	8.2	-170	0.3
MW-73-080	2/8/2017	12,400	26.4	7.5	-70	4.07
MW-73-080	5/2/2017	11,700	30.2	7.3	59	3.52
MW-73-080	9/27/2017	13,900	29.4	7.3	-64	1.18
MW-73-080	12/6/2017	15,200	28.3	7.4	-35	1.11
MW-74-240	4/27/2017	883	26.2	8.8	-21	0.7
MW-74-240	12/6/2017	1,220	25.3	8.3	-18	4.61
OW-03D	12/8/2017	10,000	24.6	7.5	72	2.49
PE-01	2/7/2017	5,090	26.5	7.7	-9.6	4.32
PE-01	3/8/2017	4,510	20.3	7.8	70	4.16

Table D-3

Field Water Quality Measurements, January 2017 through December 2017

Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide

Groundwater and Surface Water Monitoring Report,

PG&E Topock Compressor Station, Needles, California

Location ID	Sample Date	Specific Conductance (µS/cm)	Temperature (deg C)	pH	ORP (mV)	Dissolved Oxygen (mg/L)
PE-01	8/2/2017	4,430	28.6	7.3	73	--
PE-01	11/2/2017	5,220	25.2	7.3	110	1.49
PE-01	12/7/2017	2,640	19.8	7.3	-54	2.65
PGE-08	12/14/2017	25,700	28.3	8.4	-85	1.66
PM-03	12/14/2017	1,360	27.4	7.5	-80.8	5.43
PM-04	12/14/2017	2,155	26.4	7.2	-79.5	3.81
R-19	1/25/2017	985	11.3	8.6	-120	9.97
R-19	2/22/2017	1,310	14.5	8.6	50	9.97
R-19	8/17/2017	1,020	22.6	8.1	97	7.53
R-19	11/16/2017	987	18.0	8.3	120	7.8
R-28	1/24/2017	983	12.3	8.6	-48	9.69
R-28	2/21/2017	1,310	15.1	8.6	53	9.69
R-28	8/16/2017	1,030	23.5	8.0	100	7.54
R-28	11/15/2017	990	18.3	8.3	120	7.84
R63	1/24/2017	989	11.6	8.5	54	9.97
R63	2/21/2017	1,300	16.3	8.5	54	9.97
R63	5/10/2017	968	18.0	8.3	-13	7.97
R63	8/16/2017	1,030	23.0	7.9	120	6.64
R63	11/15/2017	990	18.2	8.3	110	7.86
RRB	1/25/2017	973	10.4	8.6	-120	9.69
RRB	5/11/2017	967	19.4	8.3	-44	9.05
RRB	8/17/2017	1,020	23.0	8.1	100	8.16
RRB	11/16/2017	989	18.0	8.3	120	8.13
SW1	1/24/2017	874	14.0	8.1	-75	6.7
SW1	5/10/2017	1,110	22.0	7.4	-43	5.15
SW1	8/16/2017	1,100	27.2	7.9	110	5.02
SW1	11/15/2017	1,060	17.4	7.9	130	6.28
SW2	2/21/2017	1,300	17.8	7.4	43	6.94
SW2	5/10/2017	1,030	19.8	7.4	-50	4.65
SW2	8/16/2017	1,050	26.4	7.8	120	5.6
TW-01	5/3/2017	7,750	29.4	7.5	110	3.44
TW-01	12/13/2017	8,270	29.2	7.3	-77	0.7
TW-02D	4/28/2017	7,960	24.6	8.0	16	2.66
TW-02D	10/24/2017	5,830	26.9	7.3	160	3.71
TW-02S	12/7/2017	2,030	18.4	7.2	-44	2.64
TW-03D	7/18/2017	7,890	25.3	7.9	-40	3.39
TW-03D	8/2/2017	8,120	27.1	7.9	89	3.39
TW-03D	11/2/2017	8,430	25.6	7.3	100	1.46
TW-03D	12/7/2017	7,840	20.9	7.1	-34	3.36
TW-04	12/14/2017	25,400	28.6	8.2	150	0.25
TW-05	12/14/2017	15,100	29.3	7.4	41	0.25

Notes:

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

°C = degree Celsius.

mV = millivolts.

mg/L = milligrams per liter.

ORP = oxidation reduction potential, results rounded off to whole point.

µS/cm = microSiemens per centimeter.

Table D-3

Field Water Quality Measurements, January 2017 through December 2017

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

Location ID	Sample Date	Specific	Temperature	pH	ORP	Dissolved
		Conductance (μ S/cm)	(deg C)		(mV)	Oxygen (mg/L)

All field measurements were collected during groundwater and surface water sampling using a YSI multi-parameter water quality meter, or an in situ multi-parameter water quality meter.

Table D-4

Additional Water Quality Characterization, December 2016 through December 2017
*Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide
 Groundwater and Surface Water Monitoring Report,
 PG&E Topock Compressor Station, Needles, California*

			Oxygen-18 (00/00)	Deuterium (00/00)	Chloride (mg/L)	Bromide (mg/L)	Sulfate (mg/L)	Alkalinity (total) (mg/L)	Total Dissolved Solids (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Boron (mg/L)
Location ID	Sample Date													
MW-09	12/7/2016		--	--	730	ND (1)	240	130	1,700	130	32	--	460	0.73
MW-09	2/9/2017		--	--	720	0.6	250	140	1,700	110	28	--	440	0.76
MW-09	12/7/2017		--	--	770	ND (1 J)	230	130	1,700	110	29	--	390	0.62
MW-10	12/7/2016		--	--	510	ND (1)	250	120	1,400	130	18	--	390	0.74
MW-10	2/9/2017		--	--	610	0.86	260	130	1,600	120	18	--	390	0.87
MW-10	12/7/2017	FD	--	--	520	ND (2.5)	260	100	1,400	130	19	--	310	0.66
MW-10	12/7/2017		--	--	520	ND (2.5)	250	120	1,400	120	17	--	300	0.62
MW-11	12/7/2016	FD	--	--	550	ND (1)	190	89	1,300	120	21	--	310 J	0.45
MW-11	12/7/2016		--	--	560	ND (1)	190	91	1,300	130	21	--	410 J	0.49
MW-11	2/9/2017		--	--	530	0.63	190	98	1,300	120	19	--	290	0.5
MW-11	12/7/2017		--	--	600	ND (2.5)	190	92	1,300	120	21	--	300	0.44
MW-12	12/7/2016		--	--	1,900	1.1	480	120	4,100	40	7.5	--	1,500	1.3
MW-12	12/11/2017		--	--	2,000	0.93	480	110	3,800	42	7.2	--	1,500	1.2
MW-13	12/8/2016		--	--	600	ND (0.5)	150	71	1,400	110 J	17	--	470	0.41
MW-13	12/8/2017		--	--	680	ND (1)	150	79	1,400	120	18	--	350	0.41
MW-14	12/8/2016		--	--	610	ND (1)	120	67	1,400	120 J	17	--	310	0.37
MW-14	12/13/2017		--	--	770	ND (2.5)	130	63	1,600	150	20	--	360	0.33
MW-15	12/12/2016		--	--	420	ND (0.5)	130	83	1,100	95 J	23	--	190	0.29
MW-15	12/12/2017		--	--	440	ND (0.5)	140	79	1,000	100	25	--	210	0.3
MW-16	12/12/2017		--	--	160	ND (0.5)	170	100	620	27	5.3	--	210	0.31
MW-17	12/12/2017		--	--	150	ND (0.5)	310	61	810	58	8.1	--	200	0.22
MW-18	12/8/2016		--	--	350	ND (0.5)	99	88	880	79 J	13	--	200	0.25
MW-18	12/12/2017		--	--	330	ND (0.5)	96	85	830	84	13	--	190	0.21
MW-19	12/8/2016		--	--	510	ND (2.5)	160	100	1,200	100 J	16	--	290	0.37
MW-19	12/8/2017		--	--	530	ND (0.5)	170	95	1,200	110	17	--	300	0.39
MW-20-070	12/9/2016		-7.85368	-61.8873	360	ND (0.5)	240	100	1,100	52 J	14 J	5.3	340	0.41
MW-20-070	12/7/2017		-7.97363	-60.7979	390	ND (0.5 J)	240	100	1,100	54	13	5.2	310	0.5
MW-20-100	12/9/2016		-7.9278	-61.9035	500	0.62	250	130	1,300	110 J	19 J	7.2	330	0.83
MW-20-100	12/8/2017	FD	-8.10333	-60.7743	490	0.58	270	92 J	1,300	110	18	7	320	0.9
MW-20-100	12/8/2017		-8.08216	-61.072	480	0.57	240	120 J	1,300	110	18	6.9	310	0.88
MW-20-130	12/9/2016	FD	-6.81648	-60.3119	3,400	ND (2.5)	1,100	79	7,100	250 J	14 J	31	2,700	2.4
MW-20-130	12/9/2016		-6.88176	-60.0955	3,400	ND (2.5)	1,100	77	7,000	260 J	16 J	30	2,600	2.3
MW-20-130	12/7/2017		-6.81531	-58.7852	2,500	ND (2.5)	1,000	98	5,500	240	22	22	1,600	2.1
MW-21	12/14/2016		--	--	3,100	3.4	2,600	1,000	8,800	210 J	76	--	4,200	6.5
MW-21	12/12/2017		--	--	3,300	ND (5)	2,600	860	9,800	260	87	--	3,300	4.9
MW-22	12/6/2016		--	--	6,700	ND (5)	1,900	820	14,000	680	220	--	4,300	2.4
MW-22	12/6/2017		-9.86	-83.84	9,000	ND (5)	2,100	760	17,000	770	230	--	5,600	2.5
MW-23-060	12/14/2016		--	--	5,800	ND (5)	670	19	9,700	920 J	2.4	--	3,100	0.72
MW-23-060	12/8/2017		--	--	5,600	ND (5)	660	16	9,600	860	3.2	--	3,100	0.65
MW-23-080	12/14/2016	FD	--	--	5,800	ND (5)	970	45	9,600	790 J	0.55	--	3,300	0.83
MW-23-080	12/14/2016		--	--	5,700	ND (5)	970	48	9,600	850 J	0.7	--	3,200	0.82
MW-23-080	12/8/2017		--	--	5,600	ND (5)	970	44	10,000	740	0.37	--	3,200	0.77
MW-24A	12/6/2016		--	--	--	--	--	300	1,000	--	--	--	--	--
MW-24B	12/6/2016		--	--	--	--	--	51	11,000	--	--	--	--	--
MW-24BR	12/7/2016		--	--	4,800	ND (0.5)	460	46	7,900	120	3.3	--	3,200	2.5
MW-24BR	12/8/2017		--	--	4,800	ND (0.5)	460	42	7,300	110	2.8	--	2,900	2.2

Table D-4

Additional Water Quality Characterization, December 2016 through December 2017

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

Location ID	Sample Date	Oxygen-18 (00/00)	Deuterium (00/00)	Chloride (mg/L)	Bromide (mg/L)	Sulfate (mg/L)	Alkalinity (total) (mg/L)	Total Dissolved Solids (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Boron (mg/L)
MW-25	12/8/2016	-8.78942	-65.8821	380	ND (0.5)	180	130	1,100	110 J	22	8.4	220	0.41
MW-25	12/8/2017	-9.01549	-65.905	420	ND (2.5)	200	130	1,200	120	24	8.8	240	0.37
MW-26	12/8/2016	FD -7.98162	-65.5157	880	ND (2.5)	520	120	2,500	160 J	42	13	680	1.1
MW-26	12/8/2016	-7.9186	-65.4433	890	ND (2.5)	520	120	2,400	160 J	41	13	650	1.1
MW-26	12/11/2017	FD -8.44161	-64.4695	900	ND (2.5)	510	120	2,300	150	36	12	600	0.99
MW-26	12/11/2017	-8.11508	-64.5812	910	ND (2.5)	500	120	2,300	160	37	12	620	1
MW-27-020	12/6/2016	--	--	96	ND (0.5)	250	140	680	78	27	--	100	0.1
MW-27-020	12/4/2017	--	--	95	ND (0.5)	240	160	650	71	23	--	95	0.16
MW-27-060	12/6/2016	FD --	--	79	ND (0.5)	150	240	630	76 J	15	--	96	0.21
MW-27-060	12/6/2016	--	--	80	ND (0.5)	150	250	620	72 J	14	--	95	0.23
MW-27-060	12/4/2017	--	--	86	ND (0.5)	190	190	600	79	18	--	93	0.18
MW-27-085	12/6/2016	--	--	2,700	ND (2.5)	900	260	5,400	210 J	37	--	1,900	1.2
MW-27-085	12/4/2017	--	--	3,000	ND (2.5)	870	270	5,900	210	43	--	2,000	1.2
MW-28-025	12/8/2016	--	--	110	ND (0.5)	280	210	780	98 J	30	--	120	0.23
MW-28-025	12/7/2017	--	--	110	ND (0.5)	270	210	780	93	27	--	110	0.17
MW-28-090	12/8/2016	--	--	1,100	ND (2.5)	340	410	2,700	150 J	31	--	840	0.72
MW-28-090	12/7/2017	--	--	1,900	ND (2.5)	570	280	3,900	180	37	--	1,200	0.77
MW-29	12/8/2016	--	--	270	ND (2.5)	470	440	1,600	160 J	63	--	320	0.44
MW-29	12/7/2017	--	--	210	ND (0.5 J)	140	460	970	70	30	--	230	0.37
MW-30-030	12/6/2016	--	--	3,000	ND (1)	3,700	2,000	12,000	120 J	110	--	5,000	3
MW-30-030	12/6/2017	--	--	2,200	ND (2.5)	2,700	1,700	8,600	61	51	--	3,000	2.9
MW-30-050	12/6/2016	-12.8028	-101.679	90	ND (0.5)	210	190	670	82 J	19	--	100	0.16
MW-30-050	12/6/2017	FD -11.97	-99.95	98	ND (0.5)	200	210	650	78	18	--	98	0.18
MW-30-050	12/6/2017	-11.04	-96.68	97	ND (0.5 J)	200	210	650	81	19	--	100	0.25
MW-31-060	12/9/2016	FD -8.65932	-66.0943	760	ND (1)	220	93	1,700	120 J	22 J	6.6	470	0.42
MW-31-060	12/9/2016	-8.48888	-66.636	750	ND (0.5)	210	91	1,700	120 J	20 J	6.2	470	0.42
MW-31-060	12/12/2017	-8.89909	-66.2365	840	ND (2.5)	210	86	1,800	130	22	6.1	490	0.79
MW-31-135	12/9/2016	-9.57103	-75.9886	3,400	ND (2.5)	490	38	6,700	340 J	23 J	--	2,400	1.3
MW-31-135	12/12/2017	FD -10.035	-75.5511	3,700	ND (2.5)	490	33	6,700	330	20	--	2,400	1.4
MW-31-135	12/12/2017	-9.91429	-75.0122	3,800	ND (2.5)	500	35	6,800	310	19	--	2,200	1.3
MW-32-020	12/6/2016	--	--	9,800	3.2	8,200	2,800	27,000	350	330	--	10,000	5.9
MW-32-020	12/4/2017	--	--	8,400	ND (2.5)	5,800	2,400	22,000	430	290	--	8,300	5.6
MW-32-035	12/6/2016	-10.7781	-87.0352	2,800	ND (2.5)	1,100	630	6,700	370	210	20	1,800	0.99
MW-32-035	12/4/2017	-11.43	-88.18	2,500	ND (2.5)	1,100	700	5,500	360	160	15	1,600	1
MW-33-040	12/8/2016	-8.92289	-70.7913	4,600	1.5	1,700	470	10,000	67 J	100	--	3,700	3
MW-33-040	12/7/2017	-9.12344	-70.1379	4,000	ND (0.5)	1,500	420	8,400	54	72	--	3,000	2.2
MW-33-090	12/8/2016	-9.3506	-75.3833	2,800	ND (0.5)	720	110	5,500	280 J	26	--	1,900	1.3
MW-33-090	12/7/2017	-9.70239	-74.4557	2,900	ND (2.5)	730	120	5,700	260	24	--	1,900	1.1
MW-33-150	12/8/2016	-9.95151	-77.3639	5,100	ND (2.5)	770	58	8,600	370 J	41	--	3,000	1.3
MW-33-150	12/7/2017	-9.96055	-77.3368	5,100	ND (2.5)	840	58	9,000	370	41	--	3,100	1
MW-33-210	12/8/2016	-10.4696	-82.8148	6,600	ND (2.5)	1,100	58	11,000	590 J	56	--	4,000	1.6
MW-33-210	12/7/2017	-10.4956	-80.8829	6,400	ND (2.5)	1,200	59	11,000	540	52	--	3,800	1.4
MW-34-055	12/6/2016	-12.4446	-101.069	89	ND (0.5)	230	150	680	77 J	26	5.6	100	0.11
MW-34-055	12/6/2017	-11.89	-99.07	100	ND (0.5)	230	160	640	85	27	4.9	91	ND (0.5)
MW-34-080	12/6/2016	FD -10.9343	-88.0238	1,900	ND (2.5)	620	290	4,200	230 J	47	16	1,300	0.98
MW-34-080	12/6/2016	-11.3322	-88.5807	2,000	ND (2.5)	630	270	4,300	220 J	47	15	1,300	0.98

Table D-4

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PG&E Topock Compressor Station, Needles, California

Location ID	Sample Date	Oxygen-18 (00/00)	Deuterium (00/00)	Chloride (mg/L)	Bromide (mg/L)	Sulfate (mg/L)	Alkalinity (total) (mg/L)	Total Dissolved Solids (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Boron (mg/L)
MW-34-080	12/6/2017	-10.82	-85.89	2,400	ND (2.5)	670	280	4,700	220	71	14	1,400	0.89
MW-34-100	12/6/2016	-10.6026	-81.5735	4,700	0.59	1,200	130	8,900	140 J	7.6	33	3,600	2.3
MW-34-100	10/2/2017	-10.55	-84.83	--	--	--	--	--	--	--	--	--	--
MW-34-100	12/6/2017	--	--	3,500	ND (2.5)	1,000	170	6,800	140	21	24	2,300	1.7
MW-35-060	12/9/2016	-9.21068	-72.4801	2,100	ND (0.5)	350	80	4,400	270 J	33 J	--	1,300	0.76
MW-35-060	12/8/2017	-9.15817	-71.2375	2,200	ND (2.5)	330	78	3,700	240	28	--	1,200	0.74
MW-34-100	12/6/2016 *	-11.2176	-86.8470	--	--	--	--	--	--	--	--	--	--
MW-35-135	12/9/2016 FD	-10.1602	-79.937	3,100	ND (2.5)	750	50	6,400	260 J	30 J	--	2,000	0.74
MW-35-135	12/9/2016	-10.2048	-80.139	3,200	ND (2.5)	750	48	6,000	260 J	31 J	--	2,100	0.77
MW-35-135	12/8/2017	-10.5435	-79.6626	3,300	ND (2.5)	760	49	6,200	270	29	--	2,100	0.78
MW-36-020	12/7/2016	--	--	1,400	ND (1)	2,300	1,300	6,700	160	190	--	1,900	1.9
MW-36-020	12/6/2017	--	--	700	ND (0.5)	1,200	820	3,300	66	83	--	1,000	1.4
MW-36-040	12/7/2016	--	--	120	ND (0.5)	180	260	750	50	12	--	190	0.32
MW-36-040	12/6/2017	--	--	89	ND (0.5 J)	160	260	650	41	9	--	170	0.31
MW-36-050	12/7/2016	--	--	94	ND (0.5)	190	220	670	88	20	--	93	0.18
MW-36-050	12/6/2017	--	--	96	ND (0.5)	190	220	660	82	20	--	89	0.18
MW-36-070	12/7/2016	--	--	83	ND (0.5)	200	180	630	53	11	--	130	0.19
MW-36-070	12/6/2017	--	--	96	ND (0.5 J)	240	160	670	78	17	--	110	0.18
MW-36-090	12/7/2016	-12.8825	-102.093	97	ND (0.5)	210	180	680	10	1.6	--	240	0.21
MW-36-090	12/6/2017	-11.7	-94.53	1,400	ND (0.5)	470	260	2,900	110 J	19 J	--	1,000	0.73
MW-36-100	12/7/2016	-11.8676	-94.8022	2,100	0.68	590	230	4,300	140	20	--	1,400	0.97
MW-36-100	12/6/2017 FD	-11.62	-92.4	2,200	ND (2.5)	630	250	4,300	160	28	--	1,600	1
MW-36-100	12/6/2017	-11.41	-90.72	2,200	ND (2.5)	630	250	4,200	160	28	--	1,600	1
MW-37D	12/8/2016	--	--	4,900	ND (2.5)	660	30	8,900	380 J	19	--	3,300	1.8
MW-37D	12/8/2017	--	--	4,800	ND (2.5)	660	32	8,100	350	17	--	2,700	1.7
MW-37S	12/8/2016	-9.45	-72.7	1,900	ND (2.5)	310	51	3,800	190 J	24	--	1,400	0.84
MW-37S	12/8/2017	--	--	2,100	ND (2.5)	310	47	3,800	200	24	--	1,100	0.8
MW-38D	12/7/2016	--	--	7,800	ND (2.5)	740	29	14,000	390	6.2	--	4,900	2.7 J
MW-38D	12/7/2017	--	--	7,500	ND (2.5)	730	30	13,000 J	350	4.4	--	4,800	2
MW-38S	12/7/2016 FD	--	--	240	0.6	160	190	840	21	4.1	--	310	0.89
MW-38S	12/7/2016	--	--	250	0.64	160	190	890	22	4.1	--	300	0.86
MW-38S	12/7/2017	--	--	300	ND (0.5)	160	170	890	23	4.2	--	310	0.77
MW-39-050	12/7/2016	--	--	93	ND (0.5)	210	180	640	55	16	--	150	0.19
MW-39-050	12/5/2017	--	--	100	ND (0.5 J)	210	210	670	62	17	--	120	0.19
MW-39-060	12/7/2016	--	--	110	ND (0.5)	210	200	680	35	11	--	220 J	0.23
MW-39-060	12/5/2017	--	--	110	ND (0.5)	220	210	700	39	11	--	170	0.2
MW-39-070	12/7/2016	-12.8252	-101.647	270	ND (0.5)	250	240	1,100	38	8.7	--	370	0.33
MW-39-070	12/5/2017	-12.18	-98.9	320	ND (0.5)	240	240	1,100	40	9.9	--	330	0.29
MW-39-080	12/7/2016	-12.7539	-100.168	380	ND (0.5)	270	260	1,300	42	9	--	530	0.44
MW-39-080	12/5/2017	-12.01	-95.4	1,500	ND (0.5)	470	290	3,000	100	24	--	1,000	0.71
MW-39-100	12/7/2016	-10.8632	-84.1248	4,800	ND (2.5)	1,300	250	8,800	430	52	--	3,200	2.2
MW-39-100	12/5/2017	-10.59	-84.07	4,300	ND (2.5)	1,100	270	7,800	300	38	--	2,800	1.9
MW-41D	12/8/2016	--	--	7,300	ND (2.5)	780	41	12,000 J	410 J	27	--	4,800	2
MW-41D	12/13/2017 FD	--	--	7,000	ND (2.5)	760	40	12,000 J	410	25	--	4,600	1.8
MW-41D	12/13/2017	--	--	7,200	ND (2.5)	760	38	12,000	390	24	--	4,600	1.8
MW-41M	12/8/2016	--	--	5,100	ND (2.5)	560	39	8,800	410 J	31	--	3,000	1.5

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Location ID	Sample Date	Oxygen-18 (00/00)	Deuterium (00/00)	Chloride (mg/L)	Bromide (mg/L)	Sulfate (mg/L)	Alkalinity (total) (mg/L)	Total Dissolved Solids (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Boron (mg/L)
MW-41M	12/13/2017	--	--	4,600	ND (2.5)	550	36	8,300	390	28	--	2,800	1.3
MW-41S	12/8/2016	--	--	1,700	ND (1)	310	57	3,300	140 J	19	--	1,100	0.94
MW-41S	12/13/2017	--	--	1,900	ND (2.5)	330	51	3,500	150	19	--	1,100	0.86
MW-42-030	12/6/2016	-12.0212	-96.8008	--	--	--	--	--	--	--	--	--	--
MW-42-030	12/4/2017	FD -12.6524	-99.8262	--	--	--	--	--	--	--	--	--	--
MW-42-030	12/4/2017	-12.5387	-99.0429	--	--	--	--	--	--	--	--	--	--
MW-42-055	12/6/2016	-12.6162	-102.947	81	ND (0.5)	190	220	680	6.2 J	1.8	--	260	0.2
MW-42-055	12/4/2017	-13.1	-102.23	81	ND (0.5)	170	240	620	5.5	1.4	--	220	0.21
MW-42-065	12/6/2016	FD -12.6097	-98.5784	1,000	ND (0.5)	380	390	2,600	71 J	16	--	1,000	0.64
MW-42-065	12/6/2016	-12.3166	-98.3368	1,100	ND (0.5)	380	390	2,700	72 J	15	--	1,100	0.69
MW-42-065	12/4/2017	-12.91	-100.05	510	ND (0.5)	260	350	1,500	27	6.5	--	490	0.41
MW-43-025	12/7/2016	--	--	110	ND (0.5)	290	260	870	100	43	--	98	0.17
MW-43-025	12/5/2017	--	--	120	ND (0.5 J)	280	260	830	90	37	--	110	0.18
MW-43-075	12/9/2016	--	--	3,100	ND (2.5)	950	500	6,300	320 J	150 J	--	2,000	0.95
MW-43-075	12/5/2017	--	--	3,400	ND (2.5)	940	480	6,800	280	150	--	2,100	1.1
MW-43-090	12/9/2016	--	--	5,700	ND (2.5)	1,000	200	10,000	390 J	80 J	--	3,400	1.9
MW-43-090	12/5/2017	--	--	5,800	ND (2.5)	1,200	220	9,800	410	98	--	3,800	2
MW-44-070	12/7/2016	-12.0253	-100.557	250	ND (0.5)	230	220	970	43	7.6	--	300	0.3
MW-44-070	12/6/2017	-12.21	-96.99	220	ND (0.5)	230	220	900	56	9.9	--	230	0.33
MW-44-115	12/7/2016	-10.1688	-81.7723	3,400	1.1	850	81	6,300	89	4.4	--	2,300	1.8
MW-44-115	10/2/2017	-10.42	-81.59	--	--	--	--	--	--	--	--	--	--
MW-44-115	12/6/2017	--	--	3,200	ND (0.5)	850	110	5,800	90	5.4	--	2,200	1.8
MW-44-125	12/7/2016	FD -10.2988	-84.9745	3,300	0.76	580	120	5,500	79	5	--	2,300	1.7
MW-44-125	12/7/2016	-10.4135	-85.2032	3,300	0.77	580	110	5,800	77	5	--	2,100	1.6
MW-44-125	12/6/2017	-10.07	-80.81	3,900	ND (0.5)	640	100	6,400	88	5.6	--	2,800	2.1
MW-46-175	12/8/2016	-10.3138	-79.1672	6,400	ND (2.5)	860	45	10,000	100 J	2.7	--	4,200	2.2
MW-46-175	12/7/2017	-10.1834	-78.8792	6,100	ND (0.5)	900	44	10,000	98	2.6	--	4,100	1.9
MW-46-205	12/8/2016	--	--	7,700	ND (2.5)	880	47	13,000	120 J	2.8	--	5,200	3.6
MW-46-205	12/7/2017	--	--	7,700	ND (0.5)	900	47	12,000	100	2.5	--	5,000	3
MW-47-055	12/8/2016	-8.98778	-70.7655	1,500	ND (2.5)	280	63	3,200	200 J	31	--	840	0.77
MW-47-055	12/7/2017	FD -9.14924	-69.4398	1,300	ND (2.5)	240	68	2,600	170	26	--	670	0.56
MW-47-055	12/7/2017	-9.09584	-69.1138	1,400	ND (2.5)	240	68	2,200	170	27	--	670	0.57
MW-47-115	12/8/2016	-9.96314	-79.1768	4,800	ND (2.5)	780	56	8,500	380 J	35	--	2,900	1.4
MW-47-115	12/7/2017	-10.3789	-78.6164	4,300	ND (2.5)	770	56	8,000	320	29	--	2,600	1.1
MW-48	12/14/2016	--	--	6,200	ND (2.5)	580	32	11,000 J	330 J	29	--	4,700	1.1
MW-48	12/13/2017	--	--	6,100	ND (2.5)	560	29	10,000	360	29	--	3,700	0.96
MW-49-135	12/8/2016	FD -9.9675	-79.8806	4,300	ND (2.5)	790	62	8,100	330 J	31	--	2,800	0.99
MW-49-135	12/8/2016	-9.84245	-78.6502	4,400	ND (2.5)	820	61	8,200	330 J	31	--	2,800	0.99
MW-49-135	12/7/2017	-10.6503	-79.9008	4,200	ND (2.5)	820	62	7,400	290	27	--	2,700	0.83
MW-49-275	12/8/2016	-13.0496	-103.81	9,000	ND (2.5)	1,400	38	15,000	240 J	5.2	--	6,000	2.7
MW-49-275	12/7/2017	-10.3275	-78.8662	8,700	ND (2.5)	1,400	38	14,000 J	210	4.7 J	--	5,700	2.4
MW-49-365	12/8/2016	-10.0002	-79.9299	15,000	ND (2.5)	1,200	39	23,000	350 J	11	--	8,600	5.5
MW-49-365	12/7/2017	-10.3957	-79.6054	14,000	ND (2.5)	1,300	44	22,000	320	6.5	--	8,400	3.7
MW-50-095	12/9/2016	--	--	1,600	ND (0.5)	290	59	3,200	120 J	13 J	--	1,100	0.79
MW-50-095	12/8/2017	--	--	1,700	ND (2.5)	290	53	3,000	120	12	--	990	0.79
MW-50-200	12/9/2016	--	--	7,800	ND (2.5)	970	37	13,000 J	570 J	30 J	--	4,700	1.9

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MW-50-200	12/8/2017		--	--	6,800	ND (2.5)	890	33	12,000	500	26	--	4,200	1.8
MW-51	12/9/2016		--	--	4,100	ND (2.5)	350	84	6,900	300 J	20 J	--	2,600	1.6
MW-51	12/11/2017		--	--	4,200	ND (2.5)	690	80	6,500	300	19	--	2,600	1.6
MW-52D	12/5/2016		--	--	7,500	ND (5)	940	66	12,000	320	78	--	3,300	1.4
MW-52D	12/5/2017		--	--	7,400	ND (2.5)	980	61	12,000	250	14	--	4,600	2.3
MW-52M	12/5/2016		--	--	5,500	ND (2.5)	660	100	8,900	270	15	--	3,200	2.2
MW-52M	12/5/2017	FD	--	--	5,500	ND (2.5)	660	97	9,200	330	29	--	3,200	1.7
MW-52M	12/5/2017		--	--	5,400	ND (2.5)	650	89	9,100	330	29	--	3,100	1.7
MW-52S	12/5/2016	FD	--	--	2,600	ND (2.5)	1,000	920	6,200	370	160 J	--	1,700	0.6 J
MW-52S	12/5/2016		--	--	2,500	ND (2.5)	1,100	930	6,500	340	27 J	--	1,700	1.6 J
MW-52S	12/5/2017		--	--	2,700	ND (2.5)	1,100	1,100	6,200	400	200	--	1,600	0.68
MW-53D	12/5/2016		--	--	9,600	ND (5)	1,200	35	14,000 J	280	12	--	6,100	3.3
MW-53D	12/5/2017		--	--	9,100	ND (2.5)	1,200	39	15,000 J	270	9.9	--	6,100	3.1
MW-53M	12/5/2016		--	--	1,500	ND (5)	380	230	3,300	230	27	--	2,400	1.1
MW-53M	12/5/2017		--	--	5,000	ND (2.5)	640	120	8,000	210	26	--	1,900	1
MW-54-085	12/15/2016		--	--	3,380	--	570	140	6,240	177	100	--	2,060	1.2
MW-54-085	12/13/2017		--	--	3,500	--	580	--	5,920	175	92.7	--	2,170	1.76
MW-54-140	12/15/2016		--	--	4,350	--	492	93.9	7,520	144	14.7	--	2,730	1.67
MW-54-140	12/13/2017		--	--	4,360	--	554	--	7,540	156	16.2	--	2,940	2.04
MW-54-195	12/15/2016	FD	--	--	5,820	--	927	56.8	10,900	126	5.38	--	4,470	2.57
MW-54-195	12/15/2016		--	--	6,450	--	933	56.2	11,400	127	5.49	--	4,480	2.63
MW-54-195	12/13/2017		--	--	6,500	--	1,300	--	11,400	132	4.83	--	4,650	2.85
MW-55-045	12/15/2016		--	--	326	--	97.4	149	775	35.8	9.81	--	243	0.512
MW-55-045	12/13/2017		--	--	311	--	90.2	--	802	35.8	8.31	--	277	0.629
MW-55-120	12/15/2016		--	--	2,720	--	263	60.7	4,150	76.3	1.77	--	1,720	1.49
MW-55-120	12/13/2017		--	--	3,270	--	292	--	4,800	82.4	1.69	--	1,850	1.83
MW-56D	12/14/2016		--	--	7,440	--	1,340	119	13,800	411	81.4	--	4,710	2.8
MW-56D	12/13/2017		--	--	7,560	--	1,500	--	14,000	448	93	--	5,390	3.18
MW-56M	12/14/2016		--	--	4,420	--	889	437	9,240	379	110	--	2,960	1.86
MW-56M	12/13/2017		--	--	4,710	--	1,140	--	9,710	414	113	--	3,150	2.16
MW-56S	12/14/2016		--	--	1,250	--	1,240	803	4,510	283	103	--	1,250	2.3
MW-56S	12/13/2017		--	--	1,820	--	695	--	4,210	209	88.7	--	1,320	2.2
MW-57-070	12/13/2016		--	--	620	ND (2.5)	88	88	1,600	300 J	22	--	97	0.16
MW-57-070	12/11/2017		--	--	770	ND (2.5)	90	76	1,500	370	23	--	94	0.17
MW-57-185	12/13/2016		--	--	6,100	ND (2.5)	750	24	11,000	300 J	3	--	3,900	2.6
MW-57-185	12/11/2017		--	--	6,100	ND (2.5)	750	90	9,800	390	2	--	4,000	2.5
MW-58BR	12/13/2016		--	--	2,700	ND (2.5)	520	45	5,100	440 J	26	--	1,300	1
MW-58BR	12/11/2017		--	--	2,600	ND (2.5)	520	41	4,800	480	24	--	1,300	1
MW-59-100	12/7/2016	FD	--	--	3,000	ND (5)	610	120	6,100	660	20	--	1,400	1.5
MW-59-100	12/7/2016		--	--	2,900	ND (5)	610	120	6,200	620	19	--	1,300	1.4
MW-59-100	12/7/2017		--	--	4,700	ND (5)	720	85	7,800	770	24	--	1,900	1.4
MW-60-125	12/14/2016		--	--	2,800	ND (5)	470	57	5,400	590 J	26	--	1,400	0.86
MW-60-125	12/6/2017		--	--	3,200	ND (5)	490	50	5,800	510	21	--	1,400	0.67
MW-60BR-245	12/14/2016		--	--	6,000	ND (2.5)	800	24	11,000	370 J	5.6	--	3,900	2.5
MW-60BR-245	12/13/2017		--	--	5,900	ND (2.5)	780	22	10,000	400	5.9	--	3,500	2.3
MW-60BR-245	12/14/2017		--	--	5,200	ND (2.5)	740	28	8,600	560	17	--	3,100	1.7

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MW-61-110	12/13/2016	--	--	5,600	ND (5)	730	42	9,600	750 J	18	--	3,100	1.8
MW-61-110	12/6/2017	--	--	5,800	ND (5)	730	44	9,300	660	19	--	3,400	1.9
MW-62-065	12/13/2016	--	--	1,700	ND (2.5)	430	110	3,800	190 J	26	--	1,100	0.72
MW-62-065	12/6/2017	--	--	1,800	ND (2.5)	420	120	3,500	210	24	--	1,100	0.69
MW-62-110	12/14/2016	--	--	2,700	ND (1)	550	90	5,200	150 J	6.3	--	1,900	1.4
MW-62-110	12/7/2017	--	--	2,900	ND (2.5)	520	99	5,300	150	6.7	--	1,800	1.3
MW-62-190	12/14/2016	--	--	6,300	ND (2.5)	730	70	11,000	320 J	12	--	4,700	2.4
MW-62-190	12/7/2017	FD	--	6,100	ND (2.5)	720	60	10,000	310	12	--	3,800	2
MW-62-190	12/7/2017	--	--	6,300	ND (2.5)	710	58	9,300	310	12	--	3,700	2
MW-63-065	12/13/2016	--	--	1,800	ND (2.5)	590	220	4,100	170 J	21	--	1,200	0.78
MW-63-065	12/12/2017	--	--	1,700	ND (2.5)	560	210	3,700	160	16	--	1,200	0.73
MW-64BR	12/13/2016	FD	--	4,500	ND (2.5)	600	67	7,600	350 J	19	--	2,700	1.8
MW-64BR	12/13/2016	--	--	4,400	ND (2.5)	610	67	7,800	340 J	18	--	2,700	1.7
MW-64BR	12/6/2017	--	--	4,600	ND (2.5)	590	71	7,300	340	14	--	2,600	1.5
MW-65-160	12/6/2016	--	--	950	ND (2.5)	420	120	2,400	220 J	28	--	540	0.98
MW-65-160	12/5/2017	--	--	910	ND (2.5 J)	470	130	2,300	210 J	27 J	--	500	0.98
MW-65-225	12/6/2016	--	--	5,400	ND (2.5)	890	52	9,800	440	19	--	3,700	2.6
MW-65-225	12/5/2017	--	--	4,400	ND (2.5)	780	73	8,000	340	15	--	2,600	2.1
MW-66-165	12/5/2016	--	--	1,000	ND (2.5)	450	87	2,400	260	47	--	450 J	0.6
MW-66-165	12/5/2017	--	--	1,000	ND (2.5)	460	100	2,400	240	43	--	510	0.71
MW-66-230	12/5/2016	--	--	5,800	ND (5)	1,200	33	10,000	410 J	5.3 J	--	4,100	2.2
MW-66-230	12/5/2017	--	--	6,300	ND (2.5)	1,100	34	11,000 J	380	4.6	--	4,100	2.2
MW-66BR-270	12/15/2016	--	--	1,600	ND (0.5)	68	29	2,800	74 J	2.3	--	770	1.1
MW-66BR-270	12/14/2017	--	--	870	ND (0.5)	68	42	1,400	31	1.2	--	590	1.3
MW-67-185	12/5/2016	--	--	2,100	7	510	85	4,500	470	81	--	960	0.75
MW-67-185	12/4/2017	--	--	2,200	ND (2.5)	530	87	4,600	550	100	--	940	0.78
MW-67-225	12/5/2016	--	--	1,600	ND (2.5)	1,100	140	4,500	130	6.3	--	1,500	1.3
MW-67-225	12/4/2017	--	--	1,600	ND (2.5)	1,200	150	4,200	120	6	--	1,500	1.4
MW-67-260	12/5/2016	FD	--	6,200	ND (5)	800	33	10,000	290	3	--	3,900	2.6
MW-67-260	12/5/2016	--	--	6,200	ND (5)	800	35	10,000	290	2.7	--	3,900	2.5
MW-67-260	12/4/2017	--	--	5,800	ND (2.5)	760	160	10,000	280	2.5	--	3,800	2.6
MW-68-180	12/6/2016	--	--	900	ND (2.5)	1,200	86	3,500	440 J	51	--	590	0.51
MW-68-240	12/6/2016	--	--	5,600	ND (2.5)	920	60	11,000	250 J	11	--	3,600	0.93
MW-68BR-280	12/6/2016	--	--	7,400	ND (2.5)	710	19	13,000	360	4	--	4,900	2.2
MW-69-195	12/6/2016	--	--	560	0.73	630	230	2,200	94	8.2	--	810	1.6
MW-69-195	12/4/2017	--	--	540	ND (0.5)	610	250	2,100	100	10	--	620	1.6
MW-70-105	12/14/2016	--	--	910	0.51	260	93	1,900	96 J	9.4	--	630	0.69
MW-70-105	12/11/2017	--	--	980	ND (0.5)	260	88	2,000	99	9.1	--	620	0.62
MW-70BR-225	12/14/2016	FD	--	4,400	ND (5)	810	44	7,400	680 J	29	--	2,400	1.6
MW-70BR-225	12/14/2016	--	--	4,400	ND (5)	800	45	8,400	720 J	31	--	2,400	1.7
MW-70BR-225	12/11/2017	--	--	4,500	ND (5)	800	43	6,900	630	26	--	2,300	1.5
MW-71-035	12/14/2016	--	--	4,700	ND (5)	1,000	220	8,400	730 J	57	--	2,600	2.2
MW-71-035	12/12/2017	--	--	5,600	ND (5)	1,300	250	11,000 J	890	74 J	--	3,100	2.6 J
MW-72-080	12/12/2016	--	--	5,700	ND (2.5)	740	41	10,000	340 J	7.9 J	--	3,200	2.1
MW-72-080	12/7/2017	--	--	5,900	ND (2.5)	700	42	8,700	360	7.4	--	3,400	2
MW-72BR-200	12/12/2016	--	--	5,000	ND (2.5)	640	26	8,400	240 J	2.5	--	3,100	2.1

Table D-4

Additional Water Quality Characterization, December 2016 through December 2017

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

Location ID	Sample Date		Oxygen-18 (00/00)	Deuterium (00/00)	Chloride (mg/L)	Bromide (mg/L)	Sulfate (mg/L)	Alkalinity (total) (mg/L)	Total Dissolved Solids (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Boron (mg/L)
MW-72BR-200	12/6/2017		--	--	5,400	ND (2.5)	700	24	9,000	290	3.2	--	3,500	2.3
MW-73-080	12/12/2016	FD	--	--	3,400	ND (2.5)	420	85	5,900	430 J	32	--	1,900	1.2
MW-73-080	12/12/2016		--	--	3,400	ND (2.5)	420	80	6,000	410 J	32	--	1,700	1.1
MW-73-080	12/6/2017		--	--	3,900	ND (2.5)	460	85	6,300	470	28	--	2,100	1
MW-74-240	12/8/2016		--	--	120	ND (0.5)	75	170	500	18 J	2.3	--	180	0.29
MW-74-240	12/6/2017		--	--	120	ND (0.5)	74	180	520	10	1.4	--	150	0.14
OW-03D	12/8/2016		--	--	3,100	ND (1)	440	34	5,300	200 J	17	--	1,900	1.5
OW-03D	12/8/2017	FD	--	--	2,900	ND (2.5)	410	36	5,200	170	13	--	1,800	1.3
OW-03D	12/8/2017		--	--	2,900	ND (2.5)	410	36	5,300	180	13	--	1,800	1.3
OW-03M	12/8/2016		--	--	1,700	ND (0.5)	330	54	3,500	100 J	9	--	1,200	1.1
OW-03M	12/8/2017		--	--	2,000	ND (0.5)	330	48	3,600	100	10	--	1,300	1.5
OW-03S	12/8/2016		--	--	360	ND (0.5)	79	75	840	69 J	12	--	210	0.21
OW-03S	12/8/2017		--	--	360	ND (0.5)	81	73	810	71	11	--	190	0.2
PE-01	12/6/2016		--	--	1,100	--	380	220	2,400	120 J	28	--	800 J	--
PE-01	1/4/2017		--	--	1,100	--	400	220	2,600	120,000	27,000	--	730,000	--
PE-01	2/7/2017	FD	--	--	1,200	--	400	230	2,600	120	25	--	830	--
PE-01	2/7/2017		--	--	1,200	--	400	230	2,700	120	24	--	850	--
PE-01	3/8/2017		--	--	1,100	--	380	220	2,600	110	23	--	800	--
PE-01	4/25/2017		--	--	990	--	370	230	2,400	120	25	--	700	--
PE-01	5/4/2017		--	--	970	--	350	220	2,300	120	26	--	640	--
PE-01	6/7/2017		--	--	1,200	--	400	230	2,600	160	36	--	730	--
PE-01	7/18/2017		--	--	1,000	--	370	220	2,600	140	33	--	710	--
PE-01	8/2/2017		--	--	1,000	--	370	220	2,400	130	31	--	660	--
PE-01	9/7/2017		--	--	1,200	--	370	230	2,600	170	34	--	790	--
PE-01	10/3/2017		--	--	800	--	330	210	1,900	140 J	34	--	660	--
PE-01	11/2/2017		--	--	1,200	--	410	250	2,800	160	37 J	--	810	--
PE-01	12/7/2017		--	--	1,200	--	400	250	2,600	100	26	--	370	--
PGE-07BR	12/7/2016		--	--	7,900	ND (5)	460	ND (5)	12,000 J	580	12	--	4,500	2.1
PGE-07BR	12/8/2017		--	--	7,500	ND (5)	470	ND (5)	10,000 J	540	11	--	4,500	2.2
PGE-08	12/7/2016		--	--	6,500	ND (5)	1,900	44	13,000	870	21	--	4,200	3.9
PGE-08	12/14/2017		--	--	6,500	ND (5)	1,800	47	11,000	810	16	--	4,100	3.2
PM-03	12/9/2016		--	--	370	ND (0.5)	67	84	960	88 J	17 J	--	170	0.17
PM-03	12/14/2017		--	--	330	ND (0.5)	62	88	780	85	17	--	160	0.22
PM-04	12/9/2016	FD	--	--	520	ND (0.5)	88	54	1,100	86 J	13 J	--	290	0.19
PM-04	12/9/2016		--	--	540	ND (0.5)	88	54	1,100	89 J	14 J	--	290	0.2
PM-04	12/14/2017	FD	--	--	560	ND (0.5)	120	58	1,300	100	18	--	280	0.27
PM-04	12/14/2017		--	--	550	ND (0.5)	110	56	1,200	98	18	--	280	0.25
R-28	11/15/2017		-12.42	-97.09	91	ND (0.1)	230	130	580	60	21	4	88	0.12
TW-01	12/13/2017	FD	--	--	2,300	ND (2.5)	700	110	4,700	300	20	--	1,400	1.5
TW-01	12/13/2017		--	--	2,200	ND (2.5)	710	110	4,800	320	20	--	1,400	1.6
TW-02D	12/13/2016		--	--	1,800	ND (2.5)	440	190	4,000	160 J	34	--	1,100	0.85
TW-02D	3/8/2017		--	--	1,700	--	410	200	3,500	150	28	--	1,100	--
TW-02D	4/28/2017	FD	--	--	2,100	ND (0.5)	530	140	4,300	220	30	--	1,500	--
TW-02D	4/28/2017		--	--	2,100	ND (0.5)	510	160	4,300	210	29	--	1,400	--
TW-02D	10/24/2017		--	--	1,000	ND (0.5)	230	83	2,200	--	--	--	--	--
TW-02D	12/7/2017		--	--	1,800	ND (2.5)	370	160	3,300	160	37	--	1,100	0.82

Table D-4

Additional Water Quality Characterization, December 2016 through December 2017

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

Location ID	Sample Date	Oxygen-18 (00/00)	Deuterium (00/00)	Chloride (mg/L)	Bromide (mg/L)	Sulfate (mg/L)	Alkalinity (total) (mg/L)	Total Dissolved Solids (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Boron (mg/L)
TW-02S	12/13/2016	--	--	880	ND (0.5)	330	200	2,300	96 J	24	--	530	0.5
TW-02S	12/7/2017	--	--	610	ND (0.5)	170	94	1,300	80	21	--	340	0.38
TW-03D	12/6/2016	--	--	2,300	--	520	140	4,600	210 J	31	--	1,500	--
TW-03D	1/4/2017	--	--	2,300	--	520	150	4,400	180,000	27,000	--	1,400,000	--
TW-03D	2/7/2017	--	--	2,300	--	520	160	4,700	210	31	--	1,700	--
TW-03D	3/8/2017	FD	--	2,200	--	520	160	4,600	200	28	--	1,500	--
TW-03D	3/8/2017	--	--	2,200	--	520	160	4,600	210	30	--	1,600	--
TW-03D	4/25/2017	--	--	2,200	--	520	160	4,500	220	30	--	1,600	--
TW-03D	5/4/2017	--	--	2,100	--	510	160	4,400	230	31	--	1,400	--
TW-03D	6/7/2017	--	--	2,200	--	510	150	4,400	200	26	--	1,400	--
TW-03D	7/18/2017	--	--	2,200	--	510	150	4,700	110	17	--	1,400	--
TW-03D	8/2/2017	--	--	2,200	--	510	140	4,000	190	26	--	1,400	--
TW-03D	9/7/2017	--	--	2,200	--	500	150	4,300	220	28	--	1,400	--
TW-03D	10/3/2017	--	--	2,200	--	500	140	4,300	200	27	--	1,600	--
TW-03D	11/2/2017	--	--	2,200	--	510	150	4,400	210	29	--	1,500	--
TW-03D	12/7/2017	--	--	2,300	--	500	150	4,300	190	29	--	1,500	--
TW-04	12/14/2017	--	--	7,700	ND (2.5)	1,100	51	15,000	380	34	--	5,000	2.1
TW-05	12/14/2017	--	--	4,300	ND (2.5)	550	35	7,600	340	20 J	--	2,700	1.4

Notes:

--- = data were not collected, were not available, were rejected or there was a field instrument malfunction.

* = Result of second analytical run from primary sample

0/00 = differences from global standards in parts per thousand.

FD = field duplicate sample.

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

mg/L = milligrams per liter

ND = not detected at the listed reporting limit.

Alkalinity (total) reported as calcium carbonate.

Table D-5

Additional Results from Trial Wells for June 2015 through December 2017

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

			General Chemistry							Dissolved Metals (µg/L)							Dissolved Metals (mg/L)			
Location ID	Sample Date	Sample Method	Total Dissolved Solids	Specific Conductance	Chloride	Sulfate	Nitrate/Nitrite as Nitrogen	Bromide	Alkalinity (total)	Hexavalent Chromium	Chromium, Total	Arsenic	Iron	Manganese	Molybdenum	Selenium	Boron	Calcium	Magnesium	Sodium
MW-38D	11/5/2014	MPP	13,000	20,000	7,700	690	ND (0.05)	ND (2.5)	31	18	17	7	ND (20)	73	90	ND (2.5)	2.3	440	5.9	2,300
MW-38D	4/30/2015	3V	--	--	--	--	ND (0.066)	--	--	16	14	6.3	--	ND (0.5 J)	90	ND (2.5)	--	--	--	--
MW-38D	4/30/2015	LF	--	--	--	--	ND (0.05)	--	--	20	20	6.8	--	ND (0.5)	90	ND (1)	--	--	--	--
MW-38D	12/1/2015	3V	13,000	22,000	7,200	700	0.054	ND (5)	29	20	23	7.7	ND (100)	59	95	ND (2.5)	2.7	440	8.2	5,100
MW-38D	12/1/2015	LF	12,000	22,000	7,200	690	0.05	ND (5)	29	19	19	7.3	ND (100)	43	92	ND (2.5)	2.7	440	8.1	5,100
MW-38D	5/3/2016	3V	--	--	--	--	ND (0.05)	--	--	18	17	7.6	--	56	86	ND (2.5)	--	--	--	--
MW-38D	5/3/2016	LF	--	--	--	--	ND (0.05)	--	--	19	18	7.9	--	74	84	ND (2.5)	--	--	--	--
MW-38D	12/7/2016	3V	13,000	22,000	7,800	740	0.09	ND (2.5)	29	21	21	8.2	33	48	84	ND (2.5)	2.6	380	6.2	4,800
MW-38D	12/7/2016	LF	14,000	23,000	7,800	740	ND (0.05)	ND (2.5)	29	20	21	8.1	59 J	40	87	ND (2.5)	2.7 J	390	6 J	4,900
MW-38D	5/3/2017	3V	--	--	--	--	0.069	--	--	17	15	6.7	--	44	83	ND (2.5)	--	--	--	--
MW-38D	5/3/2017	LF	--	--	--	--	0.05	--	--	16	14	7.6	--	53	92	ND (2.5)	--	--	--	--
MW-38D	12/7/2017	3V	13,000 J	16,000	7,500	720	ND (0.05)	ND (2.5)	30	21	18	7	ND (20)	22	87	ND (2.5)	1.9	330	4.4	4,700
MW-38D	12/7/2017	LF	12,000	16,000	7,500	730	0.05	ND (2.5)	30	20	18	7.3	ND (20)	21	89	ND (2.5)	2	350	4.3	4,800
MW-38S	9/22/2014	3V	--	--	--	--	ND (0.05)	--	--	ND (0.2)	ND (1)	14	--	220	47	ND (0.5)	--	--	--	--
MW-38S	11/5/2014	3V	950	1,500	280	160	ND (0.05)	0.58	180	ND (0.2)	ND (1)	13	84	210	46	ND (0.5)	0.92	26	4.3	300
MW-38S	11/5/2014	MPP	940	1,600	270	170	ND (0.05)	0.58	180	ND (0.2)	ND (1)	16	82	220	49	ND (0.5)	0.99	28	4.6	300
MW-38S	2/9/2015	3V	--	--	--	--	ND (0.05)	--	--	ND (0.2)	ND (1)	14	--	230	43	ND (0.5)	--	--	--	--
MW-38S	2/9/2015	LF	--	--	--	--	ND (0.05)	--	--	0.22	ND (1)	15	--	220	44	ND (0.5)	--	--	--	--
MW-38S	4/30/2015	3V	--	--	--	--	ND (0.05)	--	--	ND (0.2)	ND (1)	13	--	240	38	ND (0.5)	--	--	--	--
MW-38S	4/30/2015	LF	--	--	--	--	ND (0.071)	--	--	ND (0.2)	ND (1)	13	--	240	37	ND (0.5)	--	--	--	--
MW-38S	9/28/2015	3V	--	--	--	--	ND (0.05)	--	--	ND (0.2)	ND (1)	14	--	250	37	ND (0.5)	--	--	--	--
MW-38S	9/28/2015	LF	--	--	--	--	ND (0.05)	--	--	ND (0.2)	ND (1)	14	--	240	37	ND (0.5)	--	--	--	--
MW-38S	12/1/2015	3V	880	1,500	250	160	ND (0.05)	ND (0.5)	170	ND (0.2)	ND (1)	13	91	230	41	ND (0.5)	0.99	27	5.3	300
MW-38S	12/1/2015	LF	880	1,500	260	160	ND (0.05)	ND (0.5)	180	ND (0.2)	ND (1)	14	76	230	40	ND (0.5)	0.97	27	5.3	330
MW-38S	2/24/2016	3V	--	--	--	--	ND (0.05)	--	--	ND (0.2)	ND (1)	14	--	230	43	ND (0.5)	--	--	--	--
MW-38S	2/24/2016	LF	--	--	--	--	ND (0.05)	--	--	ND (0.2)	ND (1)	14	--	220	44	ND (0.5)	--	--	--	--
MW-38S	5/3/2016	3V	--	--	--	--	0.17	--	--	ND (0.2)	ND (1)	11	--	210	41	ND (0.5)	--	--	--	--
MW-38S	5/3/2016	LF	--	--	--	--	0.24	--	--	ND (0.2)	ND (1)	13	--	220	39	ND (0.5)	--	--	--	--
MW-38S	9/29/2016	3V	--	--	--	--	0.78	--	--	0.99	2.3	9.8	--	170	44	ND (0.5)	--	--	--	--
MW-38S	9/29/2016	LF	--	--	--	--	1	--	--	ND (0.2)	1.4	11	--	190	44	ND (0.5)	--	--	--	--
MW-38S	12/7/2016	FD 3V	840	1,600	240	160	1.4	0.6	190	2.5	2.5	9.9	23	140	50	ND (0.5)	0.89	21	4.1	310
MW-38S	12/7/2016	3V	880	1,500	240	160	1.4	0.6	190	2.7	2.3	9.6	55	130	47	ND (0.5)	0.86	21	4	300
MW-38S	12/7/2016	LF	890	1,600	250	160	1.3	0.64	180	2.2	2.1	9.9	23	130	48	ND (0.5)	0.86	22	4.1	300
MW-38S	2/9/2017	3V	--	--	--	--	1.6	--	--	3.8	3.6	8.4	--	110	46	0.54	--	--	--	--
MW-38S	2/9/2017	LF	--	--	--	--	1.9	--	--	0.57	ND (1)	8.6	--	120	45	0.86	--	--	--	--
MW-38S	5/3/2017	3V	--	--	--	--	2.5	--	--	1.2	1.2	7.9	--	110	37	1.3	--	--	--	--
MW-38S	5/3/2017	LF	--	--	--	--	2.7	--	--	0.34	ND (1)	7.7	--	110	35	1.8	--	--	--	--
MW-38S	9/26/2017	FD LF	--	1,500	--	--	2.7	--	--	3.1 J	3.6	7.5	--	98	36	1.3	--	--	--	--
MW-38S	9/26/2017	3V	--	1,500	--	--	2.5	--	--	3.8 J	4.2	7.7	--	100	38	1.2	--	--	--	--
MW-38S	9/26/2017	LF	--	1,500	--	--	2.9	--	--	3.1	3.6	7.7	--	100	37	1.3	--	--	--	--
MW-38S	12/7/2017	3V	890	1,400	300	160	2.8	ND (0.5 J)	170	2.9	3.1	7.3	ND (20)	70	38	1.5	0.77	23	4.2	310
MW-38S	12/7/2017	LF	870	1,400	300	160	3	ND (0.5)	170	2.3	2.5	7.1	ND (20)	68	38	1.4	0.76	23	4.2	290
MW-40D	12/4/2014	H	10,000	13,000	5,500	640	3.1	ND (2.5)	53	73	67	6	ND (20)	7.4	66	ND (2.5)	1.8	410	23	3,300
MW-40D	12/4/2014	LF	10,000	13,000	5,200	690	3.3	ND (2.5)	47	160	140	4.5	ND (20)	ND (0.5)	59	1.7	1.6	400	32	3,100
MW-40D	5/12/2015	H	--	--	--	--	0.88	--	--	ND (1)	ND (1)	17	--	1,500	64	ND (2.5)	--	--	--	--
MW-40D	5/12/2015	LF	--	--	--	--	2.9	--	--	120	110	4.3	--	ND (0.5 J)	53	ND (2.5)	--	--	--	--
MW-40D	12/7/2015	FD H	8,900	16,000	4,800	640	0.23	ND (5)	56	97	88	3.9	ND (20)	47	48	ND (2.5)	2.1	450	39	3,300
MW-40D	12/7/2015	H	8,700	16,000	5,000	670	0.067	ND (5)	61	82	78	4.2	23	54	48	ND (2.5)	2.1	420	40	3,200
MW-40D	12/7/2015	LF	9,000	16,000	4,900	670	0.26	ND (5)	55	98	87	3.9	46	47	49	ND (2.5)	2	420	40	3,300
MW-40D	5/4/2016	H	--	--	--	--	1.1	--	--	120	110	4.4	--	12	49	1.5	--	--	--	--
MW-40D	5/4/2016	LF	--	--	--	--	2.7	--	--	130	110	4.1	--	1.3	49	ND (2.5)	--	--	--	--
MW-40S	12/4/2014	H	--	2,100	--	--	3.8	--	--	7	6.7	1.2	--	ND (0.5)	7.6	1.7	--	--	--	--
MW-40S	12/4/2014	LF	--	2,100	--	--	3.8	--	--	7.6	7.1	1.2	--	ND (0.5)	8.5	2	--	--	--	--
MW-40S	12/7/2015	H	--	2,500	--	--	4.3	--	--	10	9.1	1.7	--	ND (0.5)	12	2.8	--	--	--	--
MW-40S	12/7/2015	LF	--	2,500	--	--	3.7	--	--	8.1	11	1.3	--	ND (0.5)	9.2	2	--	--	--	--
MW-57-185	11/10/2014	3V	--	17,000	--	--	ND (0.05)	--	--	9.5	8.9	12	--	170	84	ND (2.5)	--	--	--	--

Table D-5

Additional Results from Trial Wells for June 2015 through December 2017

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

			General Chemistry							Dissolved Metals (µg/L)							Dissolved Metals (mg/L)			
Location ID	Sample Date	Sample Method	Total Dissolved Solids	Specific Conductance	Chloride	Sulfate	Nitrate/Nitrite as Nitrogen	Bromide	Alkalinity (total)	Hexavalent Chromium, Chromium	Chromium, Total	Arsenic	Iron	Manganese	Molybdenum	Selenium	Boron	Calcium	Magnesium	Sodium
MW-57-185	5/11/2015	3V	--	--	--	--	ND (0.05)	--	--	10	9	15	--	220	88	ND (2.5)	--	--	--	--
MW-57-185	12/4/2015	3V	11,000	18,000	6,500	720	ND (0.05)	ND (5)	19	9.9	8.5	13	ND (20)	320	89	ND (2.5)	2.8	390	3	4,100
MW-57-185	4/28/2016	3V	--	--	--	--	0.085	--	--	4.6	5.6	10	--	240	94	ND (0.5)	--	--	--	--
MW-57-185	12/13/2016	3V	11,000	20,000	6,100	750	ND (0.05)	ND (2.5)	24	7.1	7.3	17	ND (20)	290	88	ND (12)	2.6	300 J	3	3,900
MW-57-185	5/1/2017	3V	--	--	--	--	ND (0.05)	--	--	5.9	5.2	12	--	260	80	ND (2.5)	--	--	--	--
MW-57-185	12/11/2017	3V	9,800	18,000	6,100	750	ND (0.05)	ND (2.5)	37	8.2	7.4	11	ND (20)	160	84	ND (2.5)	2.5	350	2	4,000
MW-57-185	12/11/2017	LF	9,800	16,000	6,000	740	0.15	ND (2.5)	90	3.1	3.3	3.9	ND (20)	6.9	89	ND (2.5)	2.3	390	ND (0.1)	3,800
MW-60BR-245	9/25/2014	3V	--	--	--	--	0.28	--	--	1.5	3	4.9	--	ND (0.5)	61	ND (2.5)	--	--	--	--
MW-60BR-245	12/3/2014	3V	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-60BR-245	12/4/2014	3V	--	16,000	--	--	0.18	--	--	ND (1)	ND (1)	6.8	--	17	61	ND (2.5)	--	--	--	--
MW-60BR-245	2/10/2015	3V	--	--	--	--	0.095	--	--	3.6	5.2	6.2	--	ND (0.5)	62	ND (2.5)	--	--	--	--
MW-60BR-245	5/14/2015	3V	--	--	--	--	0.17	--	--	ND (1)	ND (1)	6.7	--	ND (0.5 J)	63	1.1	--	--	--	--
MW-60BR-245	9/29/2015	3V	--	--	--	--	0.14	--	--	ND (1)	1.4	5.9	--	28	63	1.4	--	--	--	--
MW-60BR-245	12/4/2015	3V	11,000	17,000	5,900	780	0.17	ND (5)	22	61	53	7	89	22	62	ND (2.5)	2.5	470	6.3	3,900
MW-60BR-245	2/23/2016	3V	--	--	--	--	ND (0.05)	--	--	ND (1)	ND (5)	6.9	--	19	60	ND (12)	--	--	--	--
MW-60BR-245	4/29/2016	G	--	--	--	--	0.13	--	--	ND (1)	ND (5)	6.8	--	17	62	2.6	--	--	--	--
MW-60BR-245	9/29/2016	3V	--	--	--	--	0.14	--	--	ND (1)	37	7.7	--	14	64	ND (2.5)	--	--	--	--
MW-60BR-245	12/14/2016	3V	11,000	19,000	6,000	800	0.15	ND (2.5)	24	ND (1)	ND (1)	7.1	83	15	60	3.1	2.5	370 J	5.6	3,900
MW-60BR-245	2/8/2017	3V	--	--	--	--	0.16	--	--	ND (1)	ND (1)	6.4	--	13	62	ND (2.5)	--	--	--	--
MW-60BR-245	5/3/2017	3V	--	--	--	--	0.24	--	--	39	36	6.9	--	14	56	ND (2.5)	--	--	--	--
MW-60BR-245	9/26/2017	3V	--	16,000	--	--	ND (0.069)	--	--	ND (1)	ND (1)	5.3	--	14	56	3.4	--	--	--	--
MW-60BR-245	12/13/2017	LF	10,000	16,000	5,900	780	0.072	ND (2.5)	22	2.3	12	6.3	94	21	64	ND (2.5)	2.3	400	5.9	3,500
MW-60BR-245	12/14/2017	3V	8,600	14,000	5,200	740	0.82	ND (2.5)	28	690	830	2.9	560	42	36	1.9	1.7	560	17	3,100
MW-70BR-225	12/16/2014	3V	--	14,000	--	--	3.5	--	--	1,900	2,200	1.9	--	ND (0.5)	18	3	--	--	--	--
MW-70BR-225	5/27/2015	3V	--	--	--	--	3.8	--	--	2,300	2,400	1.9	--	ND (0.5)	18	2.5	--	--	--	--
MW-70BR-225	12/7/2015	3V	8,400	14,000	4,300	760	4	ND (2.5)	41	2,000	2,000	1.8	ND (20)	3	19	2.6	1.7	750	29	2,600
MW-70BR-225	4/28/2016	3V	--	--	--	--	3.6	--	--	2,000	2,100	2	--	1.2	19	2.5	--	--	--	--
MW-70BR-225	12/14/2016	FD 3V	7,400	14,000	4,400	810	3.8	ND (5)	44	1,900	1,800	2.1	27	2.3	20	3	1.6	680 J	29	2,400
MW-70BR-225	12/14/2016	3V	8,400	14,000	4,400	800	3.8	ND (5)	45	1,900	1,800	2	93	4	20	2.8	1.7	720 J	31	2,400
MW-70BR-225	5/2/2017	3V	--	--	--	--	4.1	--	--	1,800	1,800	1.8	--	1.6	17	ND (2.5)	--	--	--	--
MW-70BR-225	12/11/2017	3V	6,900	13,000	4,500	800	3.8	ND (5)	43	1,700	1,800	1.9	ND (20)	1.1	18	2.7	1.5	630	26	2,300
MW-70BR-225	12/11/2017	LF	6,700	12,000	4,100	760	3.3	ND (5)	40	1,400	1,600	2.2	110	5.7	21	ND (2.5)	1.4	630	24	2,200
MW-72BR-200	9/24/2014	3V	--	--	--	--	0.093	--	--	5.4	4.5	14	--	6.2	82	ND (2.5)	--	--	--	--
MW-72BR-200	11/17/2014	3V	--	16,000	--	--	0.15	--	--	5.8	6	16	--	ND (2.5)	78	ND (12)	--	--	--	--
MW-72BR-200	2/11/2015	3V	--	--	--	--	0.16	--	--	6.5	5.6	14	--	ND (0.5)	78	ND (2.5)	--	--	--	--
MW-72BR-200	5/4/2015	3V	--	--	--	--	ND (0.11)	--	--	4.3	3.7	12	--	ND (0.5)	72	ND (2.5)	--	--	--	--
MW-72BR-200	9/29/2015	3V	--	--	--	--	0.12	--	--	4.2	4.1	16	--	9.7	79	ND (0.5)	--	--	--	--
MW-72BR-200	12/8/2015	3V	9,000	17,000	5,200	660	0.17	ND (5)	22	6.4	6.2	15	34	6.8	85	ND (0.5)	2	300	2.3	3,300
MW-72BR-200	2/23/2016	3V	--	--	--	--	0.1	--	--	6	5.6	16	--	24	81	ND (2.5)	--	--	--	--
MW-72BR-200	4/28/2016	3V	--	--	--	--	0.072	--	--	3.9	3.6	16	--	16	87	ND (0.5)	--	--	--	--
MW-72BR-200	9/28/2016	3V	--	--	--	--	0.14	--	--	4.2	4.3	16	--	7.2	83	ND (2.5)	--	--	--	--
MW-72BR-200	12/12/2016	3V	8,400	15,000	5,000	640	0.1	ND (2.5)	26	5.3	4.8	17	ND (20)	26	80	ND (2.5)	2.1	240 J	2.5	3,100
MW-72BR-200	2/8/2017	3V	--	--	--	--	0.13	--	--	6.1	6.7	15	--	9	79	ND (2.5)	--	--	--	--
MW-72BR-200	5/2/2017	3V	--	--	--	--	0.12	--	--	2.9	2.6	13	--	38	79	ND (2.5)	--	--	--	--
MW-72BR-200	9/27/2017	3V	--	16,000	--	--	0.12	--	--	3.8	3.6	15	--	8.8	78	ND (2.5)	--	--	--	--
MW-72BR-200	12/6/2017	3V	8,500	15,000	5,300	700	0.16	ND (2.5)	22	4.2	3.8	15	ND (20)	11	79	ND (2.5)	2.2	270	2.5	3,300
MW-72BR-200	12/6/2017	LF	9,000	15,000	5,400	700	0.062	ND (2.5)	24	1.5	1.7	13	39	100	78	ND (2.5)	2.3	290	3.2	3,500
TW-04	12/8/2015	3V	12,000	--	7,500	1,000	--	ND (5)	51	6.9	6.4	--	--	38	78	ND (2.5)	--	--	--	--
TW-04	12/14/2017	3V	12,000	19,000	7,200	1,100	--	ND (2.5)	51	8.2	8.3	--	ND (20)	64	64	0.68	1.9	380	34	5,000
TW-04	12/14/2017	LF	15,000	22,000	7,700	950	--	ND (2.5)	38	2.8	4	--	68	86	110	0.64	2.1	170	5	4,800
TW-05	12/8/2015	3V	8,600	16,000	5,000	590	--	ND (5)	35	16	14	--	22	ND (0.5)	28	ND (2.5)	1.3	420	21	3,000
TW-05	12/14/2017	3V	7,400	12,000	4,300	550	--	ND (2.5)	35	14	12	--	21 J	2.2	28 J	0.65	1.4	340	20 J	2,700
TW-05	12/14/2017	LF	7,600	12,000	4,300	520	--	ND (2.5)	35	10	13	--	260	19	31	0.62	1.4	340	19	2,700

Notes:

ND =parameter not detected at the listed reporting limit.

General chemistry results in milligrams per liter (mg/L), except Specific

Table D-5
Additional Results from Trial Wells for June 2015 through December 2017
Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide
Groundwater and Surface Water Monitoring Report,
PG&E Topock Compressor Station, Needles, California

Location ID	Sample Date	Sample Method	General Chemistry							Dissolved Metals (µg/L)							Dissolved Metals (mg/L)			
			Total Dissolved Solids	Specific Conductance	Chloride	Sulfate	Nitrate/Nitrite as Nitrogen	Bromide	Alkalinity (total)	Hexavalent Chromium	Chromium, Total	Arsenic	Iron	Manganese	Molybdenum	Selenium	Boron	Calcium	Magnesium	Sodium

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

3V = three volume.

H = HYDRASleeve™

LF = Low-Flow (minimal drawdown)

µg/L = micrograms per liter.

mg/L = miligrams per liter.

conductance which is in µS/cm.

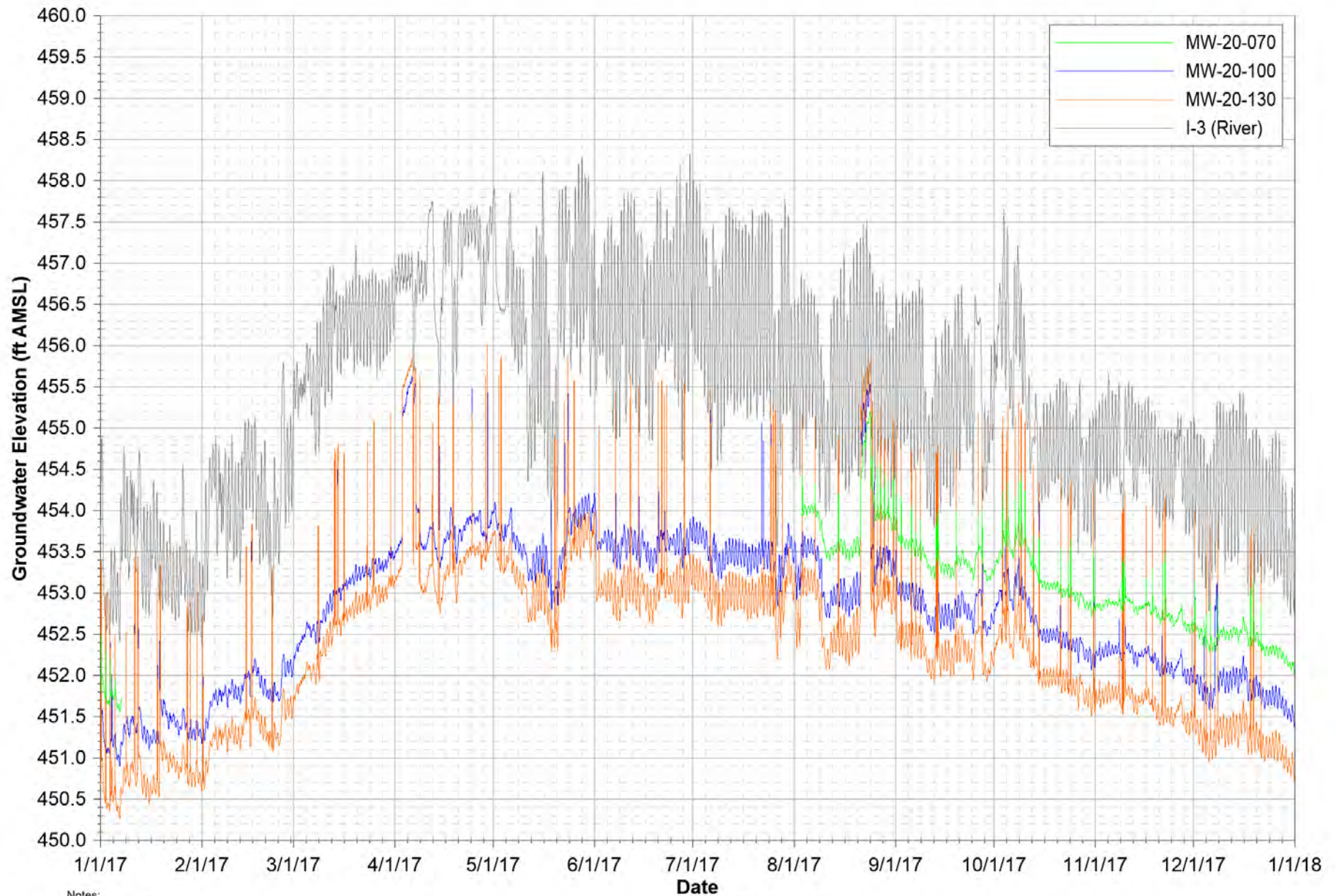
Nitrate and Nitrate/Nitrite reported as Nitrogen.

Alkalinity bicarbonate result equals Alkalinity (total) result. Alkalinity (total) shown on table. Alkanlity carbonate result and hydroxide result are ND at 5 mg/L.

APPENDIX E

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 January 7, 2017 through August 2, 2017 due to transducer malfunction.

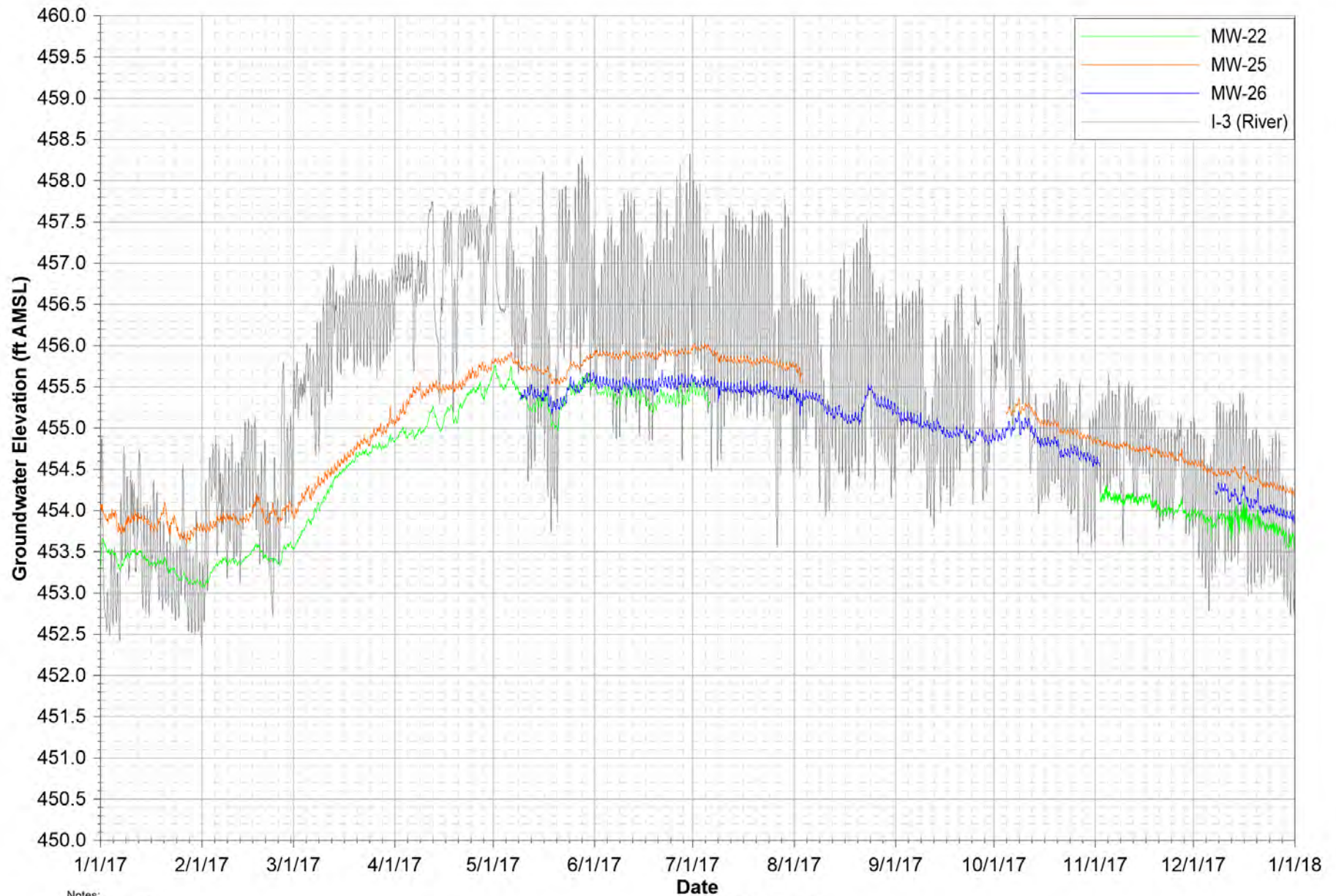
Date

FIGURE E-1A

MW-20 CLUSTER HYDROGRAPHS

FOURTH QUARTER 2017 AND ANNUAL 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.
3. MW-22 data unavailable from July 6, 2017 through November 1, 2017 due to transducer malfunction.
4. MW-25 data unavailable from August 3, 2017 through October 3, 2017 due to transducer malfunction.
5. MW-26 data unavailable from January 1, 2017 through May 8, 2017 and from November 2, 2017 through December 6, 2017 due to transducer malfunction.

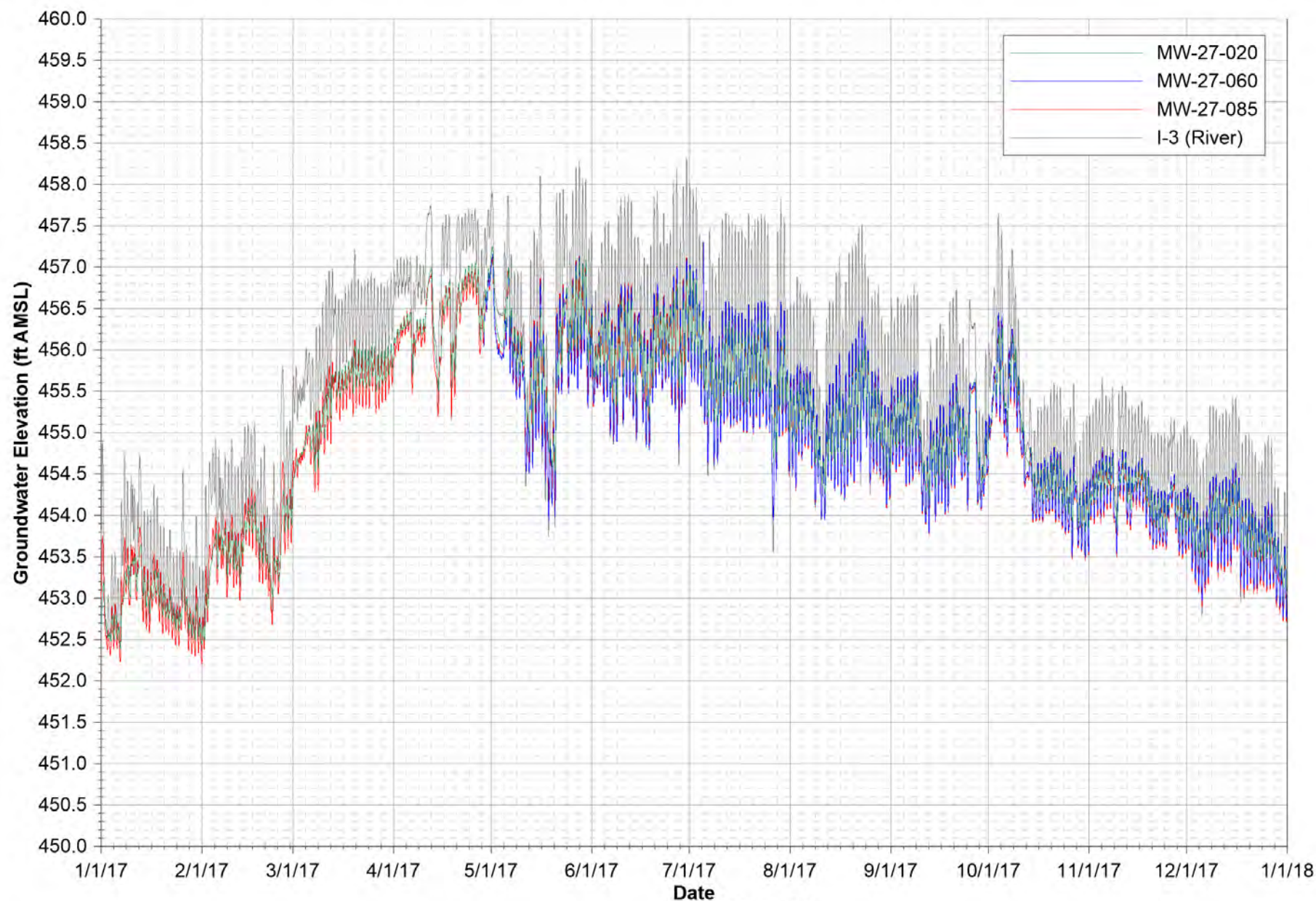
Date

FIGURE E-1B

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

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



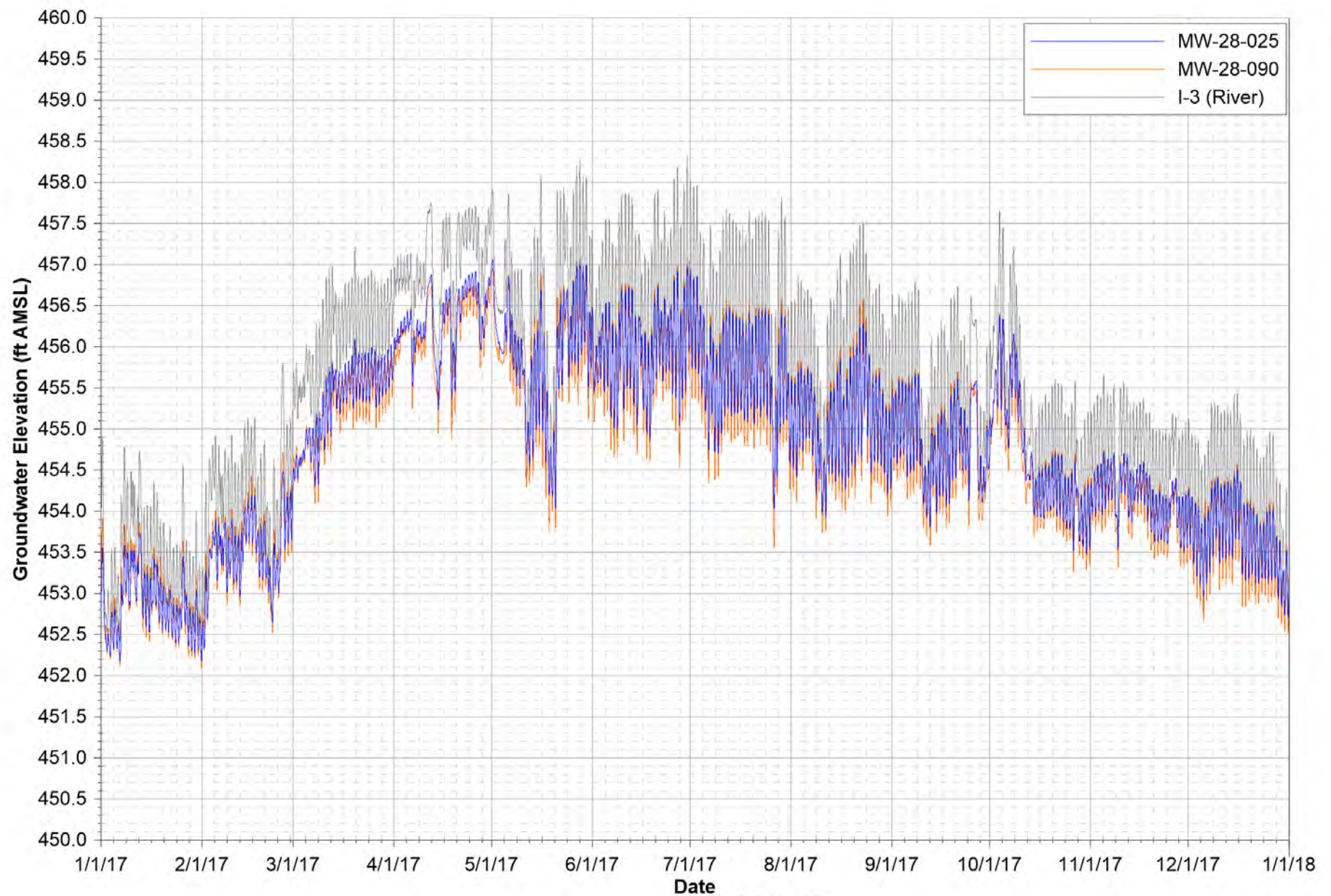


Notes:

1. Data subject to review.
2. ft amsl = feet above mean sea level.
3. MW-27-060 data unavailable from January 1, 2017 through April 27, 2017 due to transducer malfunction.

**FIGURE E-1C
MW-27 CLUSTER HYDROGRAPHS**

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

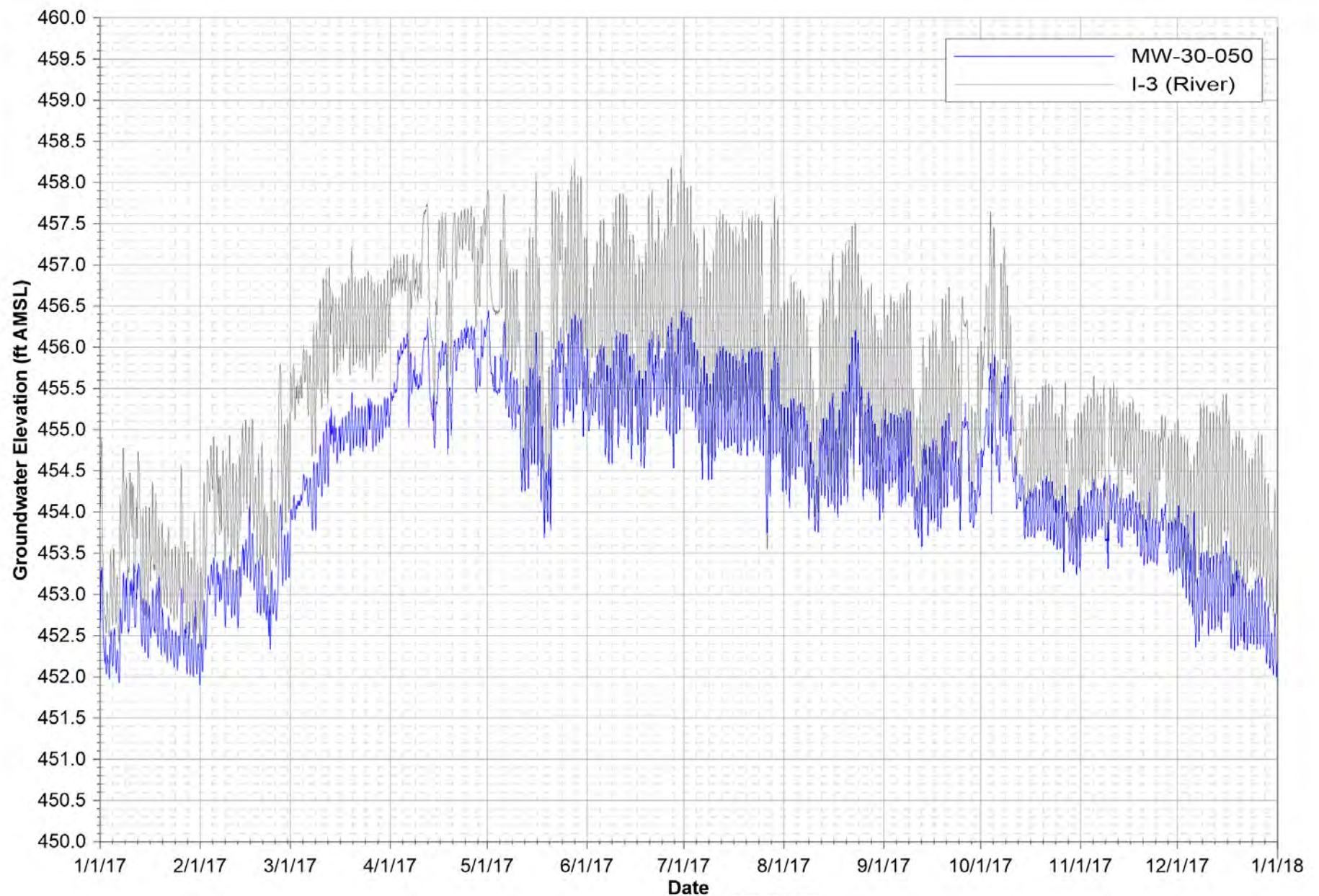


Notes:
 1. Data subject to review.
 2. ft amsl = feet above mean sea level.

FIGURE E-1D

MW-28 CLUSTER HYDROGRAPHS

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



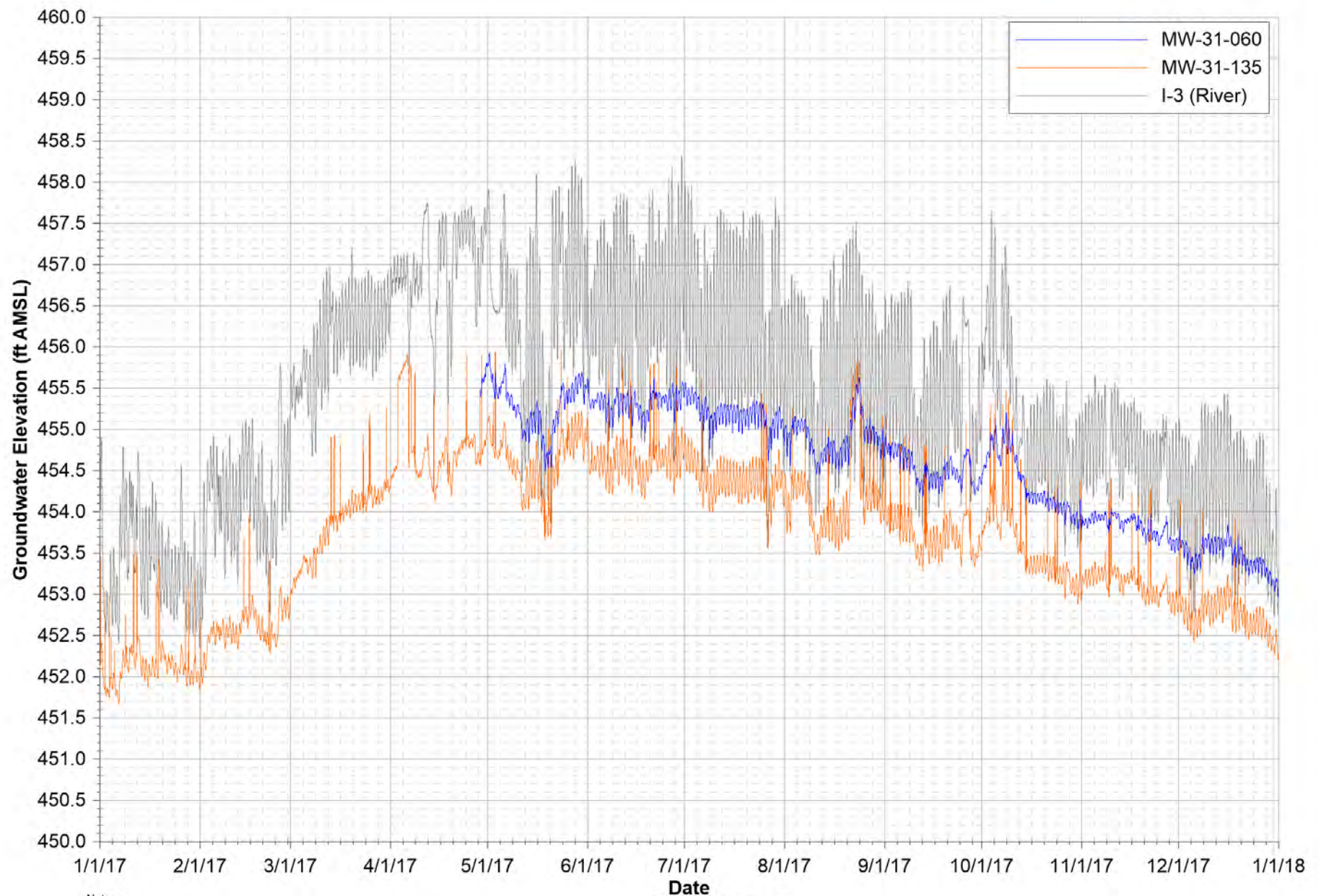
Notes:
1. Data subject to review.
2. ft amsl = feet above mean sea level.

Date

FIGURE E-1E

MW-30-050 HYDROGRAPH

FOURTH QUARTER 2017 AND ANNUAL INTERIMMEASURES PERFORMANCE MONITORING
AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA



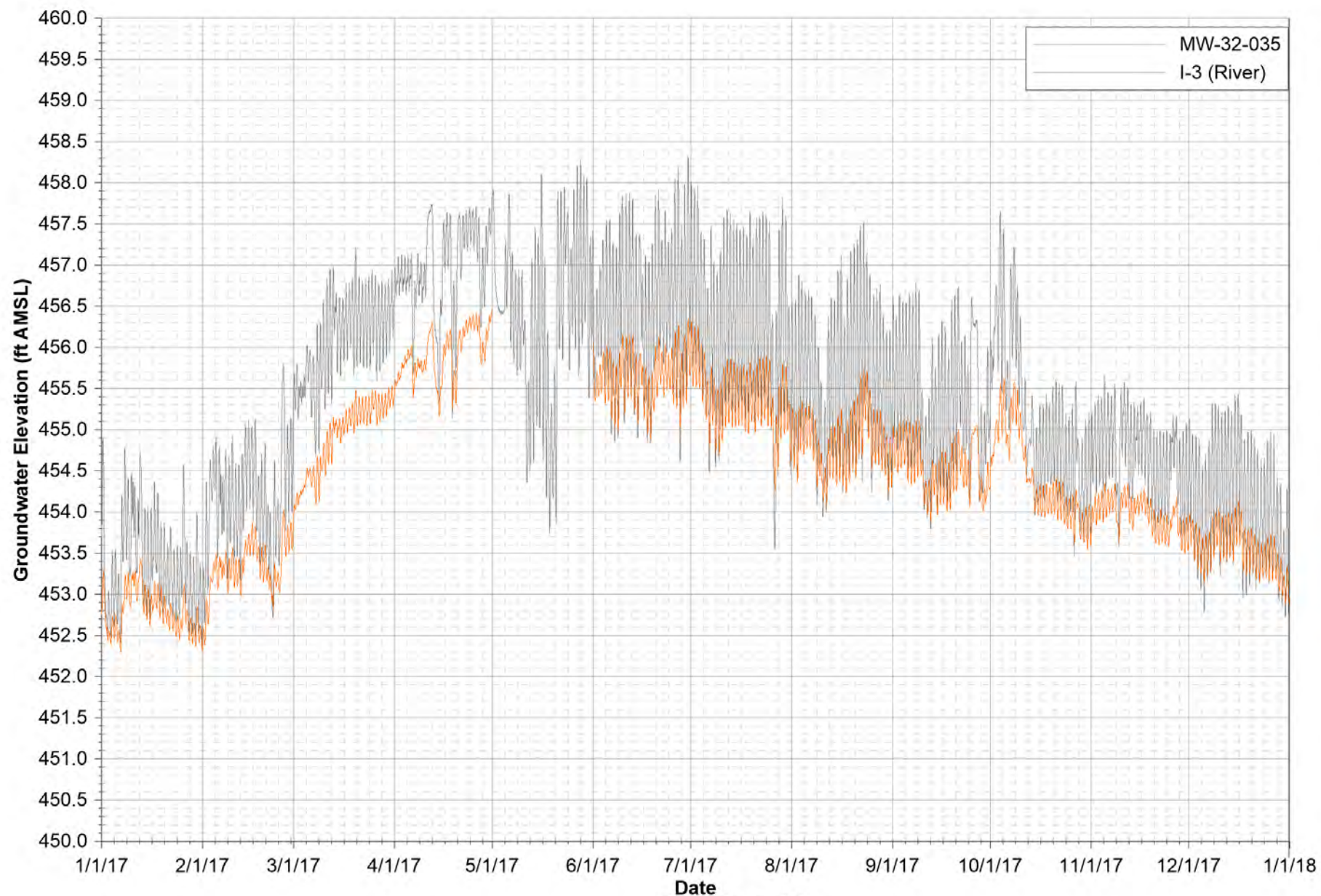
Notes:

1. Data subject to review.
2. ft amsl = feet above mean sea level.
3. MW-31-060 data unavailable from January 1, 2017 through April 27, 2017 due to transducer malfunction.

FIGURE E-1F

MW-31 CLUSTER HYDROGRAPHS

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



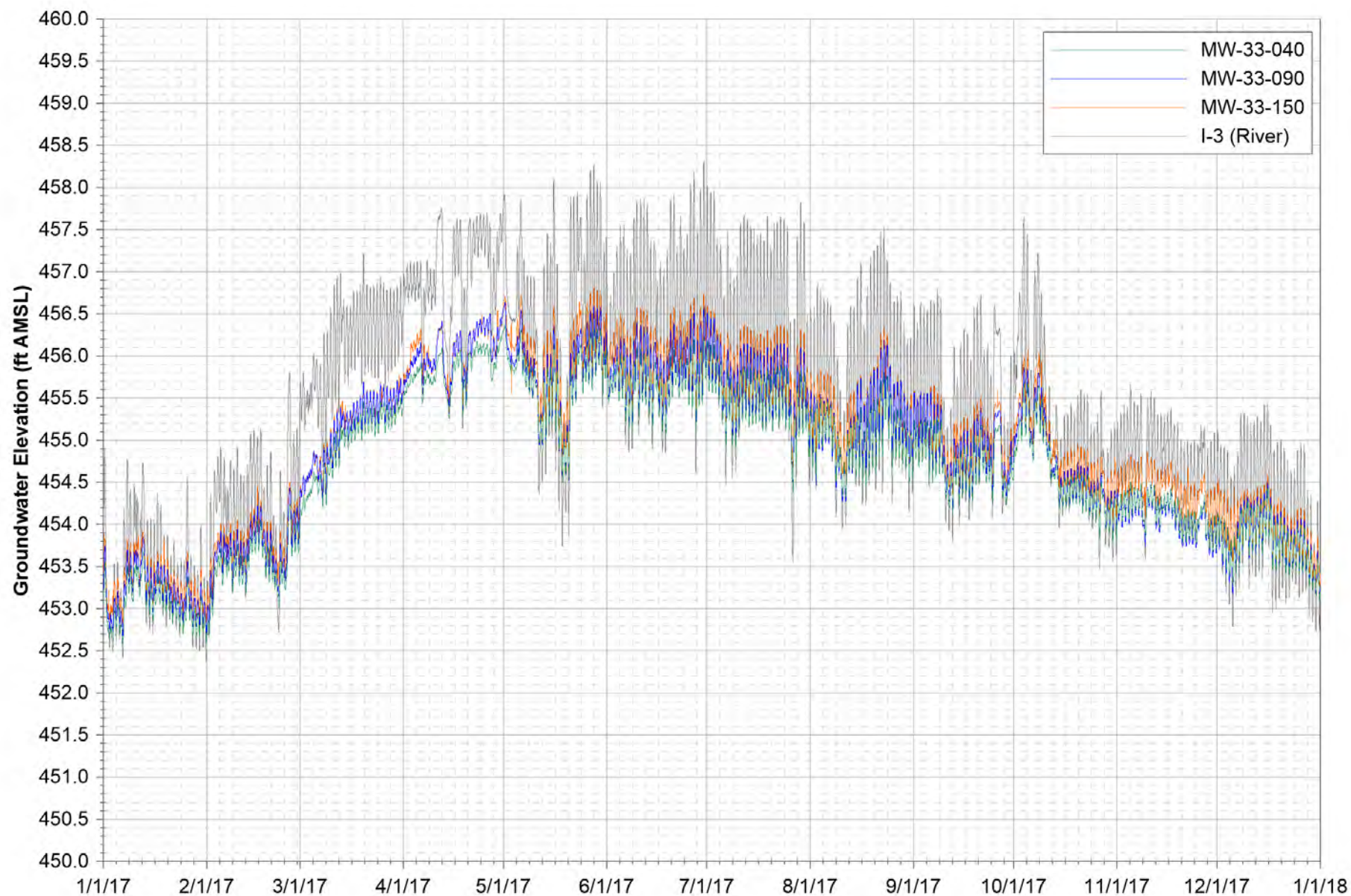
Notes:

1. Data subject to review.
2. ft amsl = feet above mean sea level.
3. MW-32-035 data unavailable from April 30, 2017 through May 31, 2017 due to transducer malfunction.

FIGURE E-1G

MW-32-050 HYDROGRAPH

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



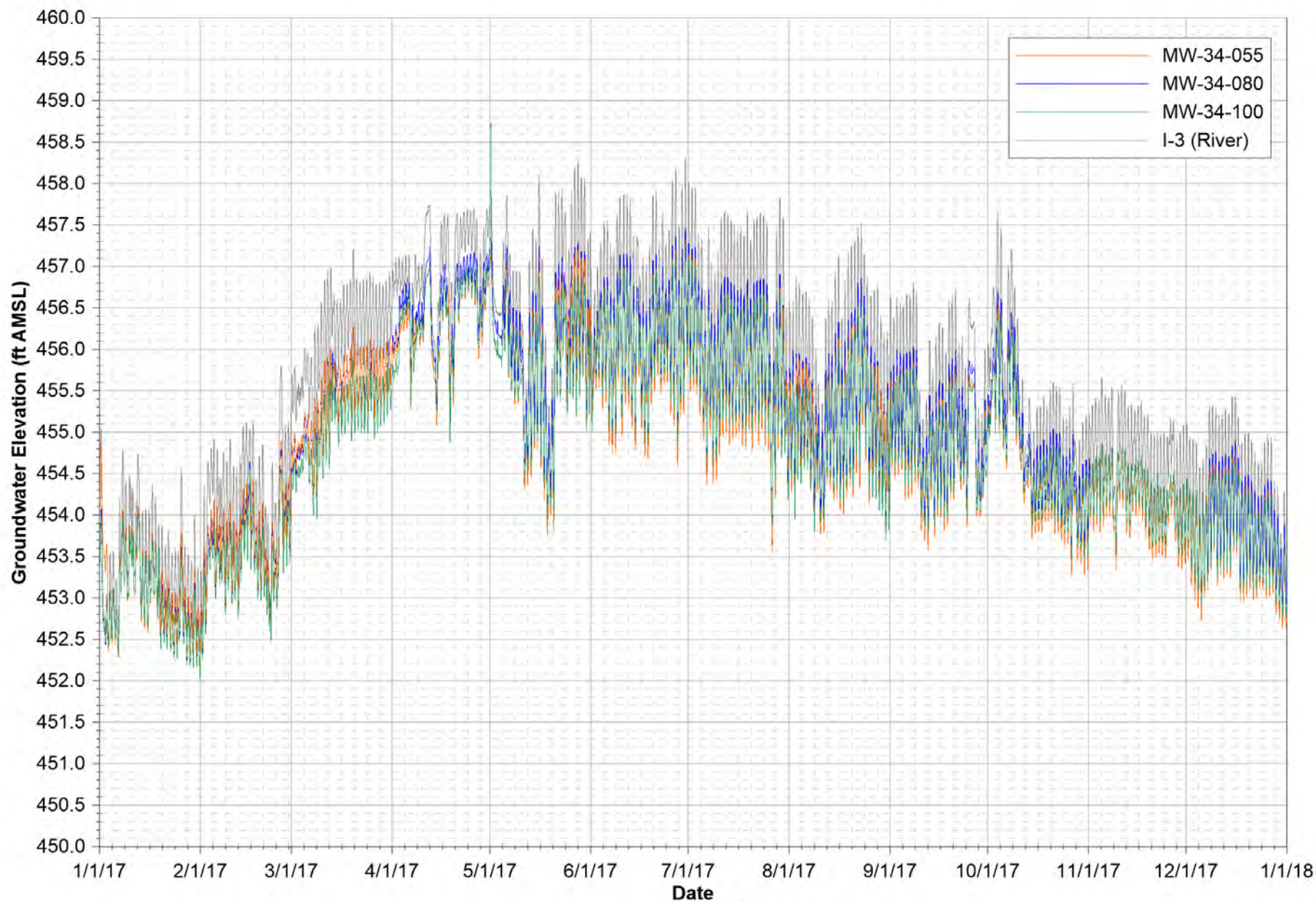
Notes:
 1. Data subject to review.
 2. ft amsl = feet above mean sea level.

Date

FIGURE E-1H

MW-33 CLUSTER HYDROGRAPHS

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



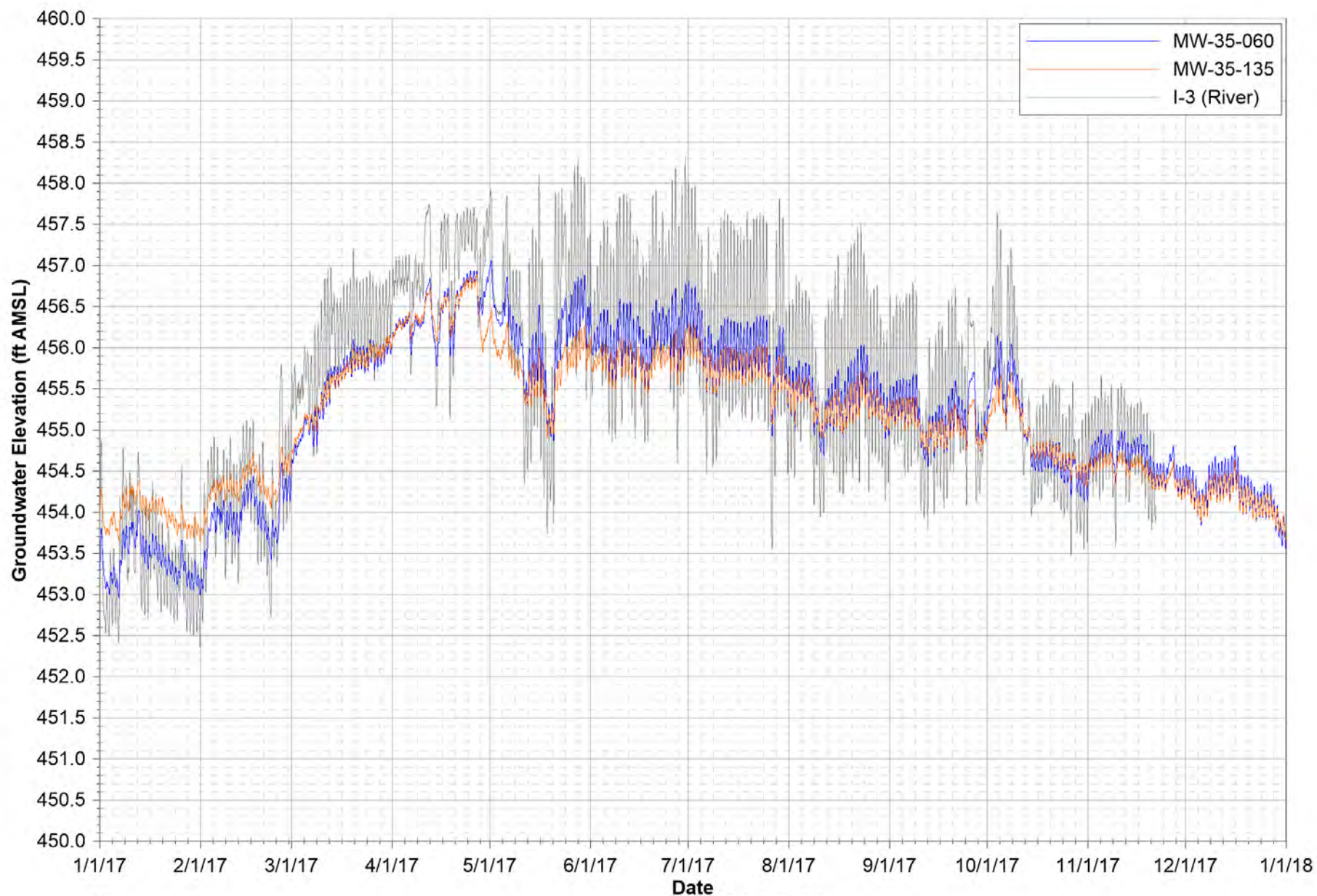
Notes:

1. Data subject to review.
2. ft amsl = feet above mean sea level.
3. MW-34-080 data unavailable from November 1, 2017 through December 6, 2017 due to transducer malfunction.

FIGURE E-11

MW-34 CLUSTER HYDROGRAPHS

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



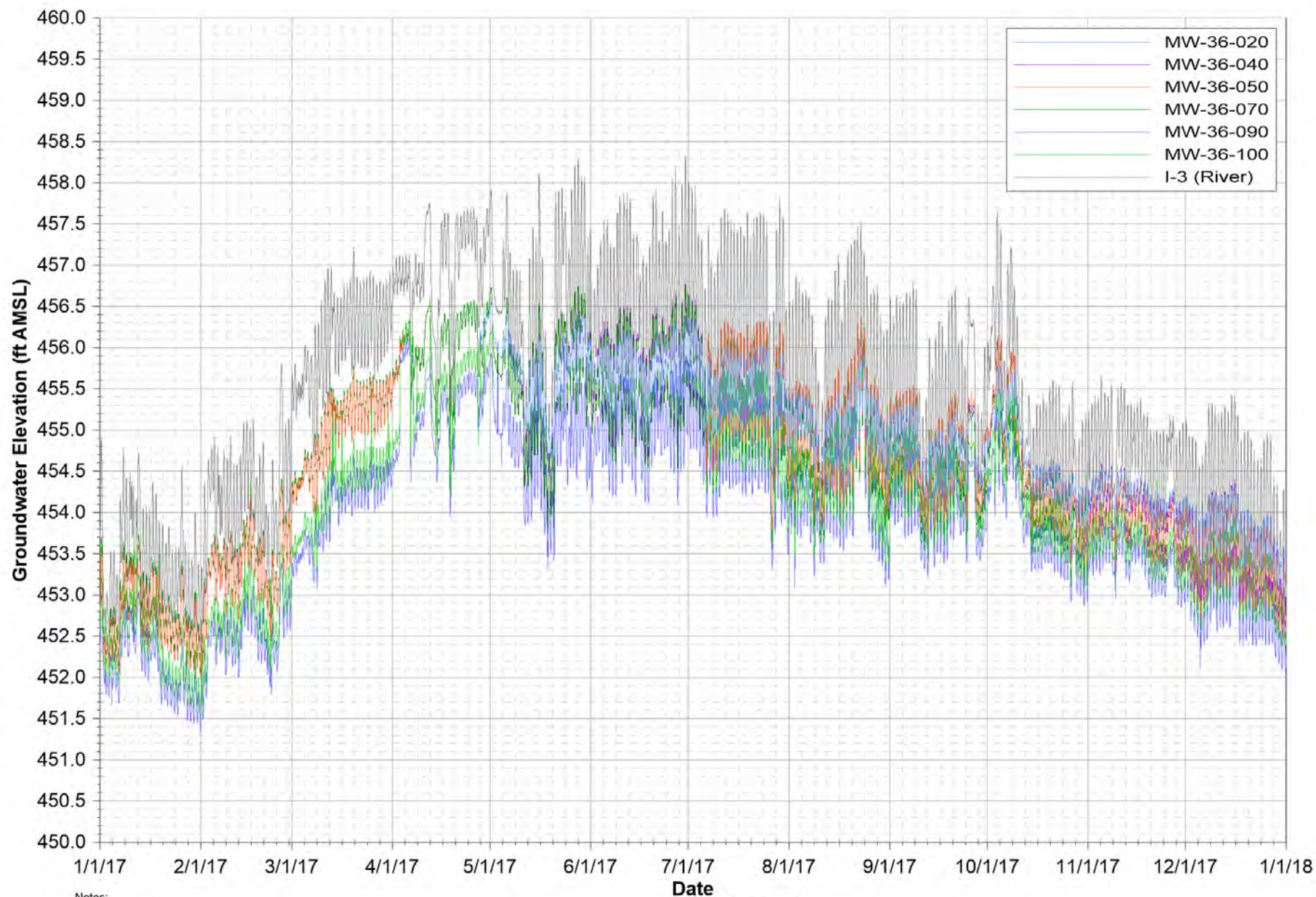
Notes:
 1. Data subject to review.
 2. ft amsl = feet above mean sea level.

Date

FIGURE E-1J

MW-35 CLUSTER HYDROGRAPHS

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



Notes:

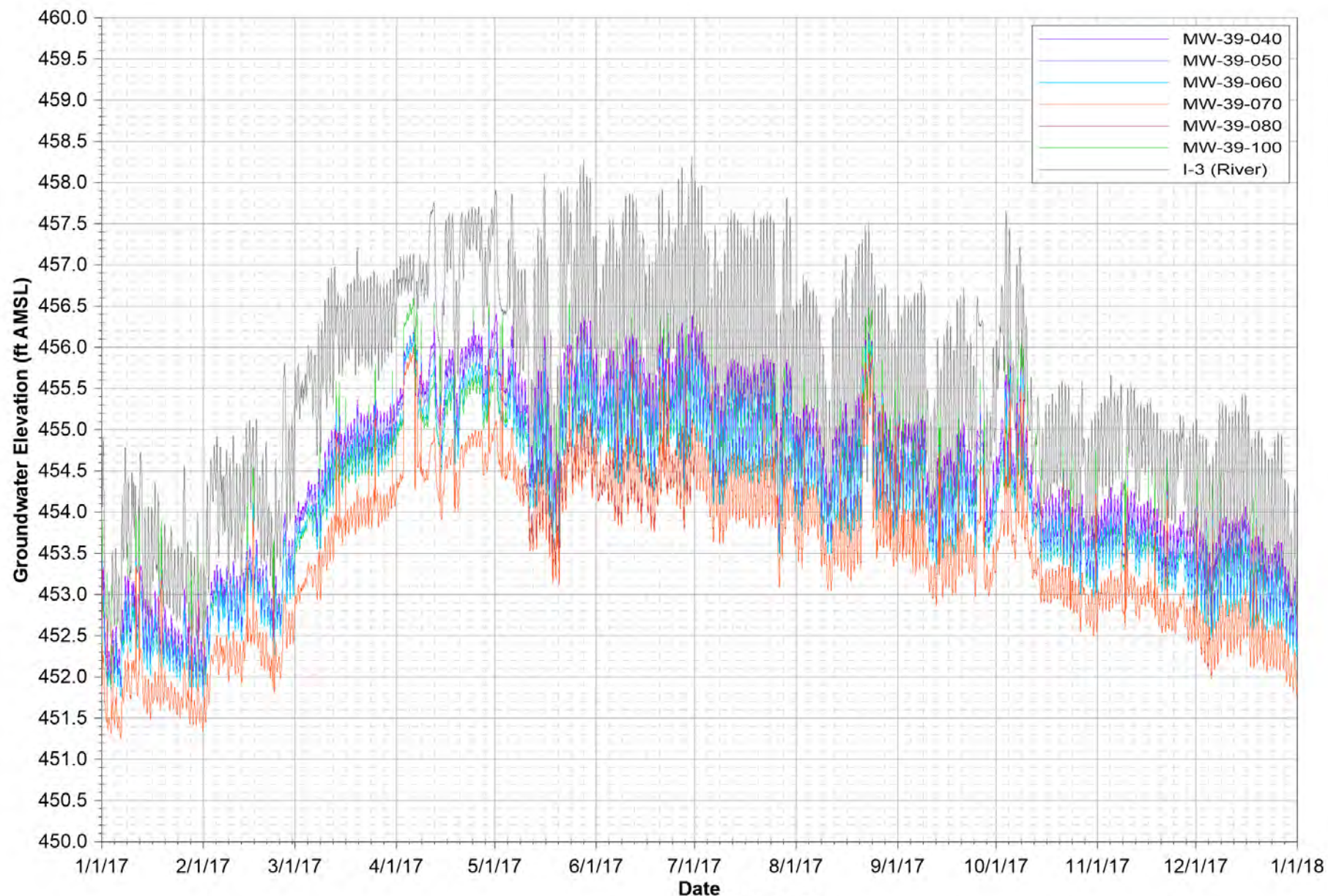
1. Data subject to review.
2. ft amsl = feet above mean sea level.
3. MW-36-020 data unavailable from January 1, 2017 through April 26, 2017 due to transducer malfunction.
4. MW-36-040 data unavailable from January 1, 2017 through May 8, 2017 due to transducer malfunction.
5. MW-36-050 data unavailable from April 4, 2017 through July 5, 2017 due to transducer malfunction.
6. MW-36-100 data unavailable from May 2, 2017 through July 5, 2017 due to transducer malfunction.

Date

FIGURE E-1K

MW-36 CLUSTER HYDROGRAPHS

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



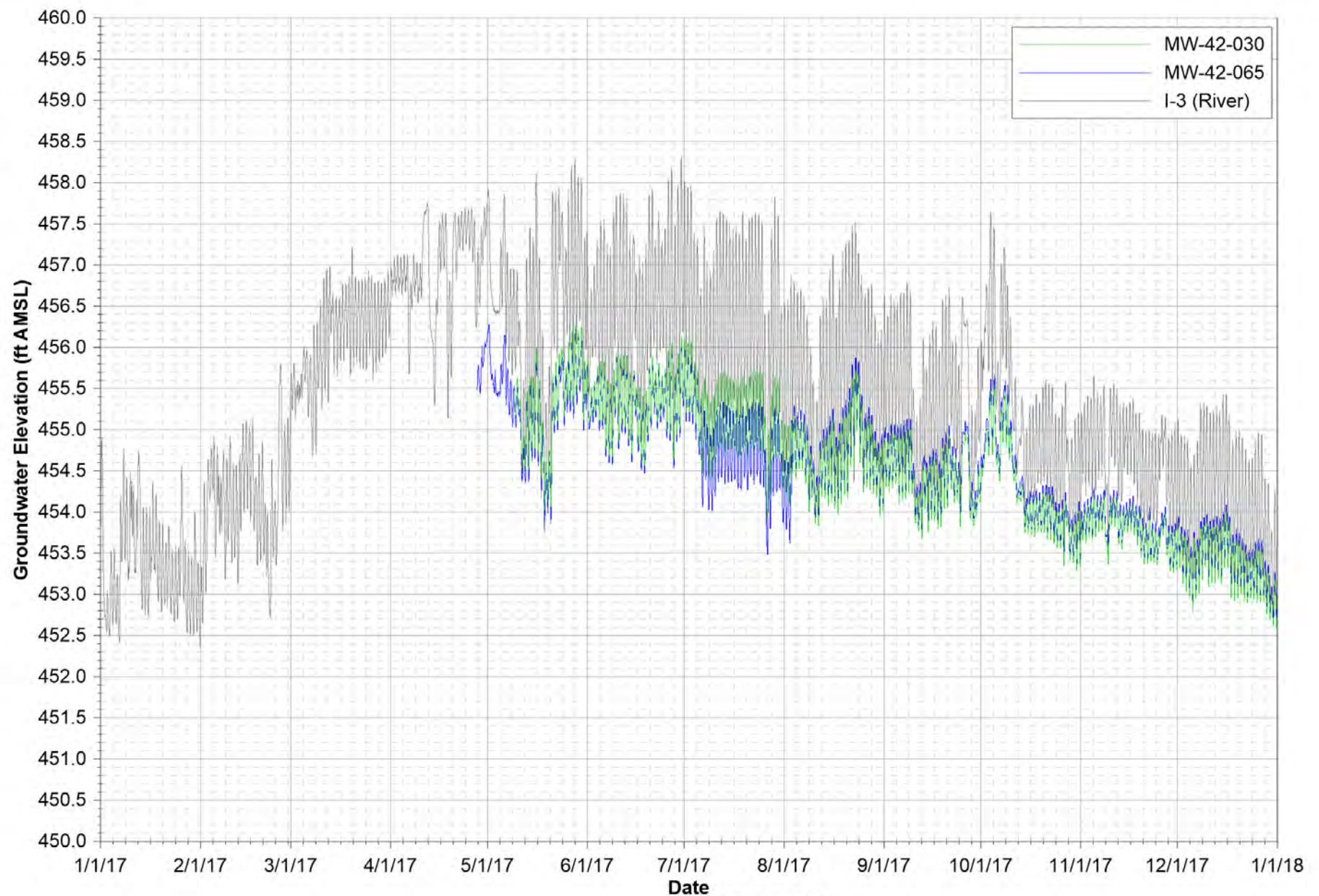
Notes:

1. Data subject to review.
2. ft amsl = feet above mean sea level.
3. MW-39-080 data unavailable from January 1, 2017 through May 8, 2017 due to transducer malfunction.

FIGURE E-1L

MW-39 CLUSTER HYDROGRAPHS

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



Notes:

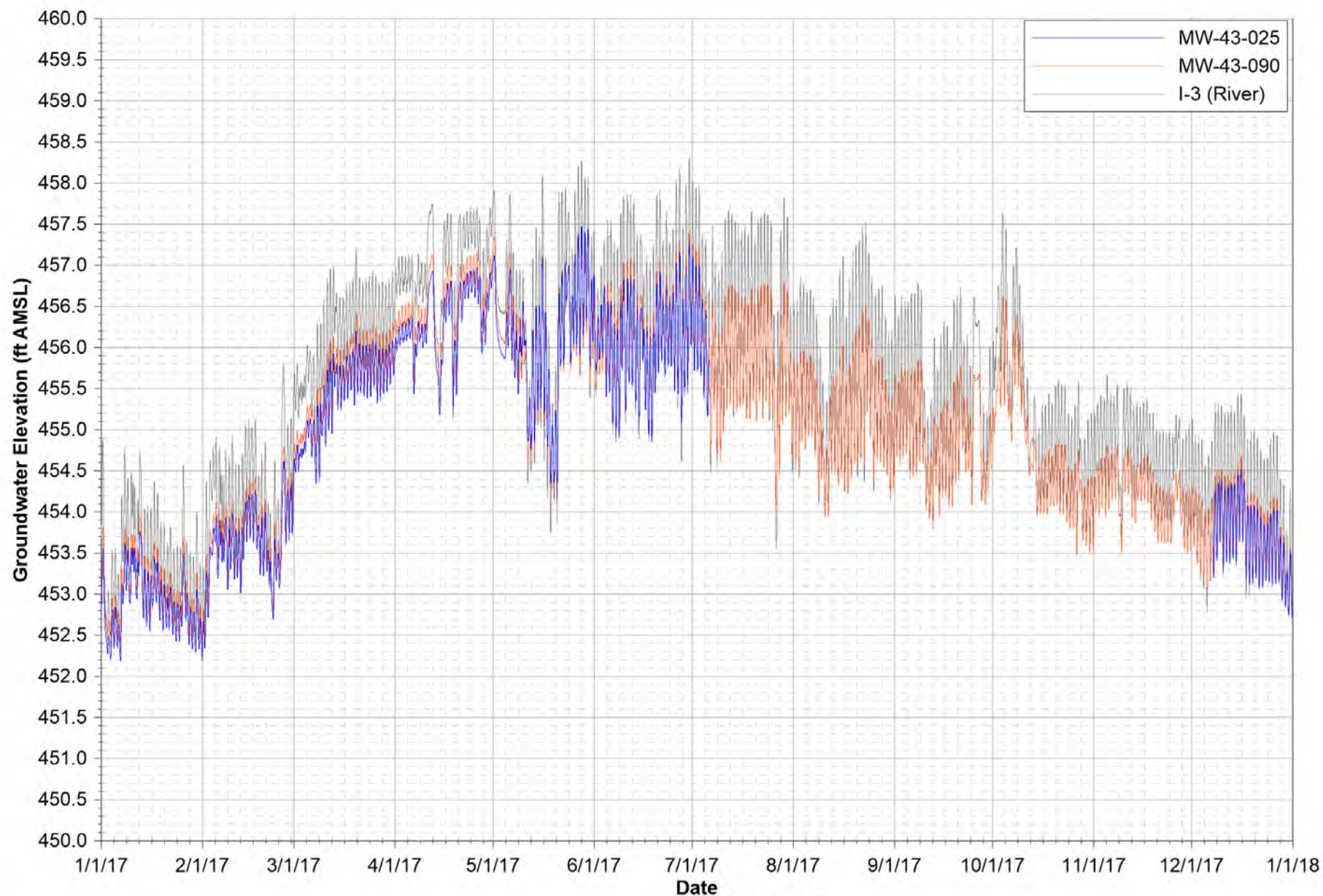
1. Data subject to review.
2. ft amsl = feet above mean sea level.
3. MW-42-030 data unavailable from January 1, 2017 through May 8, 2017 due to transducer malfunction.
4. MW-42-065 data unavailable from January 1, 2017 through April 26, 2017 due to transducer malfunction.

Date

FIGURE E-1M

MW-42 CLUSTER HYDROGRAPHS

FOURTH QUARTER 2017 AND ANNUAL 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.
3. MW-43-025 data unavailable from July 6, 2017 through December 6, 2017 due to transducer malfunction.

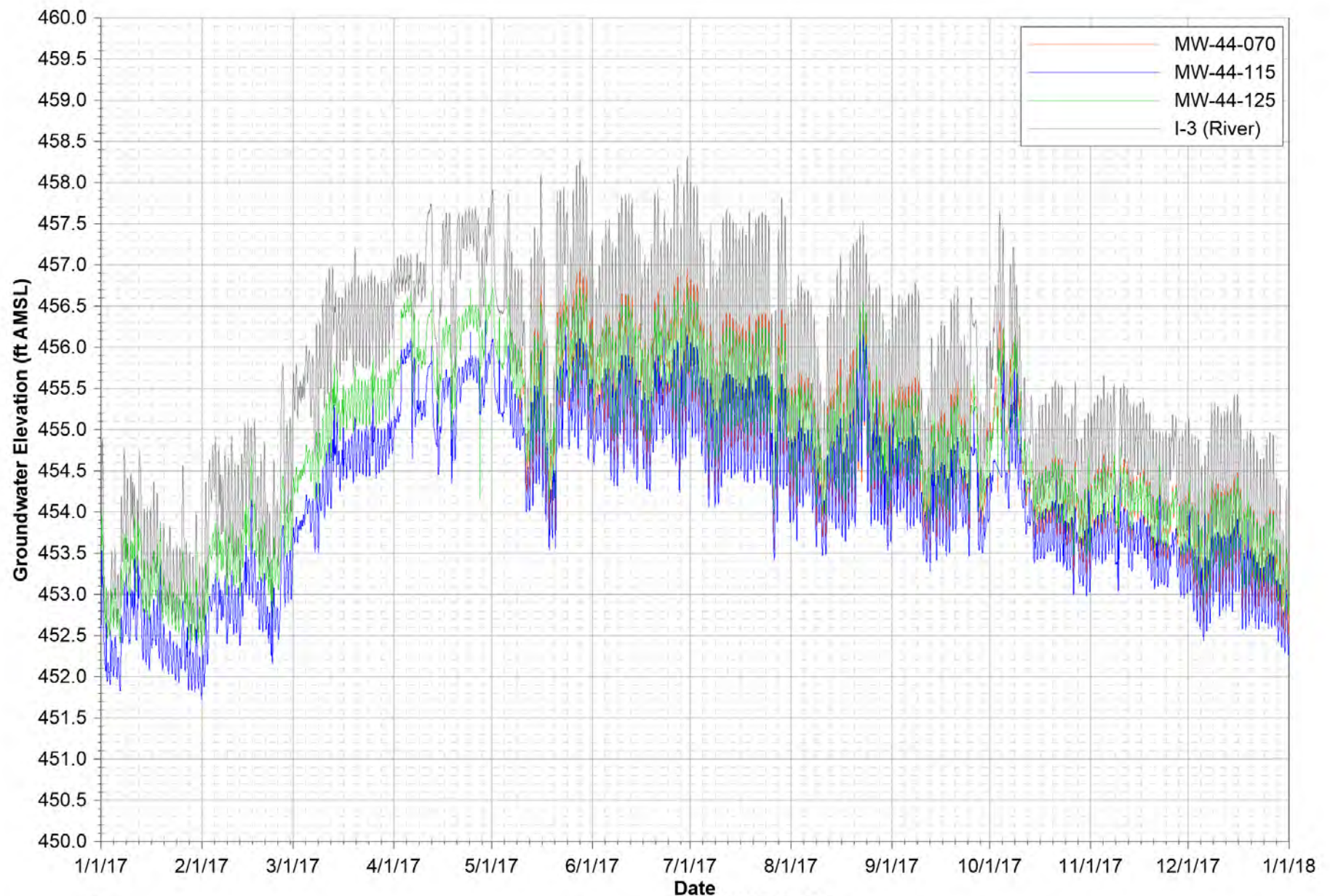
Date

FIGURE E-1N

MW-43 CLUSTER HYDROGRAPHS

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





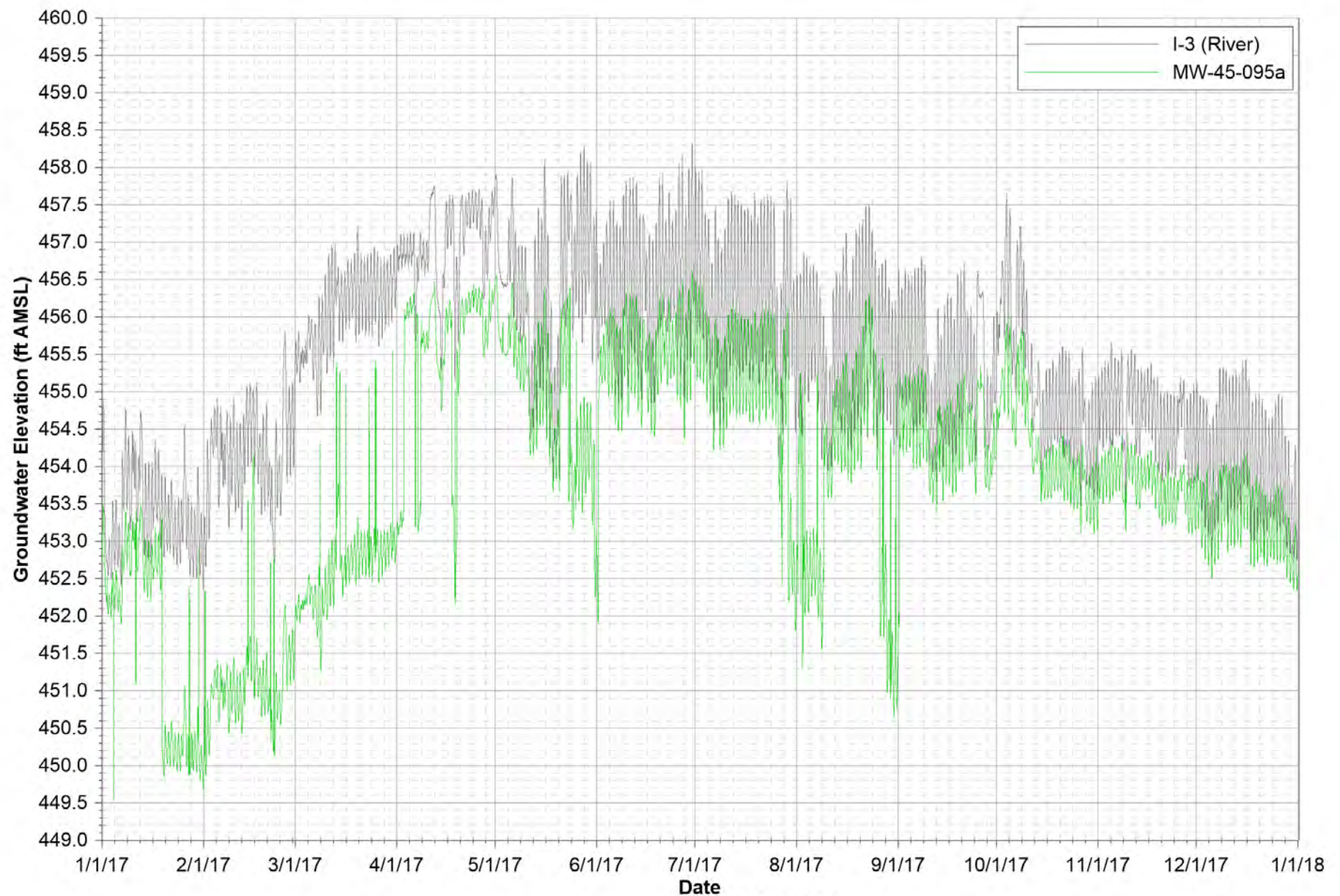
- Notes:
1. Data subject to review.
 2. ft amsl = feet above mean sea level.
 3. MW-44-070 data unavailable from January 1, 2017 through May 8, 2017 due to transducer malfunction.
 4. MW-44-115 data unavailable on October 3, 2017 due to transducer malfunction.

Date

FIGURE E-10

MW-44 CLUSTER HYDROGRAPHS

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

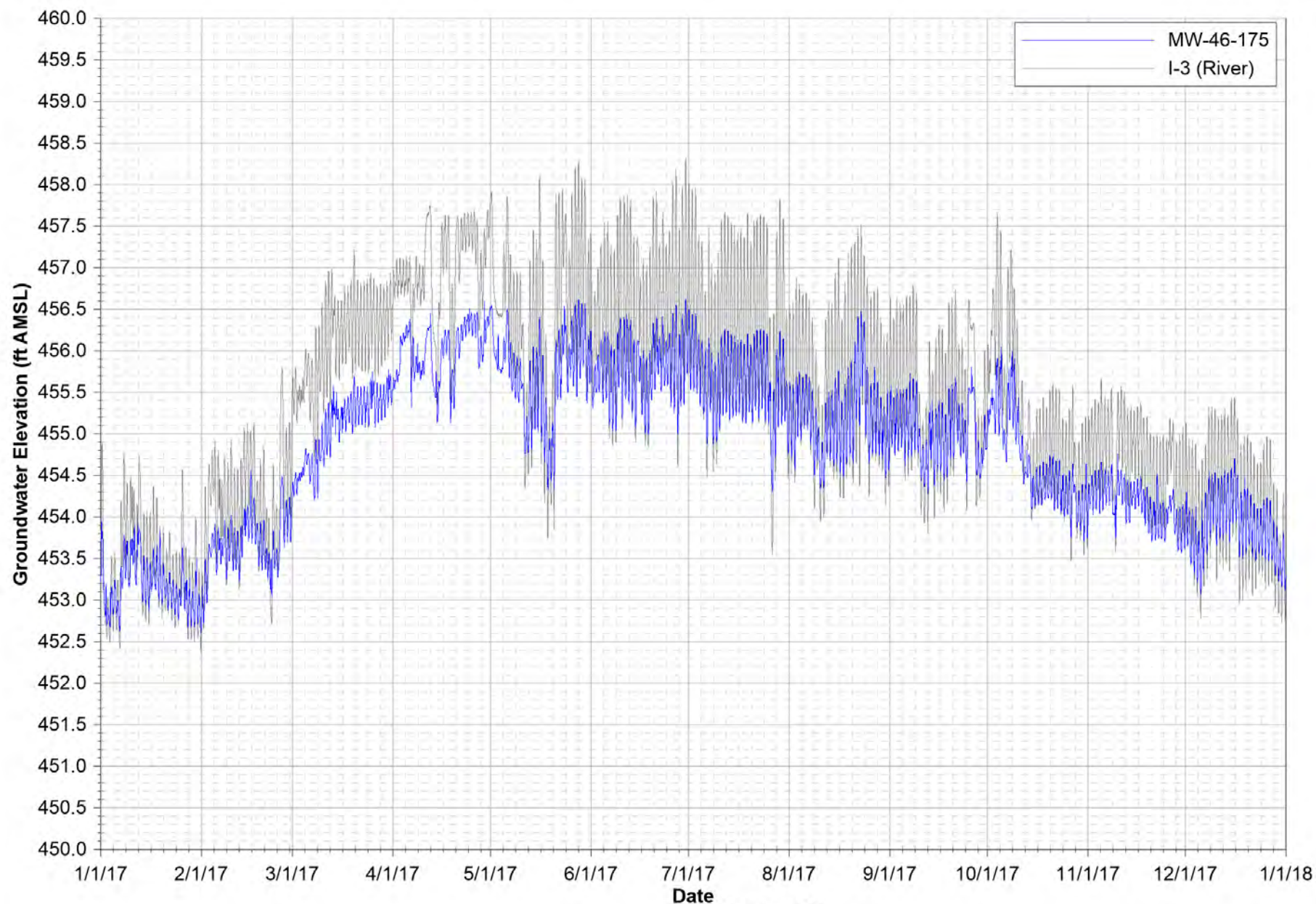


Notes:
 1. Data subject to review.
 2. ft amsl = feet above mean sea level.

FIGURE E-1P

MW-45-095a HYDROGRAPH

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



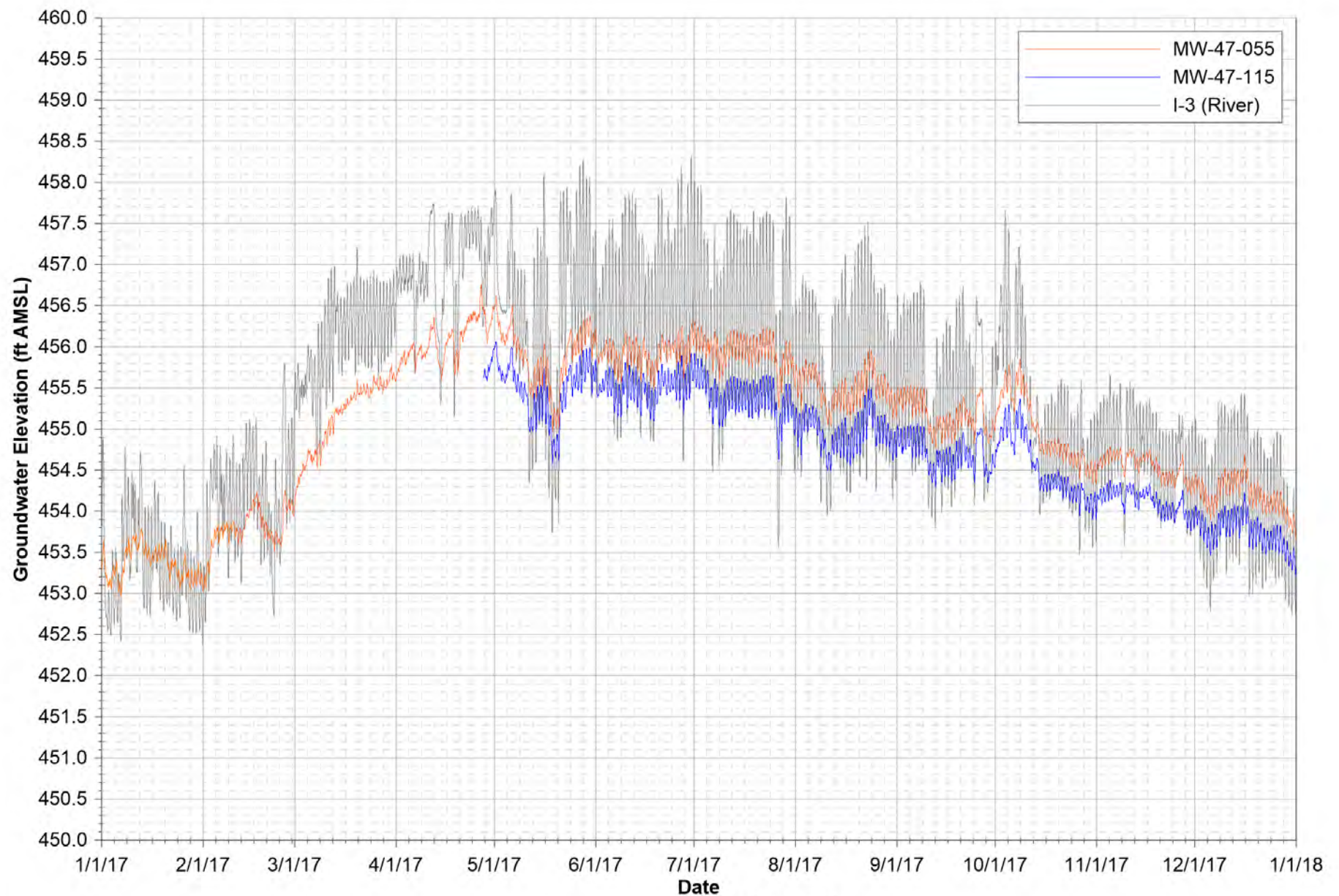
Notes:
 1. Data subject to review.
 2. ft amsl = feet above mean sea level.

Date

FIGURE E-1Q

MW-46-175 HYDROGRAPH

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



Notes:

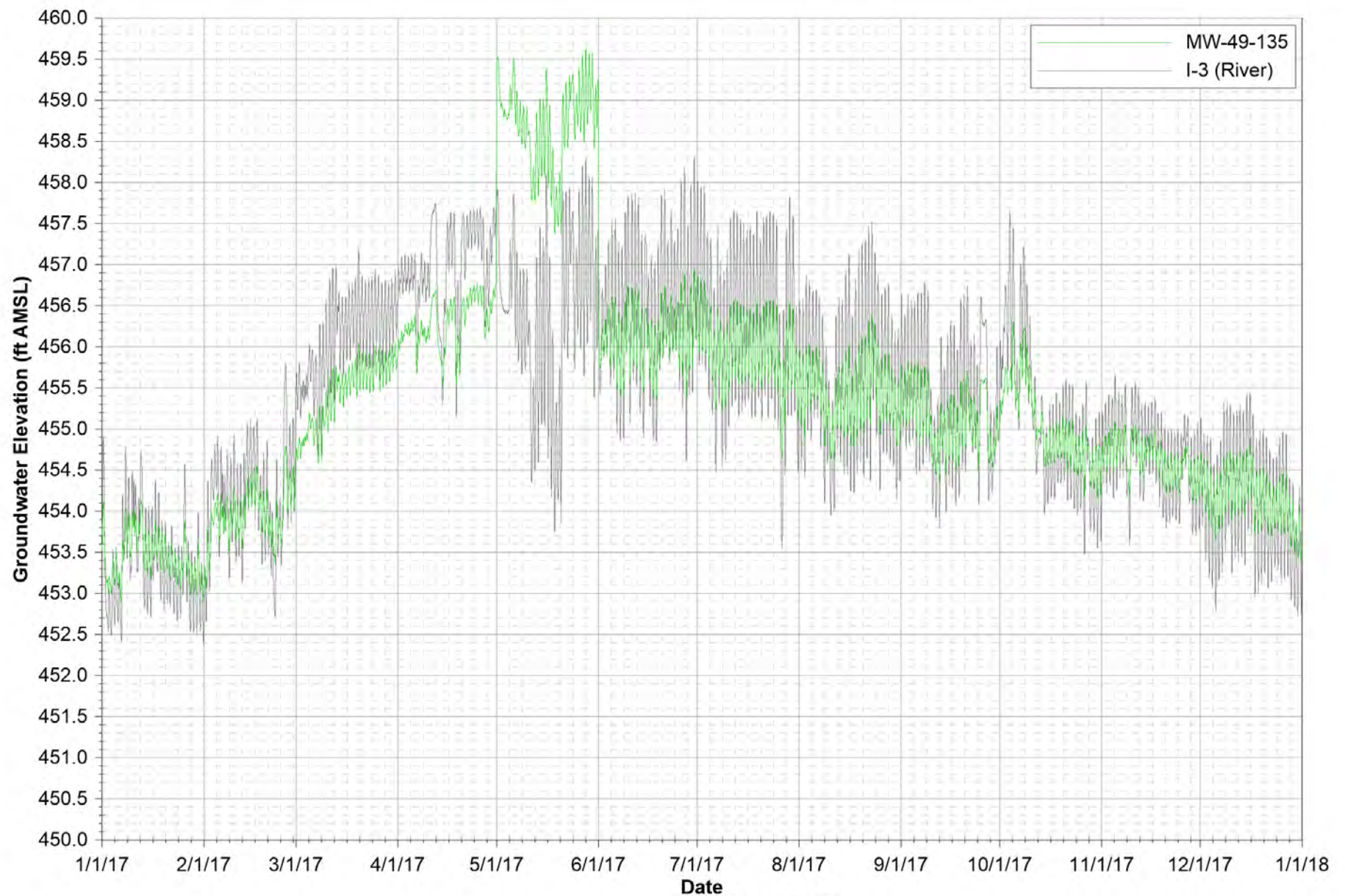
1. Data subject to review.
2. ft amsl = feet above mean sea level.
3. MW-47-115 data unavailable from January 1, 2017 through April 26, 2017 due to transducer malfunction.

FIGURE E-1R

MW-47 CLUSTER HYDROGRAPHS

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



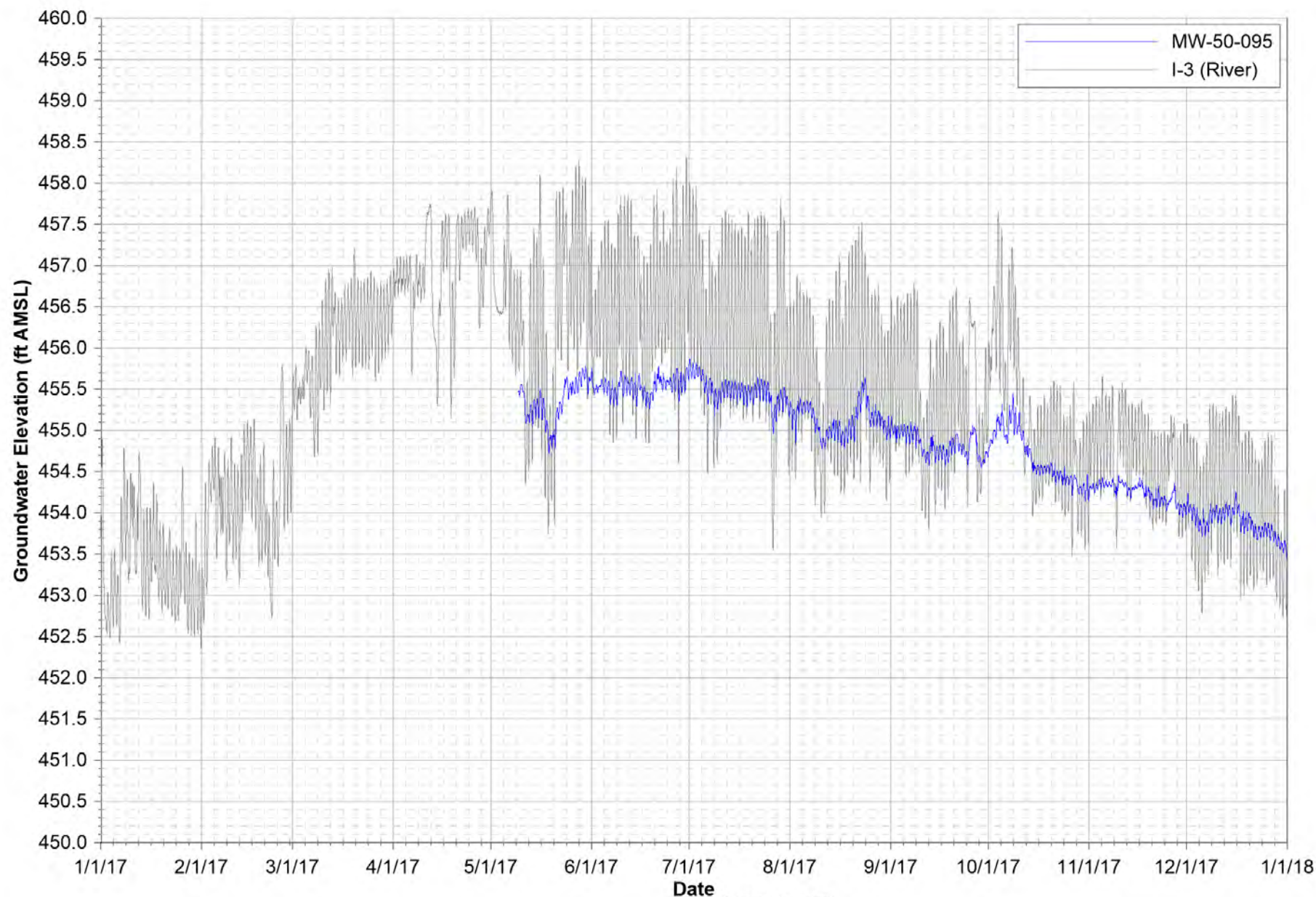


Notes:
 1. Data subject to review.
 2. ft amsl = feet above mean sea level.

Date

FIGURE E-1S MW-49-135 HYDROGRAPH

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



Notes:

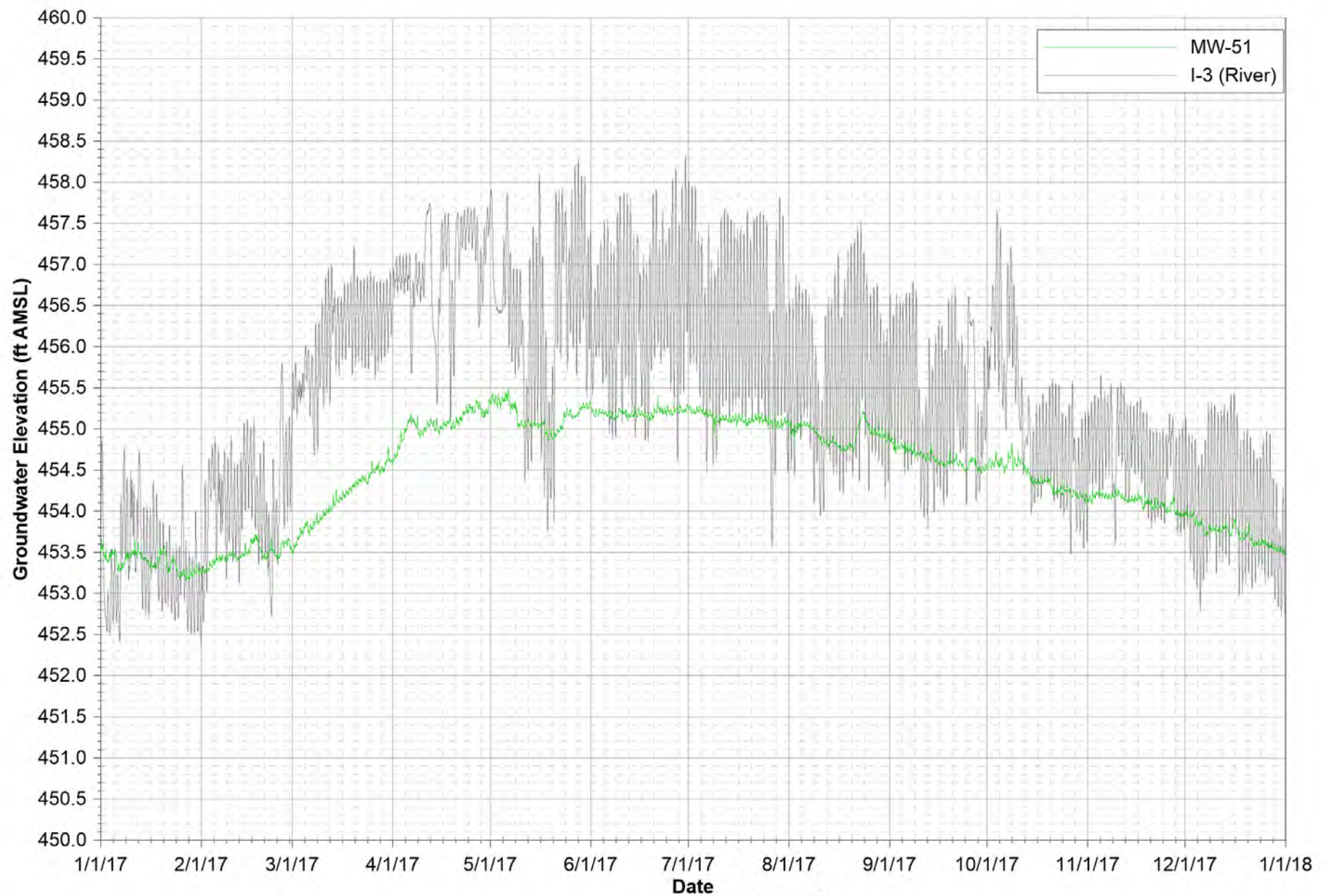
1. Data subject to review.
2. ft amsl = feet above mean sea level.
3. MW-50-095 data unavailable from January 1, 2017 through May 8, 2017 due to transducer malfunction.

Date

FIGURE E-1T

MW-50-095 HYDROGRAPH

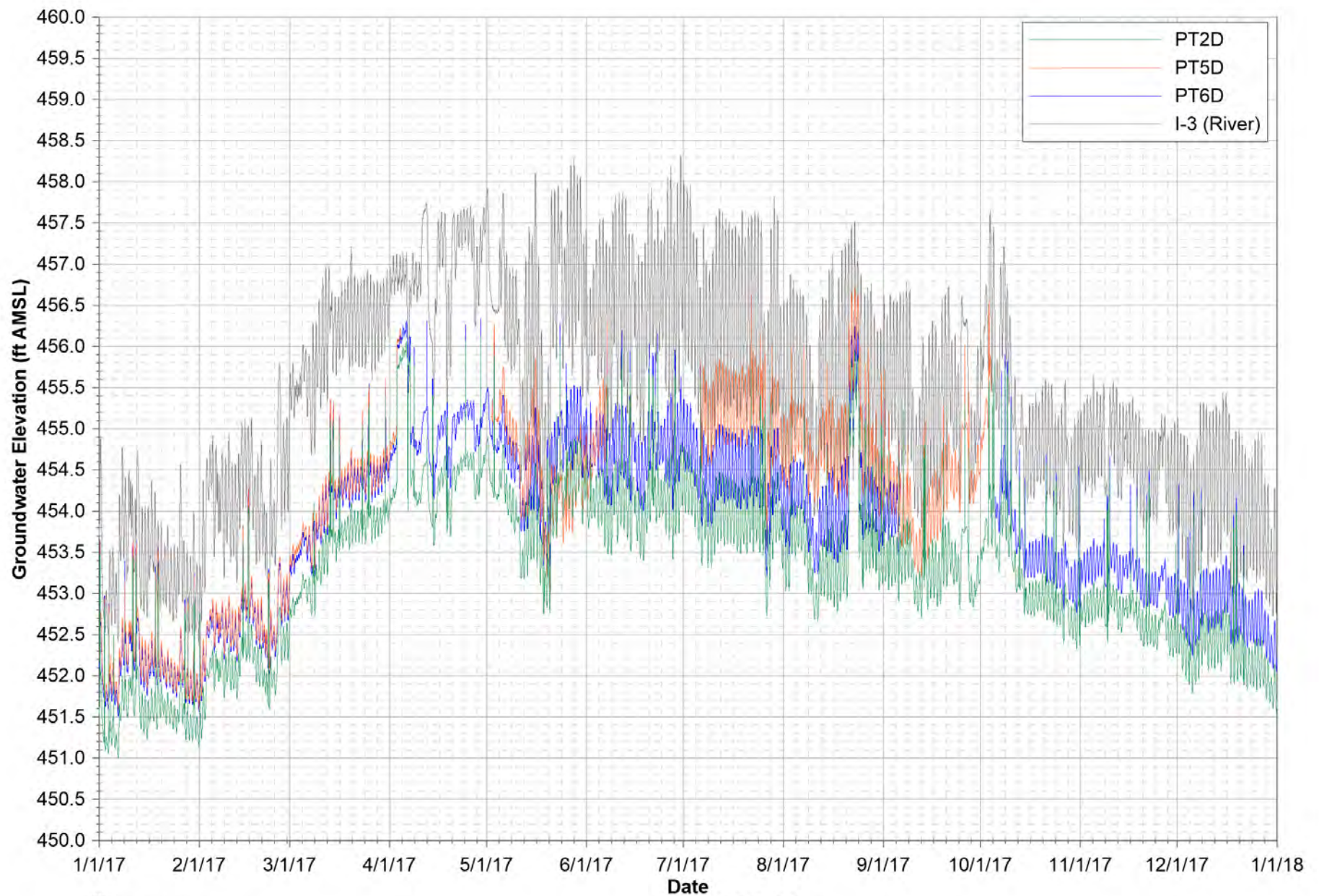
FOURTH QUARTER 2017 AND ANNUAL INTERIM MEASURES PERFORMANCE MONITORING
AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA



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

FIGURE E-1U **MW-51 HYDROGRAPHS**

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



Note:

1. Data subject to review.
2. ft amsl = feet above mean sea level.
3. PT-5D data unavailable from April 4, 2017 through May 1, 2017, from June 7, 2017 through July 5, 2017, and from October 4, 2017 through December 31, 2017 due to transducer malfunction.
4. PT-6D data unavailable from September 6, 2017 through October 4, 2017 due to transducer malfunction.

Date

FIGURE E-1V

INSITU PILOT STUDY WELL HYDROGRAPHS

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

Table E-1**Average Monthly and Quarterly Groundwater Elevations, Fourth Quarter 2017**

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

Well ID	Aquifer Zone	November 2017	December 2017	Quarter Average	Days in Quarter Average
I-3	River Station	454.70	454.09	454.39	61
MW-20-070	Shallow Zone	452.80	452.41	452.60	61
MW-20-100	Middle Zone	452.23	451.87	452.05	61
MW-20-130	Deep Zone	451.69	451.26	451.47	61
MW-22	Shallow Zone	454.09	453.85	453.97	60
MW-25	Shallow Zone	454.72	454.40	454.56	61
MW-26	Shallow Zone	INC	454.09	INC	INC
MW-27-020	Shallow Zone	454.26	453.82	454.04	61
MW-27-060	Middle Zone	454.21	453.71	453.96	61
MW-27-085	Deep Zone	454.15	453.64	453.89	61
MW-28-025	Shallow Zone	454.15	453.66	453.90	61
MW-28-090	Deep Zone	454.05	453.55	453.80	61
MW-30-050	Middle Zone	453.86	452.94	453.39	61
MW-31-060	Shallow Zone	453.82	453.45	453.63	61
MW-31-135	Deep Zone	453.14	452.74	452.94	61
MW-32-035	Shallow Zone	453.97	453.54	453.75	61
MW-33-040	Shallow Zone	454.14	453.77	453.95	61
MW-33-090	Middle Zone	454.11	453.79	453.94	61
MW-33-150	Deep Zone	454.43	453.95	454.19	61
MW-34-055	Middle Zone	454.13	453.68	453.90	61
MW-34-080	Deep Zone	INC	453.91	INC	INC
MW-34-100	Deep Zone	454.22	453.72	453.97	61
MW-35-060	Shallow Zone	454.65	454.22	454.43	61
MW-35-135	Deep Zone	454.50	454.15	454.32	61
MW-36-020	Shallow Zone	454.14	453.69	453.91	61
MW-36-040	Shallow Zone	454.02	453.53	453.77	61
MW-36-050	Middle Zone	453.91	453.41	453.66	61
MW-36-070	Middle Zone	453.90	453.41	453.65	61
MW-36-090	Deep Zone	453.44	452.89	453.16	61
MW-36-100	Deep Zone	453.62	453.16	453.39	61
MW-39-040	Shallow Zone	453.79	453.29	453.54	61
MW-39-050	Middle Zone	453.65	453.20	453.42	61
MW-39-060	Middle Zone	453.48	453.03	453.25	61
MW-39-070	Middle Zone	452.91	452.46	452.68	61
MW-39-080	Deep Zone	452.91	452.46	452.68	61

Table E-1**Average Monthly and Quarterly Groundwater Elevations, Fourth Quarter 2017**

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

Well ID	Aquifer Zone	November 2017	December 2017	Quarter Average	Days in Quarter Average
MW-39-100	Deep Zone	453.48	453.04	453.25	61
MW-42-030	Shallow Zone	453.77	453.32	453.54	61
MW-42-065	Middle Zone	453.85	453.41	453.63	61
MW-43-025	Shallow Zone	INC	453.64	INC	INC
MW-43-090	Deep Zone	454.20	453.73	453.96	61
MW-44-070	Middle Zone	454.03	453.51	453.76	61
MW-44-115	Deep Zone	453.57	453.10	453.33	61
MW-44-125	Deep Zone	454.06	453.59	453.82	61
MW-45-095a	Deep Zone	453.77	453.27	453.51	61
MW-46-175	Deep Zone	454.15	453.88	454.01	61
MW-47-055	Shallow Zone	454.55	454.19	454.37	61
MW-47-115	Deep Zone	454.12	453.74	453.92	61
MW-49-135	Deep Zone	454.63	454.16	454.39	61
MW-50-095	Middle Zone	454.24	453.87	454.06	61
MW-51	Middle Zone	454.12	453.72	453.92	61
MW-54-085	Deep Zone	454.55	454.00	454.27	61
MW-54-140	Deep Zone	454.15	453.71	453.93	61
MW-54-195	Deep Zone	453.53	453.19	453.36	61
MW-55-045	Middle Zone	455.60	455.39	455.49	61
MW-55-120	Deep Zone	455.81	455.85	455.83	61
PT2D	Deep Zone	452.75	452.27	452.51	61
PT5D	Deep Zone	INC	INC	INC	INC
PT6D	Deep Zone	453.24	452.79	453.01	61
RRB	River Station	454.23	INC	INC	INC

Notes:

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

Quarter Average = average of daily averages over reporting period.

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

Table E-2**Average, Minimum and Maximum Groundwater Elevations, January 2017 through December 2017***Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide**Groundwater and Surface Water Monitoring Report,**PG&E Topock Compressor Station, Needles, California*

Well ID	Aquifer Zone	Minimumm (ft amsl)	Maximum (ft amsl)	Average (ft amsl)	Number of Days Reporting Data
I-3	River Station	452.73	457.58	455.38	365
MW-20-070	Shallow Zone	451.61	455.06	INC	INC
MW-20-100	Middle Zone	450.98	455.52	452.85	365
MW-20-130	Deep Zone	450.36	455.72	452.38	365
MW-22	Shallow Zone	453.09	455.71	INC	INC
MW-25	Shallow Zone	453.66	455.99	454.97	304
MW-26	Shallow Zone	453.89	455.62	INC	INC
MW-27-020	Shallow Zone	452.53	457.07	454.93	365
MW-27-060	Middle Zone	453.07	456.92	INC	INC
MW-27-085	Deep Zone	452.46	456.90	454.83	365
MW-28-025	Shallow Zone	452.37	456.88	454.81	365
MW-28-090	Deep Zone	452.39	456.71	454.73	365
MW-30-050	Middle Zone	452.14	456.26	454.39	365
MW-31-060	Shallow Zone	453.10	455.82	INC	INC
MW-31-135	Deep Zone	451.77	455.80	453.70	365
MW-32-035	Shallow Zone	452.45	456.36	454.48	334
MW-33-040	Shallow Zone	452.71	456.27	454.71	365
MW-33-090	Middle Zone	452.83	456.51	454.83	365
MW-33-150	Deep Zone	452.99	456.61	454.98	365
MW-34-055	Middle Zone	452.53	456.90	454.84	365
MW-34-080	Deep Zone	452.41	457.11	455.06	330
MW-34-100	Deep Zone	452.36	457.58	454.82	365
MW-35-060	Shallow Zone	453.08	456.93	455.17	365
MW-35-135	Deep Zone	453.75	456.82	455.14	365
MW-36-020	Shallow Zone	453.18	456.45	INC	INC
MW-36-040	Shallow Zone	452.93	456.16	INC	INC
MW-36-050	Middle Zone	452.28	456.11	INC	INC
MW-36-070	Middle Zone	452.36	456.52	454.56	365
MW-36-090	Deep Zone	451.59	455.99	453.93	365
MW-36-100	Deep Zone	451.79	456.22	453.95	301
MW-39-040	Shallow Zone	452.16	456.23	454.37	365
MW-39-050	Middle Zone	452.08	456.04	454.26	365
MW-39-060	Middle Zone	451.94	456.02	454.10	365
MW-39-070	Middle Zone	451.39	455.87	453.50	365

Table E-2**Average, Minimum and Maximum Groundwater Elevations, January 2017 through December 2017**

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

Well ID	Aquifer Zone	Minimumm (ft amsl)	Maximum (ft amsl)	Average (ft amsl)	Number of Days Reporting Data
MW-39-080	Deep Zone	452.00	455.60	INC	INC
MW-39-100	Deep Zone	452.07	456.46	454.11	365
MW-42-030	Shallow Zone	452.81	455.89	INC	INC
MW-42-065	Middle Zone	452.89	456.12	INC	INC
MW-43-025	Shallow Zone	452.34	456.90	INC	INC
MW-43-090	Deep Zone	452.52	457.10	454.96	365
MW-44-070	Middle Zone	452.85	456.32	INC	INC
MW-44-115	Deep Zone	452.00	455.96	454.15	364
MW-44-125	Deep Zone	452.60	456.53	454.71	365
MW-45-095a	Deep Zone	449.99	456.35	453.82	365
MW-46-175	Deep Zone	452.80	456.41	454.83	365
MW-47-055	Shallow Zone	453.05	456.52	455.05	365
MW-47-115	Deep Zone	453.39	455.99	INC	INC
MW-49-135	Deep Zone	453.08	459.40	455.37	365
MW-50-095	Middle Zone	453.57	455.75	INC	INC
MW-51	Middle Zone	453.20	455.40	454.45	365
MW-54-085	Deep Zone	453.31	456.85	INC	INC
MW-54-140	Deep Zone	453.22	456.58	INC	INC
MW-54-195	Deep Zone	452.78	455.96	INC	INC
MW-55-045	Middle Zone	455.16	457.32	456.09	354
MW-55-120	Deep Zone	455.25	457.53	456.23	354
PT2D	Deep Zone	451.15	455.93	453.28	365
PT5D	Deep Zone	451.78	456.31	INC	INC
PT6D	Deep Zone	451.68	456.18	453.80	337
RRB	River Station	453.42	457.20	INC*	INC*

Notes:

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

Averages = average of daily averages over reporting period.

*Surface water at river gauging station only in intermittent connection with river water throughout the year

APPENDIX F

Groundwater Monitoring Data for Groundwater Monitoring Program
and Performance Monitoring Program



Table F-1

Chemical Performance Monitoring Analytical Results, March 2005 through December 2017

Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide

Groundwater and Surface Water Monitoring Report,

PG&E Topock Compressor Station, Needles, California

Location ID	Sample Date	Total Dissolved Solids (mg/L)	Oxygen-18 (0/00)	Deuterium (00/00)	Chloride (mg/L)	Sulfate (mg/L)	Nitrate (mg/L)	Bromide (mg/L)	Alkalinity (total) (mg/L)	Total Dissolved Solids (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Boron (mg/L)
MW-20-070	3/10/2005	1,940	-7.1	-59	740	378	--	ND (1)	81.7	ND (1)	198	55.4	9.89	431	0.412
MW-20-070	6/15/2005	2,050	-8.3	-57	760	392	--	ND (1)	71.3	ND (1)	204	60.7	11.4	468	0.445
MW-20-070	6/15/2005	1,980	-7	-60	749	388	--	ND (1)	73.8	ND (1)	189	55.4	10.5	433	0.414
MW-20-070	10/11/2005	1,950	-7.2	-57	737	359	--	0.641	69.9	0.641	198	49.9	14.6	323	0.402
MW-20-070	12/15/2005	1,830	-7.1	-49	645	326	--	ND (1)	77.8	ND (1)	138	42.3	14.5	267	0.441
MW-20-070	3/10/2006	1,940	-7.2	-54	679	358	--	ND (0.5)	82.2	ND (0.5)	161	48.6	9.22	424	0.427
MW-20-070	5/5/2006	1,750	-8.2	-55.9	696	376	--	0.574	74.5	0.574	162	49.2	9.55	461	0.476
MW-20-070	10/3/2006	1,840	-8.1	-60.5	669	352	--	ND (5)	80	ND (5)	154	45.9	9.51	466	0.515
MW-20-070	10/3/2006	1,890	-8.1	-60.4	677	357	--	ND (5)	85	ND (5)	158	47.6	9.82	472	0.535
MW-20-070	12/13/2006	1,910	-7.6	-61.2	678	352	--	0.699	77.5	0.699	149	44.3	9.09	458	0.459
MW-20-070	3/14/2007	1,740	-8.5	-64.3	689	358	--	0.641	80	0.641	139	42.2	8.83	451	0.503
MW-20-070	5/3/2007	1,750	-8.4	-66.7	697	344	--	ND (1)	77.5	ND (1)	139	41.2	8.65	390	0.477
MW-20-070	10/11/2007	1,820	-8.2	-63.9	699	367	--	ND (1)	80	ND (1)	130	39.1	11	600	0.54
MW-20-070	3/12/2008	1,790	-7.6	-65.2	695	360	--	ND (1)	77	ND (1)	139	41.2	10.7	403	0.51
MW-20-070	10/7/2008	1,900	-8.5	-64.4	650	360	--	0.61	83	0.61	136	37.9	10.5	400	0.608
MW-20-070	3/12/2009	1,900	-7.74	-60.82	670	330	--	ND (1)	79	ND (1)	128	40.2	9.95	496	0.549
MW-20-070	9/25/2009	1,700	-8.7	-66.43	700	310	--	ND (2.5)	74	ND (2.5)	130	33	9.7	390	0.42
MW-20-070	12/16/2010	1,700	-7.5	-62.3	680	320	--	0.51	79	0.51	130	33	12	400	0.51
MW-20-070	12/7/2011	1,400	-7.9	-61.9	540	330	--	ND (0.5)	71	ND (0.5)	100	25	--	380	--
MW-20-070	10/4/2012	--	--	--	430	290	--	--	--	--	76.2	22.9	--	346	--
MW-20-070	11/27/2012	1,400	-7.8	-62.6	450	300	10.6	ND (0.5)	94	ND (0.5)	79.2	22.2	8.07	350	0.484
MW-20-070	3/12/2013	--	--	--	440	290	8.6	--	100	--	82.8	22.3	--	358	--
MW-20-070	5/9/2013	--	--	--	--	--	10.1 J	--	--	--	--	--	--	--	--
MW-20-070	12/11/2013	1,200	-8.12	-63.88	390	260	8.05	ND (0.5)	91	ND (0.5)	70	17	15	580	0.51
MW-20-070	5/7/2014	--	--	--	--	--	7.15	--	--	--	--	--	--	--	--
MW-20-070	12/15/2014	1,100	-8.07	-63.1	330	230	7.7	ND (0.5)	100	ND (0.5)	49	12	4.4	310	0.43
MW-20-070	5/19/2015	--	--	--	--	--	7.6	--	--	--	--	--	--	--	--
MW-20-070	5/19/2015	--	--	--	--	--	7.9	--	--	--	--	--	--	--	--
MW-20-070	12/8/2015	1,000	-7.97973	-61.7815	320	220	7	ND (1)	100	ND (1)	54	13	4.8	300	0.52
MW-20-070	4/27/2016	--	--	--	--	--	8.5	--	--	--	--	--	--	--	--
MW-20-070	12/9/2016	1,100	-7.85368	-61.8873	360	240	8	ND (0.5)	100	ND (0.5)	52 J	14 J	5.3	340	0.41
MW-20-070	4/27/2017	--	--	--	--	--	8.8	--	--	--	--	--	--	--	--
MW-20-070	12/7/2017	1,100	-7.97363	-60.7979	390	240	9	ND (0.5 J)	100	ND (0.5 J)	54	13	5.2	310	0.5
MW-20-100	3/10/2005	2,490	-5.2	-49	466	511	--	ND (1)	84.2	ND (1)	133	19.8	8.98	712	0.859
MW-20-100	6/15/2005	2,500	-4.7	-46	921	506	--	ND (1)	84	ND (1)	137	21.3	9.06	592	0.713
MW-20-100	10/11/2005	2,400	-5.3	-48	887	484	--	0.731	82.3	0.731	170	23.7	15.2	500	0.718
MW-20-100	12/15/2005	2,340	-5.4	-40	813	404	--	ND (1)	82.7	ND (1)	136	21.4	14.8	406	0.709
MW-20-100	3/10/2006	2,500	-5.6	-50.3	861	475	--	ND (0.5)	92.5	ND (0.5)	171	27	7.75	597	0.803
MW-20-100	5/5/2006	2,260	-5.1	-46.4	927	522	--	ND (1)	82.5	ND (1)	193	32	10.8	577	0.716
MW-20-100	10/3/2006	2,320	-5.8	-51.5	863	456	--	ND (5)	90	ND (5)	202	34.4	10.9 J	568	0.874
MW-20-100	12/13/2006	2,200	-6.2	-54.5	874	457	--	0.851	92.5	0.851	205	32.2	9.55	575	0.881
MW-20-100	12/13/2006	1,960	-6.2	-54.4	861	459	--	0.83	97.5	0.83	205	32.2	11.4	579	0.889
MW-20-100	3/14/2007	2,180	-6.8	-57.8	847	477	--	0.785	87.5	0.785	194	31.7	9.9	521	0.715
MW-20-100	5/3/2007	2,330	-6.7	-59.3	888	484	--	ND (1)	87.5	ND (1)	208	34.6	9.63 J	532	0.686
MW-20-100	5/3/2007	2,300	-7.3	-59.2	879	493	--	ND (1)	87.5	ND (1)	209	36	12 J	559	0.699
MW-20-100	10/10/2007	2,160	-7.2	-57.2	858	468	--	ND (1)	92	ND (1)	190	32	15	560	0.81
MW-20-100	3/12/2008	2,470	-6.9	-58.3	827	442	--	ND (1)	870	ND (1)	218	35.4	11.9	469	0.702
MW-20-100	10/8/2008	2,200	-7.9	-60.2	760	420	--	ND (1)	90	ND (1)	215	36.8	10.3	453	0.669
MW-20-100	3/13/2009	2,200	-7.08	-58.2	770	420	--	ND (1)	97	ND (1)	213	36.4	11.6	543	0.89
MW-20-100	9/25/2009	2,000	-7.67	-62.84	750	400	--	ND (2.5)	89	ND (2.5)	200	30	12	430	0.7
MW-20-100	2/10/2011	1,800	-7	-58.8	610	380	--	0.57	120	0.57	180	28	14	400	0.81

Table F-1

Chemical Performance Monitoring Analytical Results, March 2005 through December 2017

Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide

Groundwater and Surface Water Monitoring Report,

PG&E Topock Compressor Station, Needles, California

Location ID	Sample Date	Total Dissolved Solids (mg/L)	Oxygen-18 (0/00)	Deuterium (00/00)	Chloride (mg/L)	Sulfate (mg/L)	Nitrate (mg/L)	Bromide (mg/L)	Alkalinity (total) (mg/L)	Total Dissolved Solids (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Boron (mg/L)
MW-20-100	12/8/2011	1,700	-6.7	-55.6	580	380	--	ND (0.5)	120	ND (0.5)	170	25	--	390	--
MW-20-100	10/4/2012	--	--	--	570	390	--	--	--	--	157	27.8	--	400	--
MW-20-100	11/29/2012	1,700	-7	-56.6	570	360	14.2	ND (0.5)	110	ND (0.5)	149	30.6	9.64	376	0.952
MW-20-100	3/13/2013	--	--	--	560	370	6.5	--	120	--	164	27.8	--	388	--
MW-20-100	5/9/2013	--	--	--	--	--	14 J	--	--	--	--	--	--	--	--
MW-20-100	12/11/2013	1,600	-7.46	-55.86	550	290	9.5	ND (0.5)	110	ND (0.5)	140	23	8.2	400	1
MW-20-100	5/7/2014	--	--	--	--	--	11.1	--	--	--	--	--	--	--	--
MW-20-100	12/15/2014	1,500	-7.62	-60.2	530	260	8.9	ND (0.5)	120	ND (0.5)	120	18	6.4	340	0.76
MW-20-100	5/19/2015	--	--	--	--	--	9.6	--	--	--	--	--	--	--	--
MW-20-100	12/8/2015	1,300	-7.60373	-60.1171	510	240	7.3	ND (1)	110	ND (1)	120	20	7	340	0.92
MW-20-100	4/27/2016	--	--	--	--	--	8.6	--	--	--	--	--	--	--	--
MW-20-100	12/9/2016	1,300	-7.9278	-61.9035	500	250	8.1	0.62	130	0.62	110 J	19 J	7.2	330	0.83
MW-20-100	4/27/2017	--	--	--	--	--	8.7	--	--	--	--	--	--	--	--
MW-20-100	12/8/2017	FD 1,300	-8.10333	-60.7743	490	270	8.4	0.58	92 J	0.58	110	18	7	320	0.9
MW-20-100	12/8/2017	1,300	-8.08216	-61.072	480	240	8.3	0.57	120 J	0.57	110	18	6.9	310	0.88
MW-20-130	3/2/2005	5,270 J	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-20-130	3/9/2005	FD 6,200	-5.4	-51	3,080	1,080	--	ND (1)	68.9	ND (1)	231	12.8	25.4	2,390	1.99
MW-20-130	3/9/2005	5,520	-5.8	-56	3,120	1,080	--	ND (1)	68.9	ND (1)	219	12.1	24.7	2,250	1.9
MW-20-130	6/15/2005	7,790	-5	-48	3,410	1,230	--	ND (1)	68.7	ND (1)	352	23.2	31.3	2,980	2.75
MW-20-130	10/7/2005	7,330	-5	-47	3,010	1,210	--	1.04 J	72.4	1.04 J	349	13.9	38.4	2,070	2.41
MW-20-130	12/16/2005	7,860	-5.8	-43	3,260	1,000	--	ND (2.5)	63.2	ND (2.5)	324	16.3	44.4	1,780	1.98
MW-20-130	3/10/2006	8,610	-5.5	-48.8	3,370	1,250	--	ND (0.5)	74.5	ND (0.5)	312	18.9	27.7	2,730	2.03
MW-20-130	5/5/2006	7,700	-5.3	-47.2	3,900	1,280	--	ND (1)	69.2	ND (1)	349	20.3	27.7	2,810	2.4
MW-20-130	10/18/2006	8,450	-6.3	-51.4	3,680	1,100	--	ND (5)	70	ND (5)	358	20.9	28	2,870	2.28
MW-20-130	12/13/2006	FD 8,250	-5.9	-54.4	3,950	1,260	--	1.09	72.5	1.09	328	19.1	27.3	2,830	2.24
MW-20-130	12/13/2006	7,890	-6	-54.9	3,970	1,250	--	0.896	72.5	0.896	335	19.7	27.6	2,900	2.31
MW-20-130	3/8/2007	FD 8,510	-6.6	-57.4	3,900	1,210	--	1.06	72.5	1.06	351	21.3	26.8	2,750	2.19
MW-20-130	3/8/2007	8,450	-6.5	-57.7	3,930	1,240	--	1.08	70	1.08	353	21.3	27	2,760	2.24
MW-20-130	5/3/2007	FD 8,100	-6.9	-60.1	3,950	1,290	--	ND (1)	72.5	ND (1)	338	21.9	27.3	2,550	2.47
MW-20-130	5/3/2007	8,150	-7.7	-60	4,020	1,310	--	ND (1)	75	ND (1)	338	22.5	27.8	2,550	2.49
MW-20-130	10/5/2007	7,980	-7	-57.5	3,670	1,070	--	ND (1)	77	ND (1)	310	19	31	2,900	2.4
MW-20-130	3/12/2008	8,460	-6.2	-58.7	3,690	1,220	--	ND (1)	75	ND (1)	342	23.4	47	2,260	2.07
MW-20-130	10/8/2008	7,800	-7.3	-59.6	3,500	1,200	--	ND (2.5)	81	ND (2.5)	329	22	40.1	1,990	2.23
MW-20-130	3/13/2009	8,100	-6.58	-56.41	3,600	1,100	--	ND (2.5)	79	ND (2.5)	350	22.7	41.4	2,550	2.16
MW-20-130	9/25/2009	6,500	-7.59	-61.74	3,500	1,100	--	ND (2.5)	76	ND (2.5)	280	17	33	2,400	2
MW-20-130	2/10/2011	5,900	-6.6	-59	3,100	1,100	--	1	80	1	310	18	50	2,100	2.2
MW-20-130	12/9/2011	6,200	-6.6	-57.2	3,300	1,200	--	ND (2.5)	74	ND (2.5)	340	22	33	2,400	2.4
MW-20-130	10/9/2012	--	--	--	3,200	1,100	--	--	92	--	294	25.8	--	2,140	--
MW-20-130	11/29/2012	FD 7,400	-6.6	-60.4	3,400	1,100	18.6	ND (2.5)	96	ND (2.5)	315	29.2	32.9	2,410	2.06
MW-20-130	11/29/2012	7,400	-6.6	-59.5	3,300	1,100	19.4	ND (2.5)	98	ND (2.5)	286	28.7	32.7	2,310	2.13
MW-20-130	12/12/2012	FD --	--	--	3,000	1,100	--	--	81	--	--	--	--	--	--
MW-20-130	12/12/2012	--	--	--	3,000	1,100	--	--	83	--	--	--	--	--	--
MW-20-130	3/14/2013	--	--	--	3,400	1,100	7.91	--	100	--	331	30.9	--	2,260	--
MW-20-130	5/14/2013	--	--	--	--	--	13	--	--	--	--	--	--	--	--
MW-20-130	12/17/2013	FD 7,300	-6.52	-59.15	3,200	1,100	12.9	ND (1)	78	ND (1)	330	21	27	2,400	2.7
MW-20-130	12/17/2013	7,400	-6.4	-57.69	3,200	1,100	12.4	ND (1)	80	ND (1)	330	22	26	2,300	2.3
MW-20-130	5/12/2014	--	--	--	--	--	12.9	--	--	--	--	--	--	--	--
MW-20-130	12/15/2014	FD 6,800	-6.76	-59.6	2,900	1,100	15	ND (2.5)	85	ND (2.5)	290	20	21	1,700	1.8
MW-20-130	12/15/2014	6,900	-6.7	-59.6	2,800	1,100	14	ND (2.5)	85	ND (2.5)	310	21	24	1,800	1.9
MW-20-130	5/19/2015	--	--	--	--	--	14	--	--	--	--	--	--	--	--
MW-20-130	12/8/2015	FD 6,600	-6.62848	-58.2233	3,100	1,100	13	ND (2.5)	80	ND (2.5)	320	19	25	2,400	2.6

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Location ID	Sample Date	Total	Oxygen-18	Deuterium	Chloride	Sulfate	Nitrate	Bromide	Alkalinity	Total	Calcium	Magnesium	Potassium	Sodium	Boron
		Dissolved Solids (mg/L)	(0/00)	(00/00)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(total) (mg/L)	Dissolved Solids (mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
MW-20-130	12/8/2015	7,100	-6.41678	-58.0354	3,300	1,000	12	ND (2.5)	76	ND (2.5)	320	19	25	2,400	2.5
MW-20-130	4/27/2016	--	--	--	--	--	10	--	--	--	--	--	--	--	--
MW-20-130	12/9/2016	FD 7,100	-6.81648	-60.3119	3,400	1,100	11	ND (2.5)	79	ND (2.5)	250 J	14 J	31	2,700	2.4
MW-20-130	12/9/2016	7,000	-6.88176	-60.0955	3,400	1,100	12	ND (2.5)	77	ND (2.5)	260 J	16 J	30	2,600	2.3
MW-20-130	4/27/2017	FD --	--	--	--	--	11	--	--	--	--	--	--	--	--
MW-20-130	4/27/2017	--	--	--	--	--	11	--	--	--	--	--	--	--	--
MW-20-130	12/7/2017	5,500	-6.81531	-58.7852	2,500	1,000	15	ND (2.5)	98	ND (2.5)	240	22	22	1,600	2.1
MW-25	3/9/2005	877	-8.4	-62	247	169	--	ND (0.5)	158	ND (0.5)	77.6	16.1	6.24	211	0.441
MW-25	6/14/2005	FD 980	-7.2	-59	294	185	--	ND (0.5)	137	ND (0.5)	100	20.9	9.06	268	0.475
MW-25	6/14/2005	942	-8.6	-61	289	183	--	ND (0.5)	137	ND (0.5)	93.5	20	8.91	253	0.464
MW-25	10/4/2005	FD 910	-8.3	-60	251	171	--	ND (0.5)	146	ND (0.5)	94.6	15.3	10.2	185	0.371
MW-25	10/4/2005	950	-8.2	-68	252	171	--	ND (0.5)	141	ND (0.5)	83.3	14.9	9.93	164	0.362
MW-25	12/14/2005	FD 896	-8.4	-50	219	155	--	ND (0.5)	156	ND (0.5)	73	14.1	9.71	151	0.382
MW-25	12/14/2005	838	-8.4	-55	224	158	--	ND (0.5)	153	ND (0.5)	75.5	14.5	9.8	143	0.396
MW-25	3/9/2006	910	-8.4	-64.1	245	164	--	ND (0.5)	170	ND (0.5)	76.4	15.6	6.97	210	0.39
MW-25	5/3/2006	FD 924	-9	-61	274	173	--	ND (0.5)	155	ND (0.5)	79.7	17.8	7.53	245	0.431
MW-25	5/3/2006	907	-9	-59.4	272	172	--	ND (0.5)	150	ND (0.5)	78	17.3	7.38	222	0.418
MW-25	10/3/2006	892	-8.9	-62.7	222	158	--	ND (0.5)	163	ND (0.5)	73.3	15	7.25	206	0.466
MW-25	3/6/2007	843	-9	-66.9	221	164	--	ND (0.5)	160	ND (0.5)	72.9	14.4	6.85	203	0.459
MW-25	10/2/2007	FD 758	-9	-65.7	195	157	--	ND (1)	190	ND (1)	63	13	7.7	220	0.46
MW-25	10/2/2007	796	-9	-65.8	189	155	--	ND (1)	180	ND (1)	66	14	7.9	200	0.49
MW-25	10/7/2008	FD 730	-10.1	-69.1	170	150	--	ND (0.5)	210	ND (0.5)	58.4	12.9	10.2	144	0.559
MW-25	10/7/2008	740	-9.9	-68.5	170	150	--	ND (0.5)	200	ND (0.5)	59.2	12.9	9.89	143	0.559
MW-25	9/21/2009	FD 650	-8.87	-69.45	180	130	--	ND (0.5)	200	ND (0.5)	64	12	7.9	190	0.47
MW-25	9/21/2009	660	-8.91	-69.89	180	130	--	ND (0.5)	200	ND (0.5)	64	12	7.2	180	0.46
MW-25	12/7/2010	780	-9.4	-68.9	220	120	--	ND (1)	180	ND (1)	74	15	10	180	0.43
MW-25	12/15/2011	FD 890	-8.9	-66.7	280	120	--	ND (0.5)	170	ND (0.5)	91	19	8	220	0.5
MW-25	12/15/2011	860	-9.2	-68.6	270	120	--	ND (1)	170	ND (1)	89	19	8.5	210	0.49
MW-25	12/11/2012	970	-9.1	-67.6	340	140	7.25	ND (0.5)	160	ND (0.5)	90	19	7.9	200	0.38
MW-25	12/9/2013	980	-9.02	-68.72	310	140	6.99	ND (0.5)	160	ND (0.5)	98	20	8.2	220	0.43
MW-25	12/2/2014	970	-9.21	-67.9	350	140	8.9	ND (0.5)	150	ND (0.5)	100	19	7.7	210	0.39
MW-25	5/11/2015	--	--	--	--	--	9.2	--	--	--	--	--	--	--	--
MW-25	12/7/2015	1,000	-8.99177	-67.0607	340	150	10	ND (0.5)	140	ND (0.5)	110	21	7.9	230	0.42
MW-25	4/27/2016	--	--	--	--	--	9.7	--	--	--	--	--	--	--	--
MW-25	12/8/2016	1,100	-8.78942	-65.8821	380	180	9.3	ND (0.5)	130	ND (0.5)	110 J	22	8.4	220	0.41
MW-25	5/1/2017	--	--	--	--	--	12	--	--	--	--	--	--	--	--
MW-25	12/8/2017	1,200	-9.01549	-65.905	420	200	12	ND (2.5)	130	ND (2.5)	120	24	8.8	240	0.37
MW-26	3/8/2005	FD 1,800	-8.7	-70	708	338	--	ND (0.5)	96.1	ND (0.5)	166	40.9	11.4	438	0.559
MW-26	3/8/2005	1,840	-8.8	-70	756	370	--	ND (0.5)	98.7	ND (0.5)	166	41.6	10.7	439	0.557
MW-26	6/13/2005	2,130	-8.2	-65	847	371	--	ND (0.5)	103	ND (0.5)	178	44.6	14	511	0.663
MW-26	10/4/2005	2,120	-7.8	-68	779	372	--	0.601	109	0.601	166	40.4	19.8	352	0.526
MW-26	12/12/2005	2,610	-8.5	-55	788	372	--	0.546	99.7	0.546	162	39.9	20.3	349	0.613
MW-26	3/8/2006	2,070	-8.6	-60.4	772	324	--	ND (0.5)	121	ND (0.5)	155	38.1	11.7	434 J	0.621
MW-26	5/1/2006	2,130	-8.9	-62.7	927	382	--	ND (0.5)	121	ND (0.5)	165	42	12.8	555	0.723
MW-26	10/3/2006	2,220	-8.8	-63	894	370	--	ND (2.5)	105	ND (2.5)	170	43.9	12.8	510	0.692
MW-26	3/12/2007	2,280	-9	-67	917	387	--	0.646	90	0.646	163	41.6	12.9	621	0.622
MW-26	10/2/2007	2,180	-8.6	-66.3	945	391	--	ND (1)	100	ND (1)	170	42	15	620	0.66
MW-26	3/12/2008	FD 2,420	-8.9	-68.2	905	398	--	ND (1)	102	ND (1)	160	32.8 J	12.7 J	462	0.601
MW-26	3/12/2008	2,500	-8.1	-67.2	908	398	--	ND (1)	103	ND (1)	176	44.1 J	16.2 J	498	0.589
MW-26	10/8/2008	2,400	-8.7	-66.5	930	440	--	ND (1)	110	ND (1)	183	45.8	14.6	555	0.591
MW-26	3/10/2009	FD 2,300	-8.68	-65.76	860	440 J	--	1.5	100	1.5	174	46.2	15.6	631	0.65

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Location ID	Sample Date	Total Dissolved Solids (mg/L)	Oxygen-18 (0/00)	Deuterium (00/00)	Chloride (mg/L)	Sulfate (mg/L)	Nitrate (mg/L)	Bromide (mg/L)	Alkalinity (total) (mg/L)	Total Dissolved Solids (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Boron (mg/L)
MW-26	3/10/2009	2,300	-8.41	-65.3	870	440 J	--	1.4	100	1.4	172	47.9	14.8	585	0.604
MW-26	9/22/2009	2,200	-9.04	-68.25	870	450	--	ND (1)	100	ND (1)	170	39	14	550	0.59
MW-26	12/15/2010	--	--	--	900	480	--	--	100	--	180	40	--	560	--
MW-26	12/9/2011	2,300	-8.1	-65.2	930	530	--	1.2	94	1.2	210	47	15	690	0.89
MW-26	10/4/2012	--	--	--	960	550	--	--	--	--	178	46.2	--	702	--
MW-26	11/27/2012	--	--	--	960	570	18.1	--	110	--	168	45	--	671	--
MW-26	3/12/2013	--	--	--	950	560	19.5	--	100	--	186	48.7	--	705	--
MW-26	5/7/2013	--	--	--	--	--	17.7 J	--	--	--	--	--	--	--	--
MW-26	12/4/2013	2,600	-8.41	-64.08	890	520	18	1	110	1	160	41	12	670	0.93
MW-26	5/5/2014	--	--	--	--	--	20.4	--	--	--	--	--	--	--	--
MW-26	12/15/2014	FD 2,700	-8.31	-66.9	910	530	22	1	110	1	150	34	--	450	0.82
MW-26	12/15/2014	2,700	-8.33	-67.3	910	530	21	1.1	110	1.1	150	33	--	470	0.79
MW-26	5/19/2015	--	--	--	--	--	23	--	--	--	--	--	--	--	--
MW-26	12/8/2015	FD 2,500	-7.93156	-65.0305	870	520	20	ND (1)	110	ND (1)	140	30	14	640	0.81
MW-26	12/8/2015	2,400	-8.19913	-65.4939	890	500	20	ND (1)	110	ND (1)	140	32	13	640	0.86
MW-26	4/28/2016	--	--	--	--	--	21	--	--	--	--	--	--	--	--
MW-26	12/8/2016	FD 2,500	-7.98162	-65.5157	880	520	21	ND (2.5)	120	ND (2.5)	160 J	42	13	680	1.1
MW-26	12/8/2016	2,400	-7.9186	-65.4433	890	520	22	ND (2.5)	120	ND (2.5)	160 J	41	13	650	1.1
MW-26	4/26/2017	--	--	--	--	--	23	--	--	--	--	--	--	--	--
MW-26	12/11/2017	FD 2,300	-8.44161	-64.4695	900	510	20	ND (2.5)	120	ND (2.5)	150	36	12	600	0.99
MW-26	12/11/2017	2,300	-8.11508	-64.5812	910	500	21	ND (2.5)	120	ND (2.5)	160	37	12	620	1
MW-31-060	3/9/2005	1,540	-8.6	-63	649	210	--	ND (0.5)	76.6	ND (0.5)	108	17.3	5.97	424	0.401
MW-31-060	6/13/2005	1,660	-8.2	-65	745	207	--	ND (0.5)	70	ND (0.5)	121	18.9	6.57	403	0.388
MW-31-060	10/6/2005	1,660	-8.6	-65	691	206	--	ND (0.5)	77.3	ND (0.5)	109	16.5	9.75	308	0.462
MW-31-060	12/13/2005	1,620	-8.7	-54	669	199	--	ND (0.5)	73	ND (0.5)	87	15.4	9.32	275	0.359
MW-31-060	3/15/2006	FD 1,640 J	-8.6	-64.9	662	192	--	ND (0.5)	81.9	ND (0.5)	101	16.8	6.94	391	0.383
MW-31-060	3/15/2006	1,560 J	-8.6	-65.6	661	191	--	ND (0.5)	89.3	ND (0.5)	106	17.5	7.3	403	0.393
MW-31-060	5/1/2006	1,630	-9.6	-63.2	691	209	--	ND (0.5)	79.6	ND (0.5)	118	20.1	7.78	467	0.449
MW-31-060	10/5/2006	1,620	-9.4	-66.3	687	205	--	ND (0.5)	80	ND (0.5)	113	20.6	9.6 J	325	0.464
MW-31-060	3/12/2007	1,750	-9.3	-69	757	222	--	ND (0.5)	72.5	ND (0.5)	116	20.3	6.05	454	0.402 J
MW-31-060	10/4/2007	1,720	-9.4	-69.6	799	208	--	ND (1)	80	ND (1)	150	26	7.3	580	0.64
MW-31-060	10/6/2008	2,000	-10.2	-72.2	810	240	--	ND (1)	81	ND (1)	150	26	9.39	460	0.399
MW-31-060	9/21/2009	1,800	-9.23	-72.11	870	220	--	ND (1)	75	ND (1)	160	26	9.6	480	0.43
MW-31-060	12/15/2010	2,000	-9	-69.3	840	210	--	ND (0.5)	78	ND (0.5)	170	27	12	440	0.43
MW-31-060	12/6/2011	1,800	-8.8	-67.9	790	200	--	ND (1)	76	ND (1)	150	24	7.6	450	0.54
MW-31-060	11/13/2012	1,900	-9.2	-71.8	890	200	3.3	ND (0.5)	78	ND (0.5)	150	24	7.1	470	0.44
MW-31-060	12/3/2013	1,900	-8.56	-66.39	870	220	3.53	ND (0.5)	78	ND (0.5)	140	24	6.4	520	0.48
MW-31-060	12/3/2014	1,700	-8.83	-68.5	790	210	3.9	ND (0.5)	140	ND (0.5)	120	19	5.2	430	0.4
MW-31-060	12/7/2015	1,600	-8.2946	-64.5767	620	200	4.7	ND (0.5)	92	ND (0.5)	100	17	5.4	470	0.5
MW-31-060	4/27/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-31-060	12/9/2016	FD 1,700	-8.65932	-66.0943	760	220	4.1	ND (1)	93	ND (1)	120 J	22 J	6.6	470	0.42
MW-31-060	12/9/2016	1,700	-8.48888	-66.636	750	210	4.1	ND (0.5)	91	ND (0.5)	120 J	20 J	6.2	470	0.42
MW-31-060	4/27/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-31-060	12/12/2017	1,800	-8.89909	-66.2365	840	210	3.4	ND (2.5)	86	ND (2.5)	130	22	6.1	490	0.79
MW-32-035	3/9/2005	3,560	-8.2	-68	1,770	465	--	0.845	260	0.845	312	85.5	13	944	1.07
MW-32-035	6/17/2005	7,550	-9.5	-72	3,520	787	--	ND (2.5)	223	ND (2.5)	506	120	14.8	2,110	1.18
MW-32-035	10/4/2005	8,340	-8.3	-70	3,840	765	--	ND (5)	208	ND (5)	567	134	29.3	1,530	1.26
MW-32-035	12/16/2005	7,660	-8.8	-63	3,510	710	--	1.02	219	1.02	606	128	30	1,580	1.25
MW-32-035	3/10/2006	9,230	-8.6	-74	4,210	1,010	--	ND (0.5)	234	ND (0.5)	654	129	19.2	2,360	1.13
MW-32-035	5/4/2006	9,840	-9.1	-67.8	4,960	1,130	--	ND (0.5)	218	ND (0.5)	693	148	19.5	2,800	1.38
MW-32-035	10/2/2006	11,200	-9.4	-71.4	5,430	1,050	--	ND (2.5)	290	ND (2.5)	839	165	23.9	3,260	1.48

Table F-1

Chemical Performance Monitoring Analytical Results, March 2005 through December 2017

Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide

Groundwater and Surface Water Monitoring Report,

PG&E Topock Compressor Station, Needles, California

Location ID	Sample Date	Total Dissolved Solids (mg/L)	Oxygen-18 (0/00)	Deuterium (00/00)	Chloride (mg/L)	Sulfate (mg/L)	Nitrate (mg/L)	Bromide (mg/L)	Alkalinity (total) (mg/L)	Total Dissolved Solids (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Boron (mg/L)
MW-32-035	12/11/2006	10,400	-9	-70.4	5,090	1,000	--	1.9	338	1.9	845	173	22.5	2,620	1.43
MW-32-035	3/6/2007	12,600	-10.2	-75.4	6,070	1,200	--	2.65	360	2.65	1,080	209	23.5	2,910	1.35
MW-32-035	4/30/2007	12,100	-9.9	-78.7	6,610	1,280	--	2.6	475	2.6	1,250	273	26.2	3,280	1.35
MW-32-035	10/1/2007	13,700	-8.9	-72.7	6,830	1,120	--	2.62	490	2.62	1,000	390	29	4,000	1.7
MW-32-035	10/3/2008	15,000	-9.8	-73.1	7,600	1,300	--	3.1	550	3.1	829	150	52.3	3,490	1.49
MW-32-035	9/22/2009	13,000	-9.32	-75.2	6,900	1,400	--	2.8	530	2.8	880	400	53	3,100	1.7
MW-32-035	12/9/2010	11,000	-10.2	-84.2	5,500	1,600	--	ND (2.5)	590	ND (2.5)	750	390 J	51 J	3,000	1.7 J
MW-32-035	12/9/2011	8,500	-10.8	-84.2	5,000	1,700	--	ND (2.5)	640	ND (2.5)	680	310	34	3,100	1.7
MW-32-035	12/5/2012	10,000	-11	-89	4,300	1,700	0.0274	ND (5)	630	ND (5)	460	240	31	2,700	1.3
MW-32-035	11/6/2013	8,300	-10.97	-87.16	3,500	1,600	0.0482	ND (2.5)	580	ND (2.5)	450	210	23	2,500	1.2
MW-32-035	11/11/2014	5,800	-10.39	-87.84	3,100	1,500	--	ND (0.5)	550	ND (0.5)	450	170	18	2,000	1.1
MW-32-035	12/1/2014	--	--	--	--	--	0.093	--	--	--	--	--	--	--	--
MW-32-035	4/20/2015	--	--	--	--	--	2.3	--	--	--	--	--	--	--	--
MW-32-035	12/3/2015	7,400	-11.18	-87.49	2,800	1,200	0.058	ND (2.5)	610	ND (2.5)	450	220	18	1,900	1.2
MW-32-035	4/25/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-32-035	12/6/2016	6,700	-10.7781	-87.0352	2,800	1,100	ND (0.05)	ND (2.5)	630	ND (2.5)	370	210	20	1,800	0.99
MW-32-035	4/27/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-32-035	12/4/2017	5,500	-11.43	-88.18	2,500	1,100	ND (0.05)	ND (2.5)	700	ND (2.5)	360	160	15	1,600	1
MW-34-055	3/10/2005	6,230	-10.8	-82	2,620	739	--	0.654	240	0.654	366	71.3	29.1	1,900	1.19
MW-34-055	7/15/2005	--	-10.3	-84	2,250	607	--	ND (0.5)	242	ND (0.5)	247	52	16.5	1,420	1.02
MW-34-055	10/5/2005	5,150	-10.6	-88	2,170	619	--	ND (0.5)	232	ND (0.5)	272	59.1	25.8	1,230	1.2
MW-34-055	12/14/2005	5,100	-10.8	-74	2,150	552	--	0.588	236	0.588	217	45	27.2	965	0.937
MW-34-055	3/8/2006	4,850	-10.8	-86.8	2,080	593	--	ND (0.5)	272	ND (0.5)	256	54.2	13.5	1,640	0.956
MW-34-055	5/3/2006	4,320	-11.5	-84.3	2,070	500	--	ND (0.5)	302	ND (0.5)	198	44.8	11.1	1,360	0.846
MW-34-055	10/4/2006	1,680 J	-12.2	-94.8	443	230	--	ND (0.5)	368	ND (0.5)	37.6	8.08	4.59	536	0.54
MW-34-055	10/3/2007	730	-11.3	-96.6	109	266	--	ND (1)	190	ND (1)	15	3.3	3.3	290	0.26
MW-34-055	10/7/2008	700	-13	-100	100	250	--	--	170	--	72.4	16.9	5.26	192	0.248
MW-34-055	9/30/2009	700	-12.26	-100.79	--	--	--	--	160	--	77	17	4.4	120	0.15
MW-34-055	11/17/2009	--	--	--	93	240	--	ND (0.5)	--	ND (0.5)	--	--	--	--	--
MW-34-055	12/7/2010	590	-12.1	-98.8	87	230	--	ND (0.5)	140	ND (0.5)	81	19	5.1	100	0.1
MW-34-055	12/6/2011	630	-12.3	-100.5	83	220	--	ND (0.5)	160	ND (0.5)	81	19	4.6	100	0.19
MW-34-055	12/12/2012	630	-12.7	-105	78	210	ND (0.01)	ND (0.5)	140	ND (0.5)	75	20	3.7	100	0.15
MW-34-055	11/20/2013	600	-13.09	-103.32	72	210	ND (0.01)	ND (0.5)	150	ND (0.5)	69	19	4.3	88	0.13
MW-34-055	11/6/2014	640	-12.43	-101.86	76	200	ND (0.05)	ND (0.5)	140	ND (0.5)	72	20	4	85	ND (0.1)
MW-34-055	12/3/2015	630	-13.02	-102.02	83	230	ND (0.05)	ND (0.5)	150	ND (0.5)	80	25	4.7	86	0.19
MW-34-055	12/6/2016	680	-12.4446	-101.069	89	230	ND (0.05)	ND (0.5)	150	ND (0.5)	77 J	26	5.6	100	0.11
MW-34-055	12/6/2017	640	-11.89	-99.07	100	230	ND (0.05)	ND (0.5)	160	ND (0.5)	85	27	4.9	91	ND (0.5)
MW-34-080	3/8/2005	6,940	-10.4	-83	4,180	1,040	--	1.01	304	1.01	439	68.1	28	2,750	1.65
MW-34-080	3/15/2005	8,980	--	--	3,920	ND (5)	--	--	288	--	445	65.7	29.7	2,990	--
MW-34-080	6/30/2005	7,840	-8.4	-82	3,910	979	--	ND (0.5)	302	ND (0.5)	497	76.5	27.7	2,670	1.66
MW-34-080	10/5/2005	10,200	-10.1	-85	3,880	1,060	--	ND (0.5)	302	ND (0.5)	429	72.5	47.4	1,660	1.57
MW-34-080	12/14/2005	8,800	-10.2	-71	3,700	880	--	0.854	297	0.854	432	68.3	54.9	1,710	1.54
MW-34-080	3/9/2006	7,830	-9.9	-86.8	3,520	986	--	ND (0.5)	313	ND (0.5)	383	65.8	24	2,420	1.49
MW-34-080	5/3/2006	7,950	-11.7	-77.6	3,700	921	--	ND (0.5)	297	ND (0.5)	425	70.3	23.9	2,480	1.38
MW-34-080	10/4/2006	7,080	-11.3	-81.8	3,210	786	--	0.737	268	0.737	341	65.4	21.1	2,170	1.31
MW-34-080	12/12/2006	6,510	-10.5	-80.9	3,190	789	--	0.742	288	0.742	298	62.9	18.9	2,040	1.26
MW-34-080	3/5/2007	6,360 J	-11.5	-85.8	3,300	783	--	0.72	205	0.72	315	68.3	19.4	2,020	1.29
MW-34-080	4/30/2007	6,390	-11.5	-88.9	3,320 J	889 J	--	ND (1)	245	ND (1)	282	57	18.6	2,080	1.33
MW-34-080	10/3/2007	5,490	-11.3	-87.8	2,630	696	--	ND (1)	240	ND (1)	220	53	21	2,000	1.2
MW-34-080	12/13/2007	5,420	-10.9	-88.6	2,380	698	--	ND (1)	264	ND (1)	193	49.1	25.4	1,450	1.09
MW-34-080	3/12/2008	5,500	-11.4	-87.3	2,510	739	--	ND (1)	238	ND (1)	237	52.6	19.2	2,030	1.14

Table F-1

Chemical Performance Monitoring Analytical Results, March 2005 through December 2017

Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide

Groundwater and Surface Water Monitoring Report,

PG&E Topock Compressor Station, Needles, California

Location ID	Sample Date	Total Dissolved Solids (mg/L)	Oxygen-18 (0/00)	Deuterium (00/00)	Chloride (mg/L)	Sulfate (mg/L)	Nitrate (mg/L)	Bromide (mg/L)	Alkalinity (total) (mg/L)	Total Dissolved Solids (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Boron (mg/L)
MW-34-080	5/6/2008	5,820	-11.4	-87.3	2,460	753	--	0.525	216	0.525	230	49	30	1,600	1.2
MW-34-080	10/7/2008	5,300	-11.8	-87.6	2,400	720	--	ND (2)	250	ND (2)	223	46.3	22	1,220	0.765
MW-34-080	12/10/2008	5,300	-10.97	-93.1	2,190	698	--	ND (1)	253	ND (1)	147	45.2	20.6	3,880	1.11
MW-34-080	3/10/2009	5,100	-10.85	-84.77	2,300	700 J	--	ND (2.5)	240	ND (2.5)	219	46.3	22.2	1,480	1.08
MW-34-080	4/30/2009	5,830	-11.45	-85.79	2,340	768	--	ND (1)	237	ND (1)	219	50	24.6	1,510	1.11
MW-34-080	9/30/2009	4,000	-10.79	-88.93	2,300	710	--	ND (1)	230	ND (1)	240	46	22	1,500	0.98
MW-34-080	12/9/2009	4,580	-11.88	-89.1	2,200	690	--	ND (1)	230	ND (1)	--	--	--	--	--
MW-34-080	3/10/2010	4,900	-12.13	-91.56	2,100	660	--	ND (1)	240	ND (1)	220 J	41	28	1,400 J	0.93
MW-34-080	12/7/2010	4,600	-11.1	-87.3	2,300	700	--	ND (1)	220	ND (1)	240	47	24	1,300	1
MW-34-080	12/6/2011	3,900	-11.1	-88.1	1,900	640	--	ND (1)	230	ND (1)	220	43	16	1,300	1.1
MW-34-080	12/12/2012 FD	--	-11.1	-89.3	1,800	630	ND (0.01)	--	250	--	210	48	--	1,300	--
MW-34-080	12/12/2012	4,300	-11.2	-90.2	1,800	630	ND (0.01)	ND (1)	250	ND (1)	220	51	17	1,300	1
MW-34-080	11/20/2013 FD	4,600	-11.18	-88.36	1,900	620	ND (0.01)	ND (1)	260	ND (1)	210	56	14	1,200	1
MW-34-080	11/20/2013	4,500	-11.43	-87.99	1,900	620	ND (0.01)	ND (1)	260	ND (1)	210	52	14	1,300	0.96
MW-34-080	11/6/2014	--	-11.6	-90.9	--	--	--	--	280 J	--	240	50	12	1,200	0.84
MW-34-080	12/1/2014	--	--	--	--	--	ND (0.05)	--	--	--	--	--	--	--	--
MW-34-080	4/20/2015	--	--	--	--	--	ND (0.05)	--	--	--	--	--	--	--	--
MW-34-080	12/3/2015	3,600	-11.53	-92.07	1,500	510	ND (0.05)	ND (2.5)	300	ND (2.5)	220	48	--	1,000	0.83
MW-34-080	4/26/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-34-080	12/6/2016 FD	4,200	-10.9343	-88.0238	1,900	620	--	ND (2.5)	290	ND (2.5)	230 J	47	16	1,300	0.98
MW-34-080	12/6/2016	4,300	-11.3322	-88.5807	2,000	630	--	ND (2.5)	270	ND (2.5)	220 J	47	15	1,300	0.98
MW-34-080	4/27/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-34-080	12/6/2017	4,700	-10.82	-85.89	2,400	670	ND (0.05)	ND (2.5)	280	ND (2.5)	220	71	14	1,400	0.89
MW-34-100	3/14/2005	10,800	--	--	5,010	1,210	--	--	175	--	221	17.4	34.1	3,600	--
MW-34-100	6/21/2005 FD	10,900 J	-9.5	-77	4,920	1,180	--	ND (0.5)	179	ND (0.5)	243	18.2	32.1	3,740	2.36
MW-34-100	6/21/2005	11,300	-9.7	-75	5,350	1,270	--	ND (0.5)	179	ND (0.5)	229	17.4	27.1	3,510	2.22
MW-34-100	10/5/2005 FD	10,400	-9.9	-83	4,680	1,200	--	ND (0.5)	172	ND (0.5)	228	14.1	50.9	2,730	2.57
MW-34-100	10/5/2005	10,400	-9.9	-83	4,530	1,150	--	ND (0.5)	172	ND (0.5)	171	13.8	55.2	2,450	2.57
MW-34-100	12/14/2005 FD	--	--	--	--	--	--	--	--	--	220	15.1	64.2	2,530	2.4
MW-34-100	12/14/2005	--	--	--	--	--	--	--	--	--	226	14.9	62.9	2,530	2.32
MW-34-100	3/8/2006 FD	10,100	-10.1	-101.9J	4,920	1,220	--	--	159	--	182	11.9	36.5	3,530	2.46
MW-34-100	3/8/2006	10,000	-11.4	-75.5J	4,720	1,180	--	--	152	--	179	12.1	32.5	3,580	2.41
MW-34-100	5/3/2006 FD	9,990	-10.6	-71.9	5,170	1,230	--	--	136	--	166	12.2	31.3	3,900	2.77
MW-34-100	5/3/2006	9,940	-10.5	-74.5	5,060	1,200	--	--	133	--	162	12	31.1	3,890	2.73
MW-34-100	4/30/2007 FD	11,900	-11.2	-82.1	5,880	1,050	--	--	123	--	189	12	32.1	3,920	2.4
MW-34-100	4/30/2007	10,600	-10.9	-80.7	5,920	1,040	--	--	123	--	186	12	31.5	3,840	2.39
MW-34-100	10/3/2007 FD	10,500	-10.6	-78.4	5,360	953	--	ND (1)	120	ND (1)	160	10	43	4,300	2.4
MW-34-100	10/3/2007	10,700	-10.2	-78.2	5,350	970	--	ND (1)	120	ND (1)	170	11	44	4,300	2.5
MW-34-100	10/7/2008 FD	11,000	-11	-81.3	5,600	1,200	--	ND (2.5)	140	ND (2.5)	184	11.5	56.7	3,880 J	2.59
MW-34-100	10/7/2008	11,000	-10.9	-80.8	5,400	1,200	--	ND (2.5)	140	ND (2.5)	158	10.6	54.5	2,970 J	2.35
MW-34-100	9/30/2009 FD	--	--	--	5,600	1,300	--	--	170	--	--	--	--	--	--
MW-34-100	9/30/2009	--	--	--	5,500	1,300	--	--	170	--	200	11	73	3,800	2.3
MW-34-100	11/17/2009	11,000	-10.47	-82.38	--	--	--	ND (1)	--	ND (1)	--	--	--	--	--
MW-34-100	12/8/2010 FD	9,900	-10	-80.4	5,700	1,200	--	ND (1)	89 J	ND (1)	180	9.8	60 J	4,000	2.5
MW-34-100	12/8/2010	10,000	-9.8	-79.5	5,800	1,300	--	ND (2.5)	140 J	ND (2.5)	190	9.6	52 J	4,100	2.6
MW-34-100	12/6/2011 FD	9,400	-10	-79.5	5,600	1,200	--	ND (2.5)	120	ND (2.5)	160	7.4	43 J	3,900	2.7
MW-34-100	12/6/2011	10,000	-10.1	-79.2	5,700	1,300	--	ND (2.5)	120	ND (2.5)	170	7.6	43	4,000	2.7
MW-34-100	11/26/2012 FD	11,000	-10.2	-80.9	5,900	1,200	0.421	ND (2.5)	130	ND (2.5)	150	8.2	47	3,200	2.6
MW-34-100	11/26/2012	11,000	-10.1	-80.5	5,900	1,200	0.444	ND (2.5)	120	ND (2.5)	150	8.6	47	3,100	2.6
MW-34-100	4/16/2013 FD	--	--	--	--	--	ND (0.5)	--	--	--	--	--	--	--	--
MW-34-100	4/16/2013	--	--	--	--	--	ND (0.5)	--	--	--	--	--	--	--	--

Table F-1

Chemical Performance Monitoring Analytical Results, March 2005 through December 2017

Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide

Groundwater and Surface Water Monitoring Report,

PG&E Topock Compressor Station, Needles, California

Location ID	Sample Date		Total Dissolved Solids (mg/L)	Oxygen-18 (0/00)	Deuterium (00/00)	Chloride (mg/L)	Sulfate (mg/L)	Nitrate (mg/L)	Bromide (mg/L)	Alkalinity (total) (mg/L)	Total Dissolved Solids (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Boron (mg/L)
MW-34-100	11/20/2013	FD	10,000	-9.81	-79.33	5,300	1,100	0.419	ND (2.5)	120	ND (2.5)	150	8.5	35	3,900	2.7
MW-34-100	11/20/2013		10,000	-10.18	-78.9	5,300	1,200	0.422	ND (2.5)	120	ND (2.5)	140	8	35	3,900	2.6
MW-34-100	10/2/2014		--	--	--	--	--	0.64	--	--	--	--	--	--	--	--
MW-34-100	12/1/2014	FD	9,900	-10.1	-77.2	5,500	1,100	0.61 J	ND (1)	100	ND (1)	140	5.6	32	4,000	2
MW-34-100	12/1/2014		9,900	-9.97	-76.95	5,400	1,100	0.58 J	ND (1)	95	ND (1)	140	5.6	30	3,900	2.2
MW-34-100	2/16/2015		--	--	--	--	--	0.61	--	--	--	--	--	--	--	--
MW-34-100	4/20/2015	FD	--	--	--	--	--	ND (0.056)	--	--	--	--	--	--	--	--
MW-34-100	4/20/2015		--	--	--	--	--	ND (0.05)	--	--	--	--	--	--	--	--
MW-34-100	10/6/2015		--	--	--	--	--	0.29	--	--	--	--	--	--	--	--
MW-34-100	12/3/2015	FD	9,600	-10.16	-78.93	5,200	1,000	0.73	ND (5)	94	ND (5)	160	7.1	31	3,800	2.8
MW-34-100	12/3/2015		9,900	-10.1	-79.04	5,100	980	0.74	ND (5)	100	ND (5)	150	6.7	30	3,700	2.7
MW-34-100	2/25/2016		--	--	--	--	--	0.13	--	--	--	--	--	--	--	--
MW-34-100	4/26/2016		--	--	--	--	--	ND (0.05)	--	--	--	--	--	--	--	--
MW-34-100	10/6/2016		--	--	--	--	--	ND (0.05)	--	--	--	--	--	--	--	--
MW-34-100	12/6/2016		8,900	-10.6026	-81.5735	4,700	1,200	0.078	0.59	130	0.59	140 J	7.6	33	3,600	2.3
MW-34-100	2/6/2017	FD	--	--	--	--	--	0.18	--	--	--	--	--	--	--	--
MW-34-100	2/6/2017		--	--	--	--	--	0.19	--	--	--	--	--	--	--	--
MW-34-100	4/27/2017		--	--	--	--	--	ND (0.05)	--	--	--	--	--	--	--	--
MW-34-100	10/2/2017		--	-10.55	-84.83	--	--	ND (0.05)	--	--	--	--	--	--	--	--
MW-34-100	12/6/2017		6,800	--	--	3,500	1,000	ND (0.05)	ND (2.5)	170	ND (2.5)	140	21	24	2,300	1.7
R-28	3/8/2005		651	-12.5	-102	90.4	231	--	ND (0.5)	132	ND (0.5)	83.7	31.4	5.02	107	ND (0.2)
R-28	6/14/2005		680	-11.6	-95	91.2	268	--	ND (0.5)	127	ND (0.5)	78.5	28.5	5.08	94.5	ND (0.2)
R-28	10/5/2005		672	-11.6	-94	85.5	255	--	ND (0.5)	122	ND (0.5)	85.7	30.4	6.3	77	ND (0.2)
R-28	12/16/2005		710	-11.5	-83	88.1	254	--	ND (0.5)	126	ND (0.5)	87.2	29.8	6.11	76.8	ND (0.2)
R-28	3/6/2006		675	-12.3	-93.4	91	270	--	ND (0.5)	146	ND (0.5)	76.6	26.6	5.22 J	91.5	ND (0.2)
R-28	5/3/2006		586	-13	-92.1	93.4	270	--	ND (0.5)	136	ND (0.5)	88.1	31.4	4.04 J	107	ND (0.2)
R-28	10/4/2006		644 J	-12.6	-95.3	90.9	259	--	ND (0.5)	133	ND (0.5)	84.2	32.1	6.17 J	96.5	ND (0.2)
R-28	12/20/2006		615	-12.4	-99.6	93.3	262	--	ND (0.5)	143	ND (0.5)	85.7	32	4.66	108	ND (0.2)
R-28	3/14/2007		710	-12.8	-100.4	96.7	268	--	ND (0.5)	133	ND (0.5)	87.9	31	5.71	105	ND (0.2)
R-28	5/9/2007		690	-13	-102.3	95.8	271	--	ND (0.5)	143	ND (0.5)	86.1	30.5	5.92	103	ND (0.2)
R-28	9/12/2007		682	-12.4	-99.4	106	296	--	ND (0.2)	122	ND (0.2)	73.8	29.9	6.36	89.2	ND (0.2)
R-28	12/6/2007		--	-11.7	-98.6	96.5	258	--	ND (0.2)	139	ND (0.2)	75.7	30.4	6.62	79.4	ND (0.2)
R-28	4/2/2008		--	--	--	92.5	309	--	ND (1)	137	ND (1)	84.7	31.4	5.58	108	0.467
R-28	6/18/2008		672	-13.2	-101.7	89.4	248	--	ND (1)	132	ND (1)	43.3	31.1	6.95	93.9	ND (0.2)
R-28	9/17/2008		640	--	--	91.4	256	--	ND (0.5)	132	ND (0.5)	83.4	31.2	6.48	78	ND (0.2)
R-28	12/4/2008		649	-11.89	-97	97.4	260	--	ND (1)	135	ND (1)	81.7	30	5.95	114	0.262
R-28	1/21/2009		652	-11.97	-96.7	91.5	253	--	ND (0.5)	134	ND (0.5)	79.2	27.8	6.01	91.7	ND (0.2)
R-28	4/9/2009		643	-12.43	-97.81	92.7	250	--	ND (0.5)	138	ND (0.5)	79.6	28.8	5.44	97	ND (0.2)
R-28	7/8/2009		632	-12.78	-98.62	84.5	239	--	ND (0.5)	131	ND (0.5)	79.6	27.3	6.17	86.9	ND (0.2)
R-28	9/9/2009		640	-12.47	-99.06	86	236	--	ND (1)	131	ND (1)	74.8	26.2	6.01	78.7	ND (0.2)
R-28	12/14/2009		612	-13.03	-98.33	89.7	244	--	ND (1)	131	ND (1)	73.5	26.7	4.98	88.2	ND (0.2)
R-28	12/21/2010		602	-12.1	-101.8	91	223	--	ND (0.5)	133	ND (0.5)	69.1	24.8	4.75	87.8	ND (0.2)
R-28	6/8/2011		--	--	--	--	--	--	--	116	--	--	--	--	--	--
R-28	8/23/2011		--	--	--	--	--	--	--	115	--	--	--	--	--	--
R-28	11/30/2011		--	--	--	--	--	--	--	119	--	--	--	--	--	--
R-28	1/11/2012		--	--	--	80.5	218	--	ND (0.5)	127	ND (0.5)	70.2	27.4	4.76	83.7	ND (0.2)
R-28	2/29/2012		--	--	--	--	--	--	--	123	--	--	--	--	--	--
R-28	5/22/2012		--	--	--	--	--	--	--	124	--	--	--	--	--	--
R-28	8/22/2012		--	--	--	--	--	--	--	126	--	--	--	--	--	--
R-28	11/1/2012		499	-12.6	-102.2	75.4	212	--	ND (0.5)	132	ND (0.5)	71.3	27.5	4.12	79.3	ND (0.2)
R-28	1/9/2013		--	--	--	--	--	--	--	130	--	--	--	--	--	--

Table F-1

Chemical Performance Monitoring Analytical Results, March 2005 through December 2017

Fourth Quarter 2017 and Annual Interim Measures Performance Monitoring and Site-wide

Groundwater and Surface Water Monitoring Report,

PG&E Topock Compressor Station, Needles, California

Location ID	Sample Date	Total Dissolved Solids (mg/L)	Oxygen-18 (0/00)	Deuterium (00/00)	Chloride (mg/L)	Sulfate (mg/L)	Nitrate (mg/L)	Bromide (mg/L)	Alkalinity (total) (mg/L)	Total Dissolved Solids (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Boron (mg/L)
R-28	3/5/2013	--	--	--	--	--	--	--	122	--	--	--	--	--	--
R-28	5/21/2013	--	--	--	--	--	ND (0.5)	--	127	--	--	--	--	--	--
R-28	7/16/2013	--	--	--	--	--	ND (0.5)	--	124	--	--	--	--	--	--
R-28	11/21/2013	564	-12.79	-103.05	80.4	220	0.293	ND (0.5)	131	ND (0.5)	73.2	26.2	4.44	84.7	0.121
R-28	1/14/2014	--	--	--	--	--	0.315	--	--	--	--	--	--	--	--
R-28	3/13/2014	--	--	--	--	--	0.41	--	--	--	--	--	--	--	--
R-28	5/22/2014	--	--	--	--	--	0.27	--	--	--	--	--	--	--	--
R-28	7/16/2014	--	--	--	--	--	0.37	--	--	--	--	--	--	--	--
R-28	11/20/2014	620	-12.26	-99.96	85	230	0.29	ND (0.5)	130	ND (0.5)	68	23	4.5	88	0.13
R-28	1/15/2015	--	--	--	--	--	0.33	--	--	--	--	--	--	--	--
R-28	2/25/2015	--	--	--	--	--	0.44	--	--	--	--	--	--	--	--
R-28	6/9/2015	--	--	--	--	--	0.37	--	--	--	--	--	--	--	--
R-28	9/16/2015	--	--	--	--	--	0.34	--	--	--	--	--	--	--	--
R-28	12/9/2015	640	-11.8759	-97.4889	94	250	0.38	ND (1)	120	ND (1)	61	20	4.7 J	100	0.13
R-28	1/26/2016	FD	--	--	--	--	0.46	--	--	--	--	--	--	--	--
R-28	1/26/2016	--	--	--	--	--	0.47	--	--	--	--	--	--	--	--
R-28	2/24/2016	--	--	--	--	--	0.52	--	--	--	--	--	--	--	--
R-28	4/27/2016	--	--	--	--	--	0.42	--	--	--	--	--	--	--	--
R-28	7/7/2016	--	--	--	--	--	0.44	--	--	--	--	--	--	--	--
R-28	11/29/2016	FD	--	-12.15	-101.1	96	0.42	ND (1)	130	ND (1)	64 J	22	4.5	91	0.21
R-28	11/29/2016	--	-12.71	-101.7	92	240	0.31	ND (1)	130	ND (1)	67 J	22	4.5	91	0.21
R-28	1/24/2017	--	--	--	--	--	0.38	--	--	--	--	--	--	--	--
R-28	2/21/2017	--	--	--	--	--	0.46	--	--	--	--	--	--	--	--
R-28	5/11/2017	--	--	--	--	--	0.42	--	--	--	--	--	--	--	--
R-28	8/16/2017	--	--	--	--	--	0.39	--	--	--	--	--	--	--	--
R-28	11/15/2017	580	-12.42	-97.09	91	230	0.32	ND (0.1)	130	ND (0.1)	60	21	4	88	0.12

Notes:

--- = data were not collected, were not available, were rejected or there was a field instrument malfunction.

* = Result of second analytical run from primary sample

0/00 = differences from global standards in parts per thousand.

FD = field duplicate sample.

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

mg/L = milligrams per liter

ND = not detected at the listed reporting limit.

Alkalinity (total) reported as calcium carbonate.

Nitrate as nitrogen was not requested. Nitrate/nitrite as nitrogen is shown.

APPENDIX G

Interim Measures Extraction System Operations Log, Fourth Quarter
2017



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

During Fourth Quarter 2017 (November and December), extraction well TW-3D operated at a target pump rate of at 135 gallons per minute, excluding periods of planned and unplanned downtime. Extraction wells TW-2S and TW-2D were operated for a brief time on December 7, 2017 for sample collection only during the fourth quarter groundwater monitoring program sampling event, and PE-01 was only operated for a brief time on November 2, 2017 and December 7, 2017 to collect monthly samples. The operational run time for the Interim Measure groundwater extraction system (combined or individual pumping) was approximately 98.3 percent during Fourth Quarter 2017. The operational run time for the Interim Measure groundwater extraction system (combined or individual pumping) was approximately 96.0 percent during the 2017 annual reporting period.

The Interim Measure Number 3 (IM-3) facility treated approximately 11,608,261 gallons of extracted groundwater during Fourth Quarter 2017. The IM-3 facility also treated approximately 6,175 gallons of purge water generated from the groundwater monitoring program and 25,200 gallons of water from IM-3 well backwashing. Four 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 1.7 percent of downtime during Fourth 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.

G.1 November 2017

- **November 8, 2017 (unplanned):** The extraction well system was offline from 8:20 a.m. to 8:28 a.m. due to loss of power from the City of Needles. Extraction system downtime was 8 minutes.
- **November 8, 2017 (unplanned):** The extraction system was offline from 2:06 p.m. to 2:08 p.m. and from 5:40 p.m. to 5:44 p.m. due to a programmable logic controller (PLC) and human machine interface (HMI) connectivity issue. Extraction system downtime was 6 minutes.
- **November 9, 2017 (planned):** The extraction well system was offline from 6:04 a.m. to 6:36 a.m. due to testing of the pipeline critical alarms and leak detection system. Extraction system downtime was 32 minutes.
- **November 9, 2017 (planned):** The extraction well system was offline from 8:58 a.m. to 10:42 a.m. to change out the microfilter modules due to high transmembrane pressure and installing a new Clarifier Feed Pump (P-400). Extraction system downtime was 1 hour 44 minutes.
- **November 9, 2017 (unplanned):** The extraction well system was offline from 11:42 a.m. to 11:58 a.m. and from 2:02 p.m. to 3:50 p.m. due to a high level at Iron Oxidation Reactor Number 3 (T-301C). A blockage was discovered at the inline mixer at the discharge of Clarifier Feed Pump (P-400) and cleared. Extraction system downtime was 2 hours 4 minutes.
- **November 9, 2017 (unplanned):** The extraction system was offline from 3:54 p.m. to 4:06 p.m. due to a programmable logic controller (PLC) and human machine interface (HMI) connectivity issue. Extraction system downtime was 12 minutes.

- **November 10, 2017 (unplanned):** The extraction system was offline from 2:32 a.m. to 3:24 a.m. due to a high pH reading at the Treated Water Storage Tank (T-700). Lab meters were recalibrated and the pH at T-700 was rechecked and found to be in compliance. Extraction system downtime was 52 minutes.
- **November 16, 2017 (planned):** The extraction system was offline from 12:44 p.m. to 1:04 p.m. to measure the total depth of extraction well TW-3D. Extraction system downtime was 20 minutes.
- **November 18, 2017 (unplanned):** The extraction system was offline from 11:34 a.m. to 11:50 a.m. due to a programmable logic controller (PLC) and human machine interface (HMI) connectivity issue. Extraction system downtime was 16 minutes.
- **November 18, 2017 (planned):** The extraction well system was offline from 11:54 a.m. to 12:56 p.m. to maintain appropriate levels in the Raw Water Storage Tank (T-100) due to the large volume of injection well backwashing water produced during the Aquagard injection well cleaning process performed by Groundwater Partners. Extraction system downtime was 1 hour 2 minutes.
- **November 21, 2017 (unplanned):** The extraction well system was offline from 11:38 a.m. to 1:58 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 20 minutes.
- **November 22, 2017 (unplanned):** The extraction well system was offline from 5:54 a.m. to 10:40 a.m. due to a high water level in Iron Oxidation Reactor Number 1 (T-301A). Scale build up on the valve was discovered restricting flow -. the scale was removed from the valve. Extraction system downtime was 4 hours 46 minutes.
- **November 30, 2017 (planned):** The extraction well system was offline from 1:30 p.m. to 1:38 p.m. due to testing of the spare pipeline critical alarms and leak detection system probes 7 and 8. Extraction system downtime was 8 minutes.

G.2 December 2017

- **December 1, 2017 (planned):** The extraction system was offline from 7:50 a.m. to 8:00 a.m. and from 8:02 a.m. to 8:14 a.m. and from 8:18 a.m. to 8:22 a.m. due to testing of the pipeline critical alarms and leak detection system. Extraction system downtime was 26 minutes.
- **December 1, 2017 (planned):** The extraction well system was offline from 9:46 a.m. to 10:36 a.m. to change out the microfilter modules due to high transmembrane pressure. Extraction system downtime was 50 minutes.
- **December 4, 2017 (unplanned):** The extraction system was offline from 5:50 a.m. to 6:02 a.m. and from 1:10 p.m. to 1:24 p.m. due to a programmable logic controller (PLC) and human machine interface (HMI) connectivity issue. Extraction system downtime was 26 minutes.
- **December 4, 2017 (unplanned):** The extraction system was offline from 10:36 p.m. to 11:22 p.m. to lower the water level in Raw Water Storage Tank (T-100). See last bullet below describing December 21 outage for cleaning. Extraction system downtime was 46 minutes.
- **December 6, 2017 (unplanned):** The extraction system was offline from 3:32 a.m. to 4:34 a.m. to lower the water level in Raw Water Storage Tank (T-100). See last bullet below describing December 21 outage for cleaning. Extraction system downtime was 1 hour 2 minutes.
- **December 8, 2017 (planned):** The extraction well system was offline from 9:20 a.m. to 10:12 a.m. to change out the microfilter modules due to high transmembrane pressure and to repair the Iron

Oxidation Reactor No. 1 (T-301A) high level alarm. Corrosion formed on the level sensor at T-301A causing it to stay in constant alarm. The sensor was cleaned and returned to service. Extraction system downtime was 52 minutes.

- **December 18, 2017 (planned):** The extraction well system was offline from 9:38 a.m. to 11:48 a.m. to change out primary Reverse Osmosis membranes due to fouling. Extraction system downtime was 2 hours 10 minutes.
- **December 19, 2017 (planned):** The extraction well system was offline from 7:16 a.m. to 10:40 a.m. to change out the microfilter modules due to high transmembrane pressure. Extraction system downtime was 3 hours 24 minutes.
- **December 21, 2017 (unplanned):** The extraction system was offline from 2:16 p.m. to 2:32 p.m. due to a programmable logic controller (PLC) and human machine interface (HMI) connectivity issue. Extraction system downtime was 16 minutes.
- **December 21, 2017 (unplanned):** The extraction system was offline from 2:36 p.m. to 3:48 p.m. to lower the water level in Raw Water Storage Tank (T-100). There was a flow restriction at the discharge of the Chromium Reduction Reactor (T-300). Personnel had to wait for a man lift to arrive due to the height of the restriction. Extraction system downtime was 1 hour 12 minutes.

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