Pacific Gas and Electric Company

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December 15, 2020

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

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

Dear Mr. Yue:

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

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

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

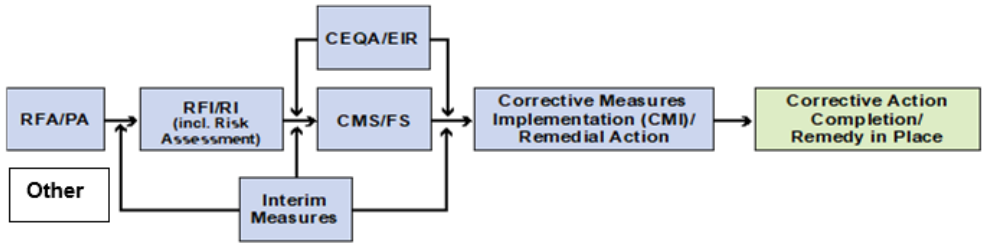
Sincerely,

Curt Russell
Topock Remediation Project Manager

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

# *Topock Project Executive Abstract*

| | |
|---|---|
| **Document Title:** | Third Quarter 2020 Interim Measures Performance Monitoring and Site-Wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles CA |
| **Submitting Agency:** | DTSC |
| **Final Document?** | ☒ Yes ☐ No |
| **Date of Document:** | December 15, 2020 |
| **Who created this document?: (i.e. PG&E, DTSC, DOI, Other)** | PG&E |
| **Priority Status:** | ☐ HIGH ☐ MED ☒ LOW |
| **Is this time critical?** | ☐ Yes ☒ No |
| **Type of Document:** | ☐ Draft ☒ Report ☐ Letter ☐ Memo ☐ Other / Explain: |
| **Action Required:** | ☒ Information Only ☐ Review & Comment<br>Return to: _____ By Date: _____<br>☐ Other / Explain: |
| **What does this information pertain to?** | ☐ Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA)/Preliminary Assessment (PA)<br>☐ RCRA Facility Investigation (RFI)/Remedial Investigation (RI) (including Risk Assessment)<br>☐ Corrective Measures Study (CMS)/Feasibility Study (FS)<br>☐ Corrective Measures Implementation (CMI)/Remedial Action<br>☐ California Environmental Quality Act (CEQA)/Environmental Impact Report (EIR)<br>☒ Interim Measures<br>☐ Other / Explain: |
| **Is this a regulatory requirement?** | ☒ Yes ☐ No<br><br>If no, why is the document needed? |
| **What is the consequence of NOT doing this item? What is the consequence of DOING this item?** | Submittal of this report is a compliance requirement under DTSC requirements. |
| **Other Justification/s:** | ☐ Permit ☐ Other / Explain: |
| **Brief Summary of Attached Document:** | This quarterly report documents the monitoring activities and performance evaluation of the interim measure (IM) hydraulic containment system under the IM Performance Monitoring Program, the Groundwater Monitoring Program, and Surface Water Monitoring Program for the Topock Project. Hydraulic and chemical monitoring data were collected and used to evaluate the IM hydraulic containment system performance based on a set of standards approved by the California Department of Substances Control (DTSC). Key items included in this report are: (1) measured groundwater elevations and hydraulic gradient data at compliance well pairs that indicate the direction of groundwater flow is away from the Colorado River and toward the pumping centers on site; (2) hexavalent chromium data for monitoring wells; (3) pumping rates and volumes from the IM extraction system; and (4) Groundwater Monitoring Program and Surface Water Monitoring Program activities and results. Based on the data and evaluation presented in this report, the IM performance standard has been met for the Third Quarter 2020 Reporting Period. On July 23, 2010, DTSC approved a revised reporting schedule for this report that included a revised IM-3 sample collection period from July 1, 2020 through October 31, 2020.<br><br>Written by: PG&E |

| | |
|---|---|
| **Recommendations:** | None. |
| **How is this information related to the Final Remedy or Regulatory Requirements?:** | This report is required by DTSC as part of the Interim Measures Performance Monitoring Program. |
| **Other requirements of this information?:** | None. |
| **Related Reports and Documents:** | Click any boxes in the Regulatory Road Map (below) to be linked to the Documents Library on the DTSC Topock Web Site (www.dtsc-topock.com)<br>  <br>**Legend**<br>RFA/PA – RCRA Facility Assessment/Preliminary Assessment<br>RFI/RI – RCRA Facility Investigation/CERCLA Remedial Investigation (including Risk Assessment)<br>CMS/FS – RCRA Corrective Measure Study/CERCLA Feasibility Study<br>CEQA/EIR – California Environmental Quality Act/Environmental Impact Report |

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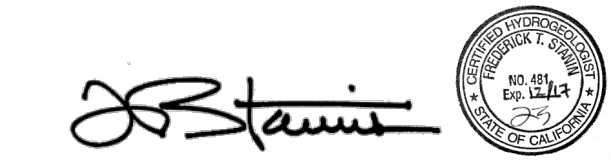
Pacific Gas and Electric Company

# FOURTH QUARTER 2019 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT

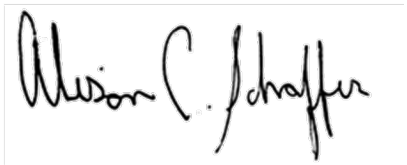
Topock Compressor Station, Needles, California

December 15, 2020

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




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



Alison Schaffer
Arcadis Report Lead

Daniel Bush, P.E.
Arcadis Project Manager

# FOURTH QUARTER 2019 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORTTHIRD QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT

Topock Compressor Station, Needles, California

Prepared for:

California Department of Toxic Substances Control

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

December 15, 2020

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# ACRONYMS AND ABBREVIATIONS

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

| | |
|---|---|
| USEPA | United States Environmental Protection Agency |
| UTL | upper tolerance limit |

# EXECUTIVE SUMMARY

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

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

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

# 1 INTRODUCTION

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

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

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

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

This report is divided into six sections:

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

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

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

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

***Section 5*** describes upcoming monitoring events for the Fourth Quarter 2020.

***Section 6*** lists the references cited throughout this report.

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

## 1.1 Third Quarter 2020 Regulatory Communication

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

- The Second Quarter 2020 Interim Measures Performance Monitoring and Site-Wide Groundwater and Surface Water Monitoring Report (PMP-GMP Report) was submitted to the DTSC on August 15, 2020 (Arcadis 2020b).
- Required GMP, RMP, and PMP notifications submitted for Third Quarter 2020 included:
    - On October 2, 2020, Arcadis sent a quarterly email notification to PG&E providing hexavalent chromium (Cr[VI]) and dissolved chromium results from the August 2020 shoreline and in-channel

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

- On November 25, 2020, Arcadis, on behalf of PG&E, sent a quarterly email notification to the DTSC providing Cr(VI) and dissolved chromium results from four subject floodplain wells (MW-34-100, MW-44-115, MW-46-175, and MW-44-125).
- As part of the conditional approval for the shutoff of extraction well PE-01, GMP monitoring results for monitoring wells listed in the July 20, 2015 DTSC approval letter (see Section 1.4.2.2; DTSC 2015) are compared to the maximum Cr(VI) and dissolved chromium concentrations measured in 2014 (or for biennial sampling frequency, the 2013 maximum concentrations). Results that exceed the previous maximum are required to be reported to the DTSC within 40 days after the end of the quarterly GMP sampling event. In Third Quarter 2020, Cr(VI) and dissolved chromium concentrations were below the notification levels; therefore, a notification email was not submitted to the DTSC.

## 1.2 History of Groundwater Impact at the Site

### 1.2.1 Cr(VI) Impacts to Groundwater

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

### 1.2.2 Background Concentrations of Cr(VI)

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

## 1.3 Site-wide Groundwater and Surface Water Monitoring Programs

### 1.3.1 Basis for GMP and RMP Programs

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

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

### 1.3.2 GMP and RMP Monitoring Networks

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

**Groundwater and Surface Water Monitoring Wells**

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

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

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

## 1.4 Interim Measure Performance Monitoring Program

### 1.4.1 Basis for PMP Program

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

injection well field (for the discharge of the treated groundwater). Figure 1-1 shows the locations of the IM-3 extraction, conveyance, treatment, and injection facilities.

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

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

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

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

### 1.4.2 PMP Monitoring Network

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

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

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

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

#### 1.4.2.1 Chromium Monitoring Network

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

#### 1.4.2.2 IM Extraction Wells

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

**Wells Monitored for Conditional Shutdown of PE-01**

On July 20, 2015, the DTSC conditionally approved a proposal to modify the IM-3 pumping regime by allowing PE-01 to be shut off and pumping to be shifted to TW-03D and TW-02D or TW-02S, so long as gradient targets are maintained and contingency is not triggered based on chromium concentrations in select floodplain wells (DTSC 2015). Because PE-01 pumps water with low concentrations of chromium

(typically less than 5 µg/L), shifting more pumping to a higher concentration extraction well can increase the rate of chromium removal from the floodplain.

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

#### 1.4.2.3 IM Hydraulic Monitoring Network

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

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

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

#### 1.4.2.4 IM Contingency Plan Monitoring Wells

The IMCP was developed to detect and control possible migration of the Cr(VI) plume toward the Colorado River (DTSC 2005). Twenty-four IMCP wells were selected as part of an early detection system to detect any increases in chromium concentrations at areas of interest across the site (Figure 1-4, Table 1-2). The IMCP wells are sampled quarterly, as part of the GMP monitoring program (note that not all 24 wells are

sampled each quarter), to determine if any increasing trends in Cr(VI) concentrations are observed. If Cr(VI) concentrations exceed the established trigger levels (based on historical Cr[VI] concentrations), then a contingency plan must be implemented in accordance with the Revised Contingency Plan Flow Chart (DTSC 2005; PG&E 2008).

#### 1.4.2.5 IM Chemical Performance Monitoring Network

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

## 1.5 Sustainability

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

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

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

# 2 THIRD QUARTER 2020 MONITORING ACTIVITIES

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

## 2.1 Groundwater Monitoring Program

The Third Quarter 2020 GMP consisted of monthly and quarterly groundwater monitoring.

### 2.1.1 Monthly Groundwater Monitoring

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

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

### 2.1.2 Quarterly Groundwater Monitoring

The quarterly GMP monitoring event, performed on September 29 through 30 and October 1, 2020, consisted of groundwater sampling and inspection of 17 monitoring wells. Monitoring wells MW-57-050 and MW-58-065 were dry during the monitoring event, and monitoring well TW-02D was not sampled due to construction associated with the final groundwater remedy at the site. The monitoring well locations are shown on Figure 1-2 and listed in Table 1-2. Samples were collected using the low-flow sampling method. During collection of each groundwater sample, field parameters were recorded (i.e., temperature, pH, specific conductivity, ORP, turbidity, TDS, and salinity). Samples were sent to Asset Laboratories in Las Vegas, Nevada. Samples were analyzed for the following constituents (note that not all samples were analyzed for the complete analytical suite listed below):

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

## 2.2 Surface Water Monitoring Program

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

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

## 2.3 IM Performance Monitoring Program

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

### 2.3.1 Chromium Monitoring

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

### 2.3.2 IM Extraction System Operation

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

**Wells Monitored for Conditional Shutdown of PE-01**

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

### 2.3.3 IM Hydraulic Monitoring

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

### 2.3.4 IM Contingency Plan Monitoring

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

# 3 SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING RESULTS

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

## 3.1 Groundwater Monitoring Results

### 3.1.1 Cr(VI) and Dissolved Chromium

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

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

During Third Quarter 2020, the maximum detected Cr(VI) and dissolved chromium concentrations were 54,000 µg/L and 51,000 µg/L (both at MW-68-180), respectively.

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

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

- Dissolved molybdenum: 190 µg/L (MW-46-175)
- Dissolved selenium: 28 µg/L (MW-68-180)
- Nitrate/nitrite as nitrogen: 35 milligrams per liter (mg/L; MW-68-180)
- Dissolved arsenic: 13 µg/L (MW-72BR-200)
- Dissolved manganese: 1,000 µg/L (MW-64BR).

### 3.1.3 Well Maintenance

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

## 3.2 Surface Water Monitoring Results

### 3.2.1 Cr(VI) and Dissolved Chromium

Table 3-2 presents the Third Quarter 2020 surface water sample results for Cr(VI) and dissolved chromium, as well as general chemistry parameters (pH and specific conductivity). Cr(VI) and dissolved chromium from the August 2020 sampling event were not detected at concentrations higher than reporting limits at any surface water monitoring location. The laboratory reports for samples analyzed during Third Quarter 2020 are provided in Appendix A.

### 3.2.2 Contaminants of Potential Concern and In Situ By-Products

Table 3-2 presents the Third Quarter 2020 surface water results for COPCs (dissolved molybdenum, dissolved selenium, and nitrate/nitrite as nitrogen), in-situ byproducts (dissolved arsenic, total iron, dissolved iron, and dissolved manganese), and other geochemical indicator parameters (dissolved barium and TSS). Maximum concentrations for each constituent are summarized below (with associated locations):

- Dissolved molybdenum: 4.9 µg/L (C-MAR-S, C-R27-S, R63)
- Dissolved selenium: 1.6 µg/L (C-I-3-S, C-I-3-D, C-NR4-D, C-CON-D, C-MAR-D)
- Nitrate/nitrite as nitrogen: 0.54 mg/L (C-NR4-D)
- Dissolved arsenic: 2.6 µg/L (C-BNS, C-1-3-D, C-CON-D, C-MAR-S, C-R22A-S, C-R27-S, R63)
- Total iron: 200 J µg/L (C-MAR-S, C-MAR-D)
- Dissolved iron: 200 J µg/L (C-NR1-D)
- Dissolved manganese: 7.1 µg/L (RRB)
- Dissolved barium: 120 µg/L (C-BNS, C-I-3-S, C-1-3-D, C-R27-S, C-TAZ-D, R63)
- TSS: 11 mg/L (C-MAR-S).

## 3.3 Data Validation and Completeness

Project chemists reviewed laboratory analytical data from the Third Quarter 2020 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 Third Quarter 2020:

- Holding time and preservation
    - Five results for Cr(VI) were below the pH requirement and were qualified as estimated non-detects, flagged “UJ”.
    - Based on the March 2007 United States Environmental Protection Agency (USEPA) ruling, and reaffirmed in the May 2012 USEPA ruling, pH has a 15-minute holding time. As a result, all samples analyzed in a certified laboratory by Method SM4500-HB (pH) are analyzed outside the

USEPA-recommended holding time. Therefore, the pH results for the Third Quarter 2020 sampling event analyzed in a certified lab are considered estimated.

- Matrix spike (MS) and matrix spike duplicate (MSD) samples
  - Dissolved iron was recovered less than quality control (QC) limits in the MS and post-digestion spike (PDS) associated with sample TW-03D-0920. Additionally, the relative percent difference between the MS/MSD did not meet criteria in the spike pair. Dissolved iron also was recovered at a concentration greater than QC limits in the MS and PDS associated with sample TW-03D-1020. The two results were qualified as estimated detects, flagged “J”.
  - Dissolved iron was recovered at concentrations less than QC limits in the MS, MSD, or PDS in the spikes associated with 26 samples. The results were qualified as estimated detects and non-detects, flagged “J” or “UJ” accordingly.
  - Dissolved magnesium was recovered at concentrations greater than QC limits in the MS and PDS associated with sample TW-03D-1020. The result was qualified as estimated detects, flagged “J”.
  - Iron was recovered at concentrations less than QC limits in the MS, MSD, or PDS in the spikes associated with 26 samples. Additionally, the relative percent difference between the MS/MSD did not meet criteria in one spike pair. The results were qualified as estimated detects, flagged “J”.
  - Dissolved barium was recovered at concentrations less than QC limits in the MS, MSD, and PDS in the spikes associated with 25 samples. The results were qualified as estimated detects, flagged “J”.
  - Dissolved selenium was recovered at concentrations greater than QC limits in the MS associated with the preparation batch. Five sample results were qualified as estimated detects, flagged “J”.
- Field duplicate samples
  - Dissolved molybdenum demonstrated relative percent differences greater than QC criteria for the field duplicate pair of samples MW-44-115-Q320/MW-907-Q320 and iron in the field duplicate pairs of C-MAR-D-Q320/MW-908-Q320 and C-R27-S-Q320/MW-909-Q320. The associated results were qualified as estimated detects and flagged “J”.

# 4 THIRD QUARTER 2020 IM PERFORMANCE MONITORING PROGRAM EVALUATION

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

## 4.1 Distribution of Hexavalent Chromium in the Floodplain

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

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

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

## 4.2 IM Extraction System Operation

During Third Quarter 2020, IM extraction well TW-03D was operated at an average pumping rate of 121.7 gallons per minute (gpm) to support hydraulic control (Table 4-1). The target pumping rate was 135 gpm. Extraction well PE-01 was not operated. The average monthly pumping rates were 127.3 gpm (July 2020), 108.8 gpm (August 2020), 121.6 gpm (September 2020), and 129.0 gpm (October 2020). Table 4-1 shows the average pumping rates and total groundwater volumes pumped during Third Quarter 2020.

The IM-3 system extracted and treated 21,547,124 gallons of groundwater during Third Quarter 2020, and an estimated 68.3 pounds (31.0 kilograms) of chromium were removed from the aquifer between June 1 and September 30, 2020 (Table 4-1). Note that groundwater extraction is reported on a different schedule than chromium removal reporting (i.e., July through October and June through September, respectively; Table 4-1). The operational runtime percentage for the IM-3 system during Third Quarter 2020 was 91.4 percent. Appendix E provides the operations log for the IM-3 system including planned and unplanned downtime.

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

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

## 4.3 IM Hydraulic Monitoring Results

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

**Hydraulic Gradient Evaluation: California Floodplain**

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

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

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

As discussed in Section 1.4.2.3, a landward hydraulic gradient of 0.001 ft/ft must be maintained to demonstrate compliance with the performance standard. Table 4-4 presents the monthly average hydraulic gradients measured for each of the gradient well pairs in Third Quarter 2020, as well as the overall average of all well pairs. The overall monthly average gradients for all well pairs were 0.0040, 0.0039, 0.0042, and 0.0036 ft/ft for July, August, September, and October 2020, respectively. Landward gradients measured each month exceeded the 0.001 ft/ft requirement, as shown in Table 4-4. Figure 4-5 illustrates the measured hydraulic gradients during Third Quarter 2020 with the concurrent Colorado River elevations and IM-3 pumping rates.

**Hydraulic Gradient Evaluation: Arizona Side of the Colorado River**

During Third Quarter 2020, pressure transducer data were recorded in five wells located on the Arizona side of the Colorado River. The average quarterly groundwater elevations for monitoring wells MW-54-085, MW-54-140, MW-54-195, MW-55-045, and MW-55-120 are presented on Figures 4-3b and 4-3c and are used for contouring where appropriate. Except for well MW-55-045, all wells in the MW-54 and MW-55 clusters are screened in the deep interval of the Alluvial Aquifer. Well MW-55-045 is screened across

portions of the shallow and middle intervals (Figure 4-3b). Average quarterly water levels at the MW-54 and MW-55 well clusters indicate that water level elevations in monitoring wells in Arizona are higher than those in wells across the river on the California floodplain. This indicates that the apparent hydraulic gradient on the Arizona side of the river is westward and, as a result, groundwater flow would also be toward the west in that area. This is consistent with the site conceptual model and with the current numerical groundwater flow model.

## 4.4 IM Contingency Plan Monitoring Results

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

## 4.5 Projected River Levels During Next Quarter

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

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

Current USBR projections, presented in Table 4-6, show that the projected Davis Dam release for November 2020 is 9,900 cubic feet per second, and the predicted Colorado River elevation at the I-3 gauge is 454.26 feet above mean sea level.

## 4.6 Third Quarter 2020 Performance Monitoring Program Evaluation Summary

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

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

- IM extraction well TW-03D was operated to support hydraulic control. A total of 21,547,124 gallons of groundwater were extracted by the IM-3 system, and an estimated 68.3 pounds (31.0 kilograms) of chromium were removed from groundwater.
- Cr(VI) and dissolved chromium concentrations in monitoring wells located within 800 feet of extraction well TW-03D were lower than their established notification levels. The shutdown of extraction well PE-01 was continued through the end of the reporting period.
- Groundwater potentiometric surface maps and the gradient analysis from designated well pairs provide evidence of hydraulic containment of the Cr(VI) plume. The overall monthly average landward gradients in Third Quarter 2020 were approximately 3.6 to 4.2 times the required minimum magnitude of 0.001 ft/ft, respectively.
- Cr(VI) concentrations in the IMCP monitoring wells were lower than their established trigger levels, indicating that chromium concentrations did not increase at areas of interest across the site.

# 5 UPCOMING OPERATION AND MONITORING EVENTS

GMP, RMP, and PMP monitoring will continue under direction from the DTSC in Fourth Quarter 2020. Monitoring and results will be reported in the Fourth Quarter 2020 and Annual PMP-GMP Report (planned for submittal by March 15, 2021).

## 5.1 Groundwater Monitoring Program

### 5.1.1 Monthly Groundwater Monitoring

Monthly GMP monitoring events are planned for November and December 2020 at extraction wells TW-03D and PE-01; however, PE-01 may be inaccessible in Fourth Quarter 2020 due to construction associated with the final groundwater remedy at the site.

### 5.1.2 Quarterly Groundwater Sampling

The quarterly GMP monitoring event is planned for November and December 2020. This event will consist of groundwater sampling and inspection of 143 monitoring wells. Any necessary corrective actions to monitoring wells will be performed in a timely manner.

If rainfall in Fourth Quarter 2020 causes surface water flow in Bat Cave Wash, monitoring wells MW-09, MW-10, and MW-11 will be sampled.

## 5.2 Surface Water Monitoring Program

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

## 5.3 IM Performance Monitoring Program

### 5.3.1 Chromium Monitoring

Chromium will be monitored as part of the Fourth Quarter 2020 GMP monthly and quarterly monitoring events. Cr(VI) data will be collected from a total of 143 monitoring wells.

### 5.3.2 IM Extraction System Operation

During Fourth Quarter 2020, the IM-3 system will continue operating, and operations will be documented. IM extraction well TW-03D will be pumped a target rate of 135 gpm, except during periods of planned and unplanned downtime, to maintain appropriate hydraulic gradients across the Alluvial Aquifer. If TW-03D cannot achieve the target pumping rate of 135 gpm, then PE-01, TW-02D, and/or TW-02S may be pumped to supplement TW-03D and achieve total flow.

Fourth Quarter 2020 GMP monitoring results from wells listed in the July 20, 2015 DTSC approval letter for conditional PE-01 shutdown (DTSC 2015) will be compared to the 2014 (or 2013 for wells sampled

biennially) maximum Cr(VI) and dissolved chromium concentrations. Results that exceed the notification levels will be reported to the DTSC within 40 days after the end of the quarterly GMP sampling event.

### 5.3.3 IM Hydraulic Monitoring

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

### 5.3.4 IM Contingency Plan Monitoring

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

## 5.4 Quarterly Notifications

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

## 5.5 Monitoring Well Installation

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

# 6 REFERENCES

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

Arcadis. 2020b. Second Quarter 2020 Interim Measures Performance Monitoring and Site-Wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles, California. August 15.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

# TABLES

**Table 1-1**

**Topock Monitoring Reporting Schedule**

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

*PG&E Topock Compressor Station, Needles, California*

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

**Notes:**

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

* = Monitoring consists of collecting hexavalent chromium and/or dissolved chromium data from groundwater monitoring wells; these data are collected during the GMP monitoring event.

GMP = Groundwater Monitoring Program.

DTSC = Department of Toxic Substance Control.

IM = interim measure.

RMP = Surface Water Monitoring Program.

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

| Location ID | Site Area | Measuring Point Elevation (ft amsl) | Well Screen Interval (ft bgs) | Well Screen Lithology | Well Casing Diameter (inches) | Well Depth (ft bgs) | Aquifer Zone | Sampling Method | GMP Monitoring Frequency | RMP Monitoring Frequency | PMP Monitoring: Chromium Monitoring Frequency | PMP Monitoring: Monitoring Frequency for Conditional Shutdown of PE-01 | PMP Monitoring: IM Hydraulic Monitoring Frequency | PMP Monitoring: IM Contingency Plan Monitoring Frequency | PMP Monitoring: IM Chemical Performance Monitoring Frequency | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-09 | Bat Cave Wash | 536.56 | 77 - 87 | Alluvial | 4 in PVC | 89.4 | Shallow | LF | Semiannual | -- | Semiannual | -- | -- | -- | -- | Bat Cave Wash flow |
| MW-10 | Bat Cave Wash | 530.65 | 74 - 94 | Alluvial | 4 in PVC | 96.9 | Shallow | LF | Semiannual | -- | Semiannual | -- | -- | -- | -- | Bat Cave Wash flow |
| MW-11 | Bat Cave Wash | 522.54 | 62.5 - 82.5 | Alluvial | 4 in PVC | 86.1 | Shallow | LF | Semiannual | -- | Semiannual | -- | -- | -- | -- | Bat Cave Wash flow |
| MW-12 | East of Station | 484.01 | 27.5 - 47.5 | Alluvial | 4 in PVC | 50.4 | Shallow | LF | Semiannual | -- | Semiannual | -- | -- | -- | -- | |
| MW-13 | Bat Cave Wash | 486.67 | 28.5 - 48.5 | Alluvial | 4 in PVC | 52.0 | Shallow | LF | Annual | -- | Annual | -- | -- | -- | -- | |
| MW-14 | East Mesa | 570.99 | 111 - 131 | Alluvial | 4 in PVC | 133.8 | Shallow | LF | Semiannual | -- | Semiannual | -- | -- | -- | -- | |
| MW-15 | East of New Ponds | 641.52 | 180.5 - 200.5 | Alluvial | 4 in PVC | 203.0 | Shallow | LF | Annual | -- | Annual | -- | -- | -- | -- | |
| MW-16 | Near New Ponds | 657.31 | 198 - 218 | Alluvial | 4 in PVC | 218.1 | Shallow | LF | Biennial | -- | Biennial | -- | -- | -- | -- | |
| MW-17 | West of Mesa Area | 589.96 | 130 - 150 | Alluvial | 4 in PVC | 153.6 | Shallow | LF | Biennial | -- | Biennial | -- | -- | -- | -- | |
| MW-18 | West Mesa | 543.19 | 85 - 105 | Alluvial | 4 in PVC | 106.7 | Shallow | LF | Annual | -- | Annual | -- | -- | -- | -- | |
| MW-19 | Route 66 | 499.92 | 46 - 66 | Alluvial | 4 in PVC | 65.8 | Shallow | LF | Semiannual | -- | Semiannual | -- | -- | -- | -- | |
| MW-20-070 | MW-20 bench | 500.07 | 50 - 70 | Alluvial | 4 in PVC | 69.6 | Shallow | LF | Semiannual | -- | Semiannual | Semiannual | Monthly | -- | Annual | |
| MW-20-100 | MW-20 bench | 500.58 | 89.5 - 99.5 | Alluvial | 4 in PVC | 101.4 | Middle | LF | Semiannual | -- | Semiannual | Semiannual | Monthly | -- | Annual | |
| MW-20-130 | MW-20 bench | 500.66 | 121 - 131 | Alluvial | 4 in PVC | 132.3 | Deep | LF | Semiannual | -- | Semiannual | Semiannual | Monthly | -- | Annual | Hydraulic Gradient Well |
| MW-21 | Route 66 | 505.55 | 39 - 59 | Alluvial | 4 in PVC | 58.5 | Shallow | LF | Semiannual | -- | Semiannual | -- | -- | Semiannual | -- | Low recharge well; typically purges dry at 1 casing volume |
| MW-22 | Floodplain | 460.72 | 5.5 - 10.5 | Fluvial | 2 in PVC | 12.4 | Shallow | LF | Semiannual | -- | Semiannual | -- | Monthly | -- | -- | |
| MW-23-060 | East Ravine | 504.08 | 50 - 60 | Bedrock | 2 in Sch 40 PVC | 60.2 | Bedrock | LF | Semiannual | -- | Semiannual | -- | -- | -- | -- | |
| MW-23-080 | East Ravine | 504.13 | 75 - 80 | Bedrock | 2 in Sch 40 PVC | 80.8 | Bedrock | LF | Semiannual | -- | Semiannual | -- | -- | -- | -- | |
| MW-24A | MW-24 Bench | 567.16 | 104 - 124 | Alluvial | 4 in PVC | 127.5 | Shallow | LF | Semiannual | -- | Semiannual | -- | -- | -- | -- | |
| MW-24B | MW-24 Bench | 564.76 | 193 - 213 | Alluvial | 4 in PVC | 214.8 | Deep | LF | Semiannual | -- | Semiannual | -- | -- | -- | -- | |
| MW-24BR | MW-24 Bench | 563.95 | 378 - 437 | Bedrock | 4 in PVC | 441.0 | Bedrock | 3V | Annual | -- | Annual | -- | -- | -- | -- | Low recharge well; typically purges dry at 1 casing volume |
| MW-25 | Near Bat Cave Wash | 542.90 | 84.5 - 104.5 | Alluvial | 4 in PVC | 106.5 | Shallow | LF | Semiannual | -- | Semiannual | -- | Monthly | -- | Annual | |
| MW-26 | Route 66 | 502.22 | 51.5 - 71.5 | Alluvial | 2 in PVC | 70.1 | Shallow | LF | Semiannual | -- | Semiannual | Semiannual | Monthly | -- | Biennial | |
| MW-27-020 | Floodplain | 460.56 | 7 - 17 | Fluvial | 2 in PVC | 14.4 | Shallow | LF | Annual | -- | Annual | Annual | Monthly | -- | -- | |
| MW-27-060 | Floodplain | 461.49 | 47.3 - 57.3 | Fluvial | 2 in PVC | 59.0 | Middle | LF | Annual | -- | Annual | Annual | Monthly | -- | -- | |
| MW-27-085 | Floodplain | 460.99 | 77.5 - 87.5 | Fluvial | 2 in PVC | 80.0 | Deep | LF | Semiannual | -- | Semiannual | Semiannual | Monthly | Semiannual | -- | Hydraulic Gradient Well |
| MW-28-025 | Floodplain | 466.77 | 13 - 23 | Fluvial | 2 in PVC | 21.1 | Shallow | LF | Semiannual | -- | Semiannual | Semiannual | Monthly | -- | -- | |
| MW-28-090 | Floodplain | 467.53 | 70 - 90 | Fluvial | 2 in PVC | 98.4 | Deep | LF | Semiannual | -- | Semiannual | Semiannual | Monthly | Semiannual | -- | |
| MW-29 | Floodplain | 485.21 | 29.5 - 39.5 | Fluvial | 2 in PVC | 41.5 | Shallow | LF | Semiannual | -- | Semiannual | -- | -- | -- | -- | |
| MW-30-030 | Floodplain | 468.12 | 12 - 32 | Fluvial | 2 in PVC | 26.9 | Shallow | LF | Annual | -- | Annual | Annual | -- | -- | -- | |
| MW-30-050 | Floodplain | 468.81 | 40 - 50 | Fluvial | 4 in PVC | 52.6 | Middle | LF | Annual | -- | Annual | Annual | Monthly | -- | -- | |
| MW-31-060 | MW-20 Bench | 496.81 | 41.5 - 61.5 | Alluvial | 4 in PVC | 64.0 | Shallow | LF | Semiannual | -- | Semiannual | Semiannual | Monthly | -- | Annual | |
| MW-31-135 | MW-20 Bench | 498.11 | 113 - 133 | Alluvial | 2 in PVC | 135.4 | Deep | LF | Annual | -- | Annual | Annual | Monthly | -- | -- | Hydraulic Gradient Well |
| MW-32-020 | Floodplain | 461.51 | 10 - 20 | Fluvial | 2 in PVC | 19.6 | Shallow | LF | Annual | -- | Annual | Annual | -- | Annual | -- | |
| MW-32-035 | Floodplain | 461.63 | 27.5 - 35 | Fluvial | 4 in PVC | 37.2 | Shallow | LF | Semiannual | -- | Semiannual | Semiannual | Monthly | Semiannual | Annual | |
| MW-33-040 | Floodplain | 487.38 | 29 - 39 | Fluvial | 2 in PVC | 41.8 | Shallow | LF | Semiannual | -- | Semiannual | Semiannual | Monthly | Semiannual | -- | |
| MW-33-090 | Floodplain | 487.55 | 69 - 89 | Alluvial | 4 in PVC | 88.3 | Middle | LF | Semiannual | -- | Semiannual | Semiannual | Monthly | Semiannual | -- | |
| MW-33-150 | Floodplain | 487.77 | 132 - 152 | Alluvial | 2 in PVC | 155.4 | Deep | LF | Semiannual | -- | Semiannual | Semiannual | Monthly | Semiannual | -- | Hydraulic Gradient Well |
| MW-33-210 | Floodplain | 487.25 | 190 - 210 | Alluvial | 2 in PVC | 223.0 | Deep | LF | Semiannual | -- | Semiannual | Semiannual | -- | Semiannual | -- | |
| MW-34-055 | Floodplain | 460.95 | 45 - 55 | Fluvial | 4 in PVC | 56.6 | Middle | LF | Annual | -- | Annual | Annual | Monthly | -- | Annual | |
| MW-34-080 | Floodplain | 461.20 | 73 - 83 | Fluvial | 4 in PVC | 84.3 | Deep | LF | Semiannual | -- | Semiannual | Semiannual | Monthly | Semiannual | Annual | |
| MW-34-100 | Floodplain | 460.97 | 89.5 - 99.5 | Fluvial | 2 in PVC | 117.0 | Deep | LF | Quarterly | -- | Quarterly | Quarterly | Monthly | Quarterly | Annual | Hydraulic Gradient Well |
| MW-35-060 | Route 66 | 484.33 | 41 - 61 | Alluvial | 2 in PVC | 56.8 | Shallow | LF | Semiannual | -- | Semiannual | -- | Monthly | -- | -- | |
| MW-35-135 | Route 66 | 484.24 | 116 - 136 | Alluvial | 2 in PVC | 158.7 | Deep | LF | Semiannual | -- | Semiannual | -- | Monthly | -- | -- | |
| MW-36-020 | Floodplain | 469.33 | 10 - 20 | Fluvial | 1 in PVC | 20.3 | Shallow | LF | Annual | -- | Annual | Annual | Monthly | -- | -- | |
| MW-36-040 | Floodplain | 469.59 | 30 - 40 | Fluvial | 1 in PVC | 40.3 | Shallow | LF | Annual | -- | Annual | Annual | Monthly | -- | -- | |
| MW-36-050 | Floodplain | 469.62 | 46 - 51 | Fluvial | 1 in PVC | 108.0 | Middle | LF | Annual | -- | Annual | Annual | Monthly | -- | -- | |
| MW-36-070 | Floodplain | 469.27 | 60 - 70 | Fluvial | 1 in PVC | 70.3 | Middle | LF | Annual | -- | Annual | Annual | Monthly | Annual | -- | |
| MW-36-090 | Floodplain | 469.64 | 80 - 90 | Fluvial | 1 in PVC | 90.3 | Deep | LF | Semiannual | -- | Semiannual | Semiannual | Monthly | -- | -- | |
| MW-36-100 | Floodplain | 469.65 | 88 - 98 | Fluvial | 2 in PVC | 108.0 | Deep | LF | Semiannual | -- | Semiannual | Semiannual | Monthly | -- | -- | |
| MW-37D | Bat Cave Wash | 486.19 | 180 - 200 | Alluvial | 2 in PVC | 226.7 | Deep | LF | Semiannual | -- | Semiannual | -- | -- | -- | -- | |
| MW-37S | Bat Cave Wash | 485.97 | 64 - 84 | Alluvial | 2 in PVC | 85.0 | Middle | LF | Annual | -- | Annual | -- | -- | -- | -- | |
| MW-38D | Bat Cave Wash | 525.31 | 163 - 183 | Alluvial | 2 in PVC | 190.9 | Deep | LF | Semiannual | -- | Semiannual | -- | -- | -- | -- | |
| MW-38S | Bat Cave Wash | 526.59 | 75 - 95 | Alluvial | 2 in PVC | 98.1 | Shallow | LF | Quarterly | -- | Quarterly | -- | -- | -- | -- | |
| MW-39-040 | Floodplain | 468.02 | 30 - 40 | Fluvial | 1 in PVC | 42.1 | Shallow | LF | Annual | -- | Annual | Annual | Monthly | Annual | -- | |
| MW-39-050 | Floodplain | 467.93 | 47 - 52 | Fluvial | 1 in PVC | 54.6 | Middle | LF | Annual | -- | Annual | Annual | Monthly | -- | -- | |
| MW-39-060 | Floodplain | 468.00 | 49 - 59 | Alluvial | 1 in PVC | 15.2 | Middle | LF | Annual | -- | Annual | Annual | Monthly | -- | -- | |
| MW-39-070 | Floodplain | 468.02 | 60 - 70 | Alluvial | 1 in PVC | 71.7 | Middle | LF | Annual | -- | Annual | Annual | Monthly | -- | -- | |
| MW-39-080 | Floodplain | 467.92 | 70 - 80 | Alluvial | 1 in PVC | 82.6 | Deep | LF | Annual | -- | Annual | Annual | Monthly | -- | -- | |
| MW-39-100 | Floodplain | 468.12 | 80 - 100 | Alluvial | 2 in PVC | 117.7 | Deep | LF | Semiannual | -- | Semiannual | Semiannual | Monthly | -- | -- | |
| MW-40D | I-40 Median | 566.08 | 240 - 260 | Alluvial | 2 in PVC | 266.0 | Deep | LF | Semiannual | -- | Semiannual | -- | -- | -- | -- | |
| MW-40S | I-40 Median | 566.04 | 115 - 135 | Alluvial | 2 in PVC | 134.0 | Shallow | H | Semiannual | -- | Semiannual | -- | -- | -- | -- | |

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

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

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

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

**Table 3-1**

**Groundwater Sampling Results, Third Quarter 2020**

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

| Location ID | Aquifer Zone | Sample Date | Sample Type | Sample Method | Hexavalent Chromium (µg/L) | Dissolved Chromium (µg/L) | Specific Conductance (µS/cm) | Dissolved Molybdenum (µg/L) | Dissolved Selenium (µg/L) | Nitrate/Nitrite as Nitrogen (mg/L) | Dissolved Arsenic (µg/L) | Dissolved Manganese (µg/L) | Dissolved Iron (µg/L) | ORP (mV) | Field pH (SU) | Turbidity (NTU) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-34-100 | DA | 10/1/2020 | | LF | ND (0.2) | ND (1.0) | 8,500 | 85 | ND (0.5) | ND (0.05) | ND (0.1) | 190 | -- | 38 | 7.1 | 8 |
| MW-38S-SMT | SA | 9/30/2020 | | LF | 4.5 | 5.4 | 1,600 | 22 | 3.9 J | 6 | 6.3 | 140 | -- | 110 | 7.4 | 8 |
| MW-44-115 | DA | 10/1/2020 | | LF | 3.4 | 4.1 | 9,600 | 55 J | ND (0.5) | ND (0.05) | 2.2 | 6.5 | -- | -19 | 7.3 | 6 |
| MW-44-115 | DA | 10/1/2020 | FD | -- | 3.4 | 3.9 | 9,300 | 84 J | ND (0.5) | ND (0.05) | 1.9 | 5.9 | -- | -- | -- | -- |
| MW-46-175 | DA | 10/1/2020 | | LF | 5.1 | 5.5 | 16,000 | 190 | 1.0 | 0.92 | -- | -- | -- | 100 | 7.2 | 8 |
| MW-58BR | BR | 9/29/2020 | | LF | 3.9 | 4.5 | 6,000 | 29 | 2.0 | 0.39 | 1.00 | 290 | -- | -22 | 7.9 | 5 |
| MW-60BR-245 | BR | 9/30/2020 | | LF | 21 | 22 | 17,000 | 63 | 3.4 J | 0.18 | ND (0.1) | 2.0 | -- | -64 | 8 | 5 |
| MW-62-065 | BR | 9/30/2020 | | LF | 590 | 610 | 6,000 | 13 | 4.7 J | 5.1 | ND (0.1) | 3.3 | -- | 13 | 7.6 | 10 |
| MW-62-110 | BR | 9/30/2020 | | LF | ND (1.0) | ND (1.0) | 12,000 | 47 | ND (0.5) | ND (0.05) | ND (0.1) | 140 | -- | -81 | 7.1 | 4 |
| MW-63-065 | BR | 9/30/2020 | | LF | 1.3 | 2.3 | 6,800 | 17 | 1.3 J | 2.4 | ND (0.1) | 1.7 | -- | -8.8 | 7.3 | 10 |
| MW-64BR | BR | 9/30/2020 | | LF | ND (1.0) | ND (1.0) | 13,000 | 66 | ND (0.5) | ND (0.05) | ND (0.1) | 1,000 | -- | -140 | 7.7 | 3 |
| MW-65-160 | SA | 9/29/2020 | | LF | 240 | 240 | 3,800 | 26 | 9.7 | 13 | 0.35 | 29 | -- | 7 | 7.7 | 31 |
| MW-65-225 | DA | 9/29/2020 | | LF | 260 | 250 | 12,000 | 43 | 3.7 | 4 | ND (0.1) | 45 | -- | -36 | 7.8 | 29 |
| MW-68-180 | SA | 9/29/2020 | | LF | 54,000 | 51,000 | 4,900 | 57 | 28 | 35 | 2.4 | 6.9 | -- | 42 | 7.6 | 47 |
| MW-69-195 | BR | 9/29/2020 | | LF | 350 | 380 | 2,500 | 58 | 10 | 20 | 3.3 | 160 | -- | 3 | 7.9 | 40 |
| MW-72-080 | BR | 9/29/2020 | | LF | 79 | 75 | 13,000 | 81 | 1.4 | 0.59 | 6.8 | 86 | -- | -20 | 7.9 | 5 |
| MW-72BR-200 | BR | 9/29/2020 | | LF | ND (1.0) | 1.7 | 14,000 | 83 | ND (0.5) | ND (0.05) | 13 | 150 | -- | -110 | 8.3 | 4 |
| MW-73-080 | BR | 9/30/2020 | | LF | 18 | 21 | 6,400 | 47 | 4.6 J | 4.5 | 0.29 | 8.3 | -- | 27 | 7.5 | 8 |
| TW-03D | DA | 7/23/2020 | | Tap | 390 | 410 | 7,000 | -- | -- | 2.3 | -- | 19 | ND (20) | 110 | 7.4 | 6 |
| TW-03D | DA | 8/4/2020 | | Tap | 440 | 430 | 7,200 | -- | -- | 2.5 | -- | 19 | ND (100) | 140 | 8.2 | 3 |
| TW-03D | DA | 9/1/2020 | | Tap | 430 | 420 | 7,000 | -- | -- | 2.9 | -- | 20 | 36 J | 120 | 7.3 | 3 |
| TW-03D | DA | 10/7/2020 | | Tap | 420 | 400 | 7,000 | -- | -- | 2.8 | -- | 19 | 93 J | 153 | 7.3 | 4 |

**Notes:**

1. Beginning February 1, 2008, hexavalent chromium samples are field-filtered per DTSC-approved change from analysis Method SW7199 to E218.6.
2. The following analytical methods were used:
   Hexavalent chromium = USEPA Method 218.6
   Dissolved chromium, dissolved molybdenum, dissolved selenium, dissolved arsenic, dissolved manganese = Method SW6020
   Specific conductance = USEPA Method 120.1
   Nitrate/Nitrate as Nitrogen = SM 4500-NO3 F
3. Monitoring wells MW-57-050 and MW-58-065 were dry during the Third Quarter 2020 sampling event. Extraction wells PE-01 and TW-02D were not sampled in Third Quarter 2020 due to construction activities associated with the final groundwater remedy at the site.

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

**Table 3-2**

**Surface Water Sampling Results, Third Quarter 2020**

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

| Location ID | Sample Date | Sample Type | Hexavalent Chromium (µg/L) | Dissolved Chromium (µg/L) | Field pH (SU) | Specific Conductance (µS/cm) | Dissolved Molybdenum (µg/L) | Dissolved Selenium (µg/L) | Nitrate/Nitrite as Nitrogen (mg/L) | Dissolved Arsenic (µg/L) | Dissolved Iron (µg/L) | Iron (µg/L) | Dissolved Manganese (µg/L) | Dissolved Barium (µg/L) | Total Suspended Solids (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C-BNS | 8/19/2020 | | ND (0.2) | ND (1.0) | 8.4 | 880 | 4.7 | 1.5 | 0.39 | 2.6 | 23 J | 51 J | 0.54 | 120 J | ND (5.0) |
| C-CON-D | 8/20/2020 | | ND (0.2) | ND (1.0) | 8.6 | 820 | 4.8 | 1.6 | 0.43 | 2.6 | ND (20 J) | 32 J | 2.1 | 110 J | ND (5.0) |
| C-CON-S | 8/20/2020 | | ND (0.2) | ND (1.0) | 8.5 | 770 | 4.5 | 1.4 | 0.39 | 2.5 | ND (20 J) | 25 J | 0.62 | 110 J | ND (5.0) |
| C-I-3-D | 8/19/2020 | | ND (0.2) | ND (1.0) | 8.7 | 860 | 4.8 | 1.6 | 0.38 | 2.6 | 51 J | 56 J | 0.62 | 120 J | ND (5.0) |
| C-I-3-S | 8/19/2020 | | ND (0.2 J) | ND (1.0) | 8.5 | 880 | 4.7 | 1.6 | 0.46 | 2.5 | 38 J | 40 J | ND (0.5) | 120 J | ND (5.0) |
| C-MAR-D | 8/20/2020 | | ND (0.2) | ND (1.0) | 8.7 | 840 | 4.7 | 1.5 | 0.35 | 2.5 | ND (20 J) | 150 J | 3.8 | 110 J | 9.0 |
| C-MAR-D | 8/20/2020 | FD | ND (0.2) | ND (1.0) | -- | 800 | 4.8 | 1.6 | 0.36 | 2.4 | ND (20 J) | 200 J | 2.5 | 110 J | 5.5 |
| C-MAR-S | 8/20/2020 | | ND (0.2) | ND (1.0) | 8.8 | 790 | 4.9 | 1.5 | 0.39 | 2.6 | ND (20 J) | 200 J | 5.5 | 110 J | 11 |
| C-NR1-D | 8/20/2020 | | ND (0.2) | ND (1.0) | 8.5 | 750 | 4.6 | 1.5 | 0.35 | 2.4 | 200 J | 150 J | 0.51 | 110 | ND (5.0) |
| C-NR1-S | 8/20/2020 | | ND (0.2) | ND (1.0) | 8.4 | 780 | 4.5 | 1.5 | 0.37 | 2.4 | ND (20 J) | 22 J | 0.59 | 110 J | ND (5.0) |
| C-NR3-D | 8/20/2020 | | ND (0.2) | ND (1.0) | 8.5 | 800 | 4.6 | 1.4 | 0.39 | 2.4 | ND (20 J) | 25 J | 0.6 | 110 J | ND (5.0) |
| C-NR3-S | 8/20/2020 | | ND (0.2) | ND (1.0) | 8.4 | 800 | 4.6 | 1.5 | 0.38 | 2.4 | ND (20 J) | 22 J | 0.57 | 110 J | ND (5.0) |
| C-NR4-D | 8/20/2020 | | ND (0.2 J) | ND (1.0) | 8.4 | 850 | 4.7 | 1.5 | 0.44 | 2.4 | ND (20 J) | 21 J | 0.71 | 110 J | ND (5.0) |
| C-NR4-D | 8/20/2020 | FD | ND (0.2) | ND (1.0) | -- | 780 | 4.7 | 1.6 | 0.54 | 2.4 | ND (20 J) | 27 J | 1.0 | 110 J | ND (5.0) |
| C-NR4-S | 8/20/2020 | | ND (0.2) | ND (1.0) | 8.3 | 820 | 4.7 | 1.5 | 0.43 | 2.5 | ND (20 J) | 31 J | 0.65 | 110 J | ND (5.0) |
| C-R22A-D | 8/19/2020 | | ND (0.2) | ND (1.0) | 8.5 | 800 | 4.6 | 1.4 | 0.32 | 2.4 | 37 J | 47 J | 0.65 | 110 J | ND (5.0) |
| C-R22A-S | 8/19/2020 | | ND (0.2) | ND (1.0) | 8.4 | 820 | 4.8 | 1.4 | 0.3 | 2.6 | ND (20 J) | 58 J | 0.74 | 110 J | ND (5.0) |
| C-R27-D | 8/19/2020 | | ND (0.2) | ND (1.0) | 8.4 | 860 | 4.6 | 1.5 | 0.34 | 2.4 | 23 J | 54 J | 0.67 | 110 J | ND (5.0) |
| C-R27-S | 8/19/2020 | | ND (0.2 J) | ND (1.0) | 8.4 | 850 | 4.6 | 1.4 | 0.34 | 2.4 | 22 J | 58 J | 0.6 | 110 J | ND (5.0) |
| C-R27-S | 8/19/2020 | FD | ND (0.2 J) | ND (1.0) | -- | 870 | 4.9 | 1.5 | 0.36 | 2.6 | 26 J | 190 J | 0.69 | 120 J | ND (5.0) |
| C-TAZ-D | 8/19/2020 | | ND (0.2) | ND (1.0) | 8.7 | 880 | 4.6 | 1.5 | 0.35 | 2.5 | ND (20 J) | 53 J | ND (0.5) | 120 J | ND (5.0) |
| C-TAZ-S | 8/19/2020 | | ND (0.2) | ND (1.0) | 8.9 | 860 | 4.6 | 1.5 | 0.43 | 2.5 | ND (20 J) | 39 J | 0.52 | 110 J | ND (5.0) |
| R-19 | 8/20/2020 | | ND (0.2) | ND (1.0) | 8.7 | 800 | 4.5 | 1.5 | 0.36 | 2.5 | ND (20 J) | 41 J | 0.72 | 110 J | ND (5.0) |
| R-28 | 8/19/2020 | | ND (0.2) | ND (1.0) | 8.4 | 860 | 4.7 | 1.5 | 0.37 | 2.5 | 41 J | 38 J | 0.95 | 110 J | ND (5.0) |
| R63 | 8/19/2020 | | ND (0.2 J) | ND (1.0) | 8.5 | 830 | 4.9 | 1.5 | 0.35 | 2.6 | ND (20 J) | 28 J | 2.4 | 120 J | ND (5.0) |
| RRB | 8/20/2020 | | ND (0.2) | ND (1.0) | 8.3 | 850 | 4.7 | 1.4 | 0.25 | 2.3 | ND (20 J) | 30 J | 7.1 | 110 J | ND (5.0) |
| SW1 | 8/20/2020 | | ND (0.2) | ND (1.0) | 8.3 | 880 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| SW2 | 8/20/2020 | | ND (0.2) | ND (1.0) | 8.4 | 850 | -- | -- | -- | -- | -- | -- | -- | -- | -- |

**Notes:**

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

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

**Table 4-1**

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

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

*PG&E Topock Compressor Station, Needles, California*

| Extraction Well ID | July 2020 Average Pumping Rate[a] (gpm) | July 2020 Volume Pumped (gal) | August 2020 Average Pumping Rate[a] (gpm) | August 2020 Volume Pumped (gal) | September 2020 Average Pumping Rate[a] (gpm) | September 2020 Volume Pumped (gal) | October 2020 Average Pumping Rate[a] (gpm) | October 2020 Volume Pumped (gal) | Third Quarter 2020 Average Pumping Rate[a] (gpm) | Third Quarter 2020 Volume Pumped (gal) |
|---|---|---|---|---|---|---|---|---|---|---|
| TW-02S | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 |
| TW-02D | 0.00 | 0 | 0.01 | 302 | 0.00 | 0 | 0.00 | 0 | 0.00 | 302 |
| TW-03D | 127.25 | 5,680,458 | 108.76 | 4,855,216 | 121.56 | 5,251,265 | 129.03 | 5,759,883 | 121.65 | 21,546,822 |
| PE-01 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 |
| **TOTAL** | **127.3** | **5,680,458** | **108.8** | **4,855,518** | **121.6** | **5,251,265** | **129.0** | **5,759,883** | **121.7** | **21,547,124** |

| | |
|---|---|
| Chromium Removed This Quarter (kg) | 31.0 |
| Chromium Removed Project to Date (kg) | 4,460 |
| Chromium Removed This Quarter (lb) | 68.3 |
| Chromium Removed Project to Date (lb) | 9,830 |

**Notes:**

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

1. Chromium removed includes the period of July 1, 2020 through October 31, 2020.

gal = gallons.

gpm = gallons per minute.

ID = identification.

IM = Interim Measure.

kg = kilograms.

lb = pounds.

**Table 4-2**

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

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

*PG&E Topock Compressor Station, Needles, California*

| Location ID | Aquifer Zone | Q3 2020 Sample Date | Q3 2020 Sample Method | Hexavalent Chromium 2014 Maximum Concentration (µg/L) | Hexavalent Chromium Q3 2020 Result (µg/L) | Dissolved Chromium 2014 Maximum Concentration (µg/L) | Dissolved Chromium Q3 2020 Result (µg/L) | Q3 2020 Result Exceeded 2014 Maximum Concentration? |
|---|---|---|---|---|---|---|---|---|
| MW-20-070 | Shallow | -- | -- | 2,200 | -- | 2,400 | -- | -- |
| MW-26 | Shallow | -- | -- | 2,400 | -- | 2,300 | -- | -- |
| MW-27-020 | Shallow | -- | -- | ND (0.20) | -- | ND (1.0) | -- | -- |
| MW-28-025 | Shallow | -- | -- | ND (0.20) | -- | ND (1.0) | -- | -- |
| MW-30-030 | Shallow | -- | -- | 0.21 | -- | ND (1.0) | -- | -- |
| MW-31-060 | Shallow | -- | -- | 600 | -- | 660 | -- | -- |
| MW-32-020 | Shallow | -- | -- | ND (1.0) | -- | ND (5.0) | -- | -- |
| MW-32-035 | Shallow | -- | -- | ND (1.0) | -- | ND (1.0) | -- | -- |
| MW-33-040 | Shallow | -- | -- | 0.28 | -- | ND (1.0) | -- | -- |
| MW-36-020 | Shallow | -- | -- | ND (0.20) | -- | ND (1.0) | -- | -- |
| MW-36-040 | Shallow | -- | -- | 0.34 | -- | ND (1.0) | -- | -- |
| MW-39-040 | Shallow | -- | -- | ND (0.20) | -- | ND (1.0) | -- | -- |
| MW-42-030 | Shallow | -- | -- | 0.54 | -- | ND (1.0) | -- | -- |
| MW-47-055 | Shallow | -- | -- | 16 | -- | 16 | -- | -- |
| MW-20-100 | Middle | -- | -- | 2,900 | -- | 2,900 | -- | -- |
| MW-27-060 | Middle | -- | -- | ND (0.20) | -- | ND (1.0) | -- | -- |
| MW-30-050 | Middle | -- | -- | ND (0.20) | -- | ND (1.0) | -- | -- |
| MW-33-090 | Middle | -- | -- | 13.3 | -- | 15.5 | -- | -- |
| MW-34-055 | Middle | -- | -- | ND (0.20) | -- | ND (1.0) | -- | -- |
| MW-36-050 | Middle | -- | -- | ND (0.20) | -- | ND (1.0) | -- | -- |
| MW-36-070 | Middle | -- | -- | ND (0.20) | -- | ND (1.0) | -- | -- |
| MW-39-050 | Middle | -- | -- | ND (0.20) | -- | ND (1.0) | -- | -- |
| MW-39-060 | Middle | -- | -- | ND (0.20) | -- | ND (1.0) | -- | -- |
| MW-39-070 | Middle | -- | -- | ND (0.20) | -- | ND (1.0) | -- | -- |
| MW-42-055 | Middle | -- | -- | 0.35 | -- | 2.8 | -- | -- |
| MW-42-065 | Middle | -- | -- | ND (0.20) | -- | ND (1.0) | -- | -- |
| MW-44-070 | Middle | -- | -- | ND (0.20) | -- | ND (1.0) | -- | -- |
| MW-51 | Middle | -- | -- | 4,800 | -- | 4,800 | -- | -- |
| MW-20-130 | Deep | -- | -- | 9,100 | -- | 9,000 | -- | -- |
| MW-27-085 | Deep | -- | -- | ND (1.0) | -- | ND (1.0) | -- | -- |
| MW-28-090 | Deep | -- | -- | ND (0.20) | -- | ND (1.0) | -- | -- |
| MW-31-135 | Deep | -- | -- | 12 | -- | 12 | -- | -- |

**Table 4-2**

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

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

| Location ID | Aquifer Zone | Q3 2020 Sample Date | Q3 2020 Sample Method | Hexavalent Chromium 2014 Maximum Concentration (µg/L) | Hexavalent Chromium Q3 2020 Result (µg/L) | Dissolved Chromium 2014 Maximum Concentration (µg/L) | Dissolved Chromium Q3 2020 Result (µg/L) | Q3 2020 Result Exceeded 2014 Maximum Concentration? |
|---|---|---|---|---|---|---|---|---|
| MW-33-150 | Deep | -- | -- | 12 | -- | 10.8 | -- | -- |
| MW-33-210 | Deep | -- | -- | 13 | -- | 13.5 | -- | -- |
| MW-34-080 | Deep | -- | -- | ND (0.20) | -- | ND (1.0) | -- | -- |
| MW-34-100 | Deep | 10/01/2020 | LF | 263 | ND (0.2) | 270 | ND (1.0) | No |
| MW-36-090 | Deep | -- | -- | ND (0.20) | -- | ND (1.0) | -- | -- |
| MW-36-100 | Deep | -- | -- | 65 | -- | 62 | -- | -- |
| MW-39-080 | Deep | -- | -- | ND (0.20) | -- | ND (1.0) | -- | -- |
| MW-39-100 | Deep | -- | -- | 57 | -- | 49 | -- | -- |
| MW-44-115 | Deep | 10/01/2020 | LF | 41.6 | 3.4 | 42.9 | 4.1 | No |
| MW-44-125 | Deep | -- | -- | 4.0 J | -- | 5.9 | -- | -- |
| MW-45-095a | Deep | -- | -- | 13.7* | -- | 14.2* | -- | -- |
| MW-46-175 | Deep | 10/01/2020 | LF | 46.3 | 5.1 | 46.1 | 5.5 | No |
| MW-46-205 | Deep | -- | -- | 5.5 | -- | 4.8 | -- | -- |
| MW-47-115 | Deep | -- | -- | 24 | -- | 20 | -- | -- |
| PE-01 | Deep | -- | -- | 5.6 | -- | 6 | -- | -- |
| TW-04 | Deep | -- | -- | 7.4* | -- | 20 | -- | -- |

**Notes:**

1. Monitoring wells presented in the table are located within approximately 800 feet of TW-03D, as stated in DTSC 2015.
2. * = Result is the maximum concentration from 2013.
3. Values shown in parentheses are the reporting limit.
4. If a field duplicate sample was collected, the maximum concentration between the primary and field duplicate sample is presented.
5. On June 27, 2014, DTSC approved discontinuation of groundwater sampling at monitoring well MW-45-095a.
6. None of the results from the Third Quarter 2020 exceeded the 2013 and/or 2014 maximum concentration for hexavalent chromium and/or dissolved chromium.

-- = not applicable.
µg/L = micrograms per liter.
DTSC = Department of Toxic Substance Control.
ID = identification.
LF = low flow (minimal drawdown).
ND = not detected at listed reporting limit.
Q3 = third quarter.

**References:**

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

**Table 4-3**

**Groundwater Elevation Results, Third Quarter 2020**

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

*PG&E Topock Compressor Station, Needles, California*

| Location ID | Aquifer Zone | July Average Groundwater Elevation (ft amsl) | August Average Groundwater Elevation (ft amsl) | September Average Groundwater Elevation (ft amsl) | October Average Groundwater Elevation (ft amsl) | Quarterly Average Groundwater Elevation (ft amsl) | Days in Quarterly Average |
|---|---|---|---|---|---|---|---|
| MW-20-070 | Shallow | 454.38 | 454.40 | 454.15 | 453.79 | 454.18 | 123 |
| MW-22 | Shallow | 455.51 | 455.35 | 455.28 | 454.98 | 455.28 | 123 |
| MW-25 | Shallow | 456.12 | 455.99 | 455.87 | 455.70 | 455.92 | 123 |
| MW-26 | Shallow | 455.73 | 455.68 | 455.54 | 455.30 | 455.56 | 123 |
| MW-27-020 | Shallow | 456.09 | 455.75 | 455.70 | 455.19 | 455.68 | 123 |
| MW-28-025 | Shallow | 455.92 | 455.60 | 455.50 | 455.13 | 455.54 | 123 |
| MW-31-060 | Shallow | INC | 455.01 | 454.82 | 454.44 | 454.79 | 98 |
| MW-32-035 | Shallow | 455.75 | 455.46 | 455.35 | 454.93 | 455.37 | 123 |
| MW-33-040 | Shallow | 455.92 | 455.54 | 455.41 | 455.10 | 455.49 | 123 |
| MW-35-060 | Shallow | INC | 455.89 | 455.84 | 455.45 | 455.85 | 115 |
| MW-36-020 | Shallow | 455.87 | 455.57 | 455.25 | 455.04 | 455.43 | 123 |
| MW-36-040 | Shallow | 455.85 | 455.54 | 455.44 | 454.93 | 455.44 | 123 |
| MW-39-040 | Shallow | 455.55 | 455.34 | 455.14 | 454.66 | 455.17 | 123 |
| MW-42-030 | Shallow | 455.53 | 455.26 | 455.14 | 454.84 | 455.19 | 123 |
| MW-43-025 | Shallow | 455.87 | 455.57 | 455.49 | 455.13 | 455.52 | 123 |
| MW-47-055 | Shallow | 456.24 | 455.98 | INC | INC | INC | 63 |
| MW-20-100 | Middle | 453.82 | 453.91 | 453.59 | 453.19 | 453.63 | 123 |
| MW-27-060 | Middle | 456.15 | 455.83 | 455.74 | 455.27 | 455.75 | 123 |
| MW-30-050 | Middle | 455.57 | 455.31 | INC | 454.61 | INC | 89 |
| MW-33-090 | Middle | 455.95 | 455.71 | 455.59 | 455.23 | 455.62 | 123 |
| MW-34-055 | Middle | 456.13 | 455.76 | 455.70 | 455.22 | 455.70 | 123 |
| MW-36-050 | Middle | 455.76 | 455.43 | 455.30 | 454.85 | 455.34 | 123 |
| MW-36-070 | Middle | 455.73 | 455.53 | 455.41 | 454.95 | 455.40 | 123 |
| MW-39-050 | Middle | 455.37 | 455.17 | 455.01 | 454.62 | 455.04 | 123 |
| MW-39-060 | Middle | 455.17 | 454.94 | 454.84 | 454.46 | 454.85 | 123 |
| MW-39-070 | Middle | 454.46 | 454.49 | 454.24 | 453.80 | 454.25 | 123 |
| MW-42-065 | Middle | 455.63 | 455.37 | 455.24 | 454.83 | 455.27 | 123 |
| MW-44-070 | Middle | 455.78 | 455.51 | 455.39 | 454.93 | 455.40 | 123 |
| MW-50-095 | Middle | 455.72 | 455.65 | 455.52 | 455.21 | 455.52 | 116 |
| MW-51 | Middle | 455.32 | 455.30 | 455.10 | INC | INC | 91 |
| MW-55-045 | Middle | 456.69 | 456.43 | 456.41 | 456.21 | 456.44 | 123 |
| MW-20-130 | Deep | 453.22 | 453.41 | 453.03 | 452.62 | 453.07 | 123 |
| MW-27-085 | Deep | 455.97 | 455.70 | 455.59 | 455.08 | 455.58 | 123 |
| MW-28-090 | Deep | 455.82 | 455.55 | 455.42 | 455.07 | 455.47 | 123 |
| MW-31-135 | Deep | 454.58 | 454.54 | 454.40 | 454.00 | 454.38 | 123 |
| MW-33-150 | Deep | 456.04 | 456.57 | 456.47 | 455.38 | 456.11 | 123 |
| MW-34-080 | Deep | 456.38 | 456.17 | 455.74 | 455.40 | 455.92 | 123 |
| MW-34-100 | Deep | 455.97 | 455.76 | 455.63 | 455.12 | 455.62 | 123 |
| MW-35-135 | Deep | 455.92 | 455.68 | 455.57 | 455.29 | 455.61 | 121 |
| MW-36-090 | Deep | INC | INC | INC | INC | INC | 8 |
| MW-36-100 | Deep | 455.30 | 455.24 | 455.05 | 454.60 | 455.05 | 123 |
| MW-39-080 | Deep | 454.46 | 454.43 | INC | 453.59 | INC | 88 |
| MW-39-100 | Deep | 454.75 | 454.91 | 454.68 | 454.37 | 454.68 | 123 |
| MW-43-090 | Deep | 456.22 | 455.93 | INC | 455.01 | INC | 88 |
| MW-44-115 | Deep | INC | 455.15 | 454.98 | 454.54 | 454.93 | 95 |
| MW-44-125 | Deep | 455.79 | 455.50 | 455.35 | 454.97 | 455.40 | 123 |

**Table 4-3**

**Groundwater Elevation Results, Third Quarter 2020**

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

| Location ID | Aquifer Zone | July Average Groundwater Elevation (ft amsl) | August Average Groundwater Elevation (ft amsl) | September Average Groundwater Elevation (ft amsl) | October Average Groundwater Elevation (ft amsl) | Quarterly Average Groundwater Elevation (ft amsl) | Days in Quarterly Average |
|---|---|---|---|---|---|---|---|
| MW-45-095a | Deep | 455.55 | 455.39 | 455.21 | 454.74 | 455.22 | 123 |
| MW-46-175 | Deep | 456.03 | 455.82 | 455.75 | 455.21 | 455.69 | 119 |
| MW-47-115 | Deep | INC | INC | INC | 455.07 | INC | 40 |
| MW-49-135 | Deep | INC | 455.90 | INC | 455.29 | INC | 73 |
| MW-54-085 | Deep | 456.25 | 455.92 | 455.89 | 455.45 | 455.88 | 123 |
| MW-54-140 | Deep | 455.45 | INC | 455.32 | 454.92 | 455.23 | 96 |
| MW-54-195 | Deep | 456.11 | 455.86 | 455.79 | 455.46 | 455.81 | 123 |
| MW-55-120 | Deep | 456.65 | 456.41 | 456.41 | 456.29 | 456.44 | 123 |
| PT-2D | Deep | 454.12 | 454.12 | 453.85 | 453.44 | 453.88 | 123 |
| PT-5D | Deep | 455.12 | 455.02 | 454.81 | 454.44 | 454.85 | 123 |
| PT-6D | Deep | 454.98 | 454.91 | 454.67 | 454.28 | 454.71 | 123 |
| I-3 | Surface water | 456.50 | 456.15 | 456.13 | 455.64 | 456.11 | 123 |
| RRB | Surface water | INC | INC | INC | INC | INC | 0 |

**Notes:**

ft amsl = feet above mean sea level.
INC = data are incomplete; less than 75 percent of data were available during the reporting period due to rejection, field equipment malfunction, or inaccessibility.
ID = identification.

**Table 4-4**

**Average Hydraulic Gradients Measured at Well Pairs, Third Quarter 2020**

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

*PG&E Topock Compressor Station, Needles, California*

| Gradient Pair | Well Pair | Reporting Period | Mean Landward Hydraulic Gradient (feet/foot) | Days in Monthly Average | PE-01 Run for Gradient Control? |
|---|---|---|---|---|---|
| Overall Average | -- | July | 0.0040 | -- | No |
| Overall Average | -- | August | 0.0039 | -- | No |
| Overall Average | -- | September | 0.0042 | -- | No |
| Overall Average | -- | October | 0.0036 | -- | No |
| Northern Gradient Pair | MW-31-135 / MW-33-150 | July | 0.0031 | 31 | No |
| Northern Gradient Pair | MW-31-135 / MW-33-150 | August | 0.0043 | 31 | No |
| Northern Gradient Pair | MW-31-135 / MW-33-150 | September | 0.0044 | 30 | No |
| Northern Gradient Pair | MW-31-135 / MW-33-150 | October | 0.0029 | 31 | No |
| Central Gradient Pair (used when PE-01 is not run for gradient control) | MW-20-130 / MW-34-100 | July | 0.0048 | 31 | No |
| Central Gradient Pair (used when PE-01 is not run for gradient control) | MW-20-130 / MW-34-100 | August | 0.0041 | 31 | No |
| Central Gradient Pair (used when PE-01 is not run for gradient control) | MW-20-130 / MW-34-100 | September | 0.0045 | 30 | No |
| Central Gradient Pair (used when PE-01 is not run for gradient control) | MW-20-130 / MW-34-100 | October | 0.0044 | 31 | No |
| Southern Gradient Pair (used when PE-01 is not run for gradient control) | MW-20-130 / MW-27-085 | July | 0.0040 | 31 | No |
| Southern Gradient Pair (used when PE-01 is not run for gradient control) | MW-20-130 / MW-27-085 | August | 0.0033 | 31 | No |
| Southern Gradient Pair (used when PE-01 is not run for gradient control) | MW-20-130 / MW-27-085 | September | 0.0037 | 30 | No |
| Southern Gradient Pair (used when PE-01 is not run for gradient control) | MW-20-130 / MW-27-085 | October | 0.0036 | 31 | No |

**Notes:**

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

-- = not applicable

**Table 4-5**

**Interim Measure Contingency Plan Trigger Levels and Results, Third Quarter 2020**

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

*PG&E Topock Compressor Station, Needles, California*

| Location ID | Aquifer Zone | Q3 2020 Sample Date | Q3 2020 Sample Method | Hexavalent Chromium Trigger Level (µg/L) | Q3 2020 Hexavalent Chromium Result (µg/L) | Q3 2020 Result Exceeded Trigger Level? |
|---|---|---|---|---|---|---|
| MW-21 | Shallow | -- | -- | 20 | -- | -- |
| MW-27-085 | Deep | -- | -- | 20 | -- | -- |
| MW-28-090 | Deep | -- | -- | 20 | -- | -- |
| MW-32-020 | Shallow | -- | -- | 20 | -- | -- |
| MW-32-035 | Shallow | -- | -- | 20 | -- | -- |
| MW-33-040 | Shallow | -- | -- | 20 | -- | -- |
| MW-33-090 | Middle | -- | -- | 25 | -- | -- |
| MW-33-150 | Deep | -- | -- | 20 | -- | -- |
| MW-33-210 | Deep | -- | -- | 20 | -- | -- |
| MW-34-080 | Deep | -- | -- | 20 | -- | -- |
| MW-34-100 | Deep | 10/1/2020 | LF | 750 | ND (0.2) | No |
| MW-36-070 | Middle | -- | -- | 20 | -- | -- |
| MW-39-040 | Shallow | -- | -- | 20 | -- | -- |
| MW-42-055 | Middle | -- | -- | 20 | -- | -- |
| MW-42-065 | Middle | -- | -- | 20 | -- | -- |
| MW-43-075 | Deep | -- | -- | 20 | -- | -- |
| MW-43-090 | Deep | -- | -- | 20 | -- | -- |
| MW-44-070 | Middle | -- | -- | 20 | -- | -- |
| MW-44-115 | Deep | 10/1/2020 | LF | 1,200 | 3.4 | No |
| MW-44-125 | Deep | -- | -- | 475 | -- | -- |
| MW-46-175 | Deep | 10/1/2020 | LF | 225 | 5.1 | No |
| MW-46-205 | Deep | -- | -- | 20 | -- | -- |
| MW-47-055 | Shallow | -- | -- | 150 | -- | -- |
| MW-47-115 | Deep | -- | -- | 31 | -- | -- |

**Notes:**

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

-- = not applicable.
µg/L = micrograms per liter.
ID = identification.
LF = Low Flow (minimal drawdown).
ND = not detected at listed reporting limit.
Q3 = third quarter.

**Table 4-6**

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

*Third Quarter 2020 Interim Measures Performance Monitoring and Site-wide*

*Groundwater and Surface Water Monitoring Report*

*PG&E Topock Compressor Station, Needles, California*

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

**Table 4-6**

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

*Third Quarter 2020 Interim Measures Performance Monitoring and Site-wide*

*Groundwater and Surface Water Monitoring Report*

*PG&E Topock Compressor Station, Needles, California*

| Month, Year | Davis Dam Release Projected (cfs) | Davis Dam Release Actual (cfs) | Davis Dam Release Difference (cfs) | Colorado River Elevation at I-3 Predicted (ft amsl) | Colorado River Elevation at I-3 Actual (ft amsl) | Colorado River Elevation at I-3 Difference (feet) |
|---|---|---|---|---|---|---|
| August 2017 | 11,500 | 11,500 | 0 | 454.91 | 455.59 | -0.68 |
| September 2017 | 12,700 | 11,100 | 1,600 | 454.39 | 455.32 | -0.93 |
| October 2017 | 12,000 | 10,900 | 1,100 | 454.01 | 455.15 | -1.14 |
| November 2017 | 10,400 | 10,000 | 400 | 454.25 | 454.70 | -0.45 |
| December 2017 | 8,800 | 9,000 | -200 | 453.51 | 454.09 | -0.58 |
| January 2018 | 8,100 | 7,100 | 1,000 | 452.50 | 453.05 | -0.55 |
| February 2018 | 11,100 | 11,000 | 100 | 454.40 | 454.82 | -0.42 |
| March 2018 | 14,400 | 13,600 | 800 | 455.38 | 455.94 | -0.56 |
| April 2018 | 16,000 | 16,800 | -800 | 456.25 | 457.09 | -0.84 |
| May 2018 | 15,900 | 16,300 | -400 | 456.80 | 457.06 | -0.26 |
| June 2018 | 15,600 | 15,300 | 300 | 456.40 | 456.88 | -0.48 |
| July 2018 | 13,700 | 13,400 | 300 | 455.60 | 456.33 | -0.73 |
| August 2018 | 12,000 | 11,900 | 100 | 454.91 | 455.58 | -0.67 |
| September 2018 | 13,400 | 13,700 | -300 | 464.03 | 456.29 | 7.74 |
| October 2018 | 11,200 | 10,300 | 900 | 454.54 | 455.16 | -0.62 |
| November 2018 | 10,500 | 10,300 | 200 | 454.40 | 455.02 | -0.62 |
| December 2018 | 7,300 | 6,300 | 1000 | 452.94 | 453.33 | -0.39 |
| January 2019 | 7,300 | 6,800 | 500 | 452.96 | 453.32 | -0.36 |
| February 2019 | 11,800 | 10,200 | 1600 | 454.71 | 454.85 | -0.14 |
| March 2019 | 12,400 | 12,200 | 200 | 455.09 | 455.47 | -0.38 |
| April 2019 | 15,100 | 14,900 | 200 | 456.20 | 456.55 | -0.35 |
| May 2019 | 15,200 | 15,200 | 0 | 456.40 | 456.87 | -0.47 |
| June 2019 | 15,100 | 14,900 | 200 | 456.38 | 456.80 | -0.42 |
| July 2019 | 14,200 | 14,500 | -300 | 455.90 | 456.53 | -0.63 |
| August 2019 | 12,700 | 13,000 | -300 | 455.31 | 455.84 | -0.53 |
| September 2019 | 13,600 | 12,900 | 700 | 455.52 | 456.06 | -0.54 |
| October 2019 | 9,800 | 9,600 | 200 | 454.19 | 454.88 | -0.69 |
| November 2019 | 8,400 | 7,700 | 700 | 453.71 | 453.89 | -0.18 |
| December 2019 | 4,300 | 4,000 | 300 | 451.93 | 452.61 | -0.68 |
| January 2020 | 5,600 | 6,200 | -600 | 452.39 | 452.62 | -0.23 |
| February 2020 | 8,300 | 9,100 | -800 | 453.34 | 453.80 | -0.46 |
| March 2020 | 13,300 | 8,900 | 4400 | 455.42 | 454.61 | 0.81 |
| April 2020 | 14,600 | 14,500 | 100 | 456.04 | 456.08 | -0.04 |
| May 2020 | 16,200 | 16,700 | -500 | 456.60 | 457.13 | -0.53 |
| June 2020 | 15,900 | 15,700 | 200 | 456.67 | 457.08 | -0.41 |
| July 2020 | 14,200 | 14,400 | -200 | 455.92 | 456.50 | -0.58 |
| August 2020 | 13,000 | 13,400 | -400 | 455.50 | 456.15 | -0.65 |
| September 2020 | 13,700 | 13,300 | 400 | 455.59 | 456.13 | -0.54 |
| October 2020 | 12,200 | 11,800 | 400 | 455.06 | 455.64 | -0.58 |
| November 2020 | 9,900 | -- | -- | 454.26 | -- | -- |

**Notes:**

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

2. Projected and actual Davis Dam releases are reported monthly by the USBR, available online at https://www.usbr.gov/uc/water/crsp/studies/24Month_11.pdf.

-- = not applicable.

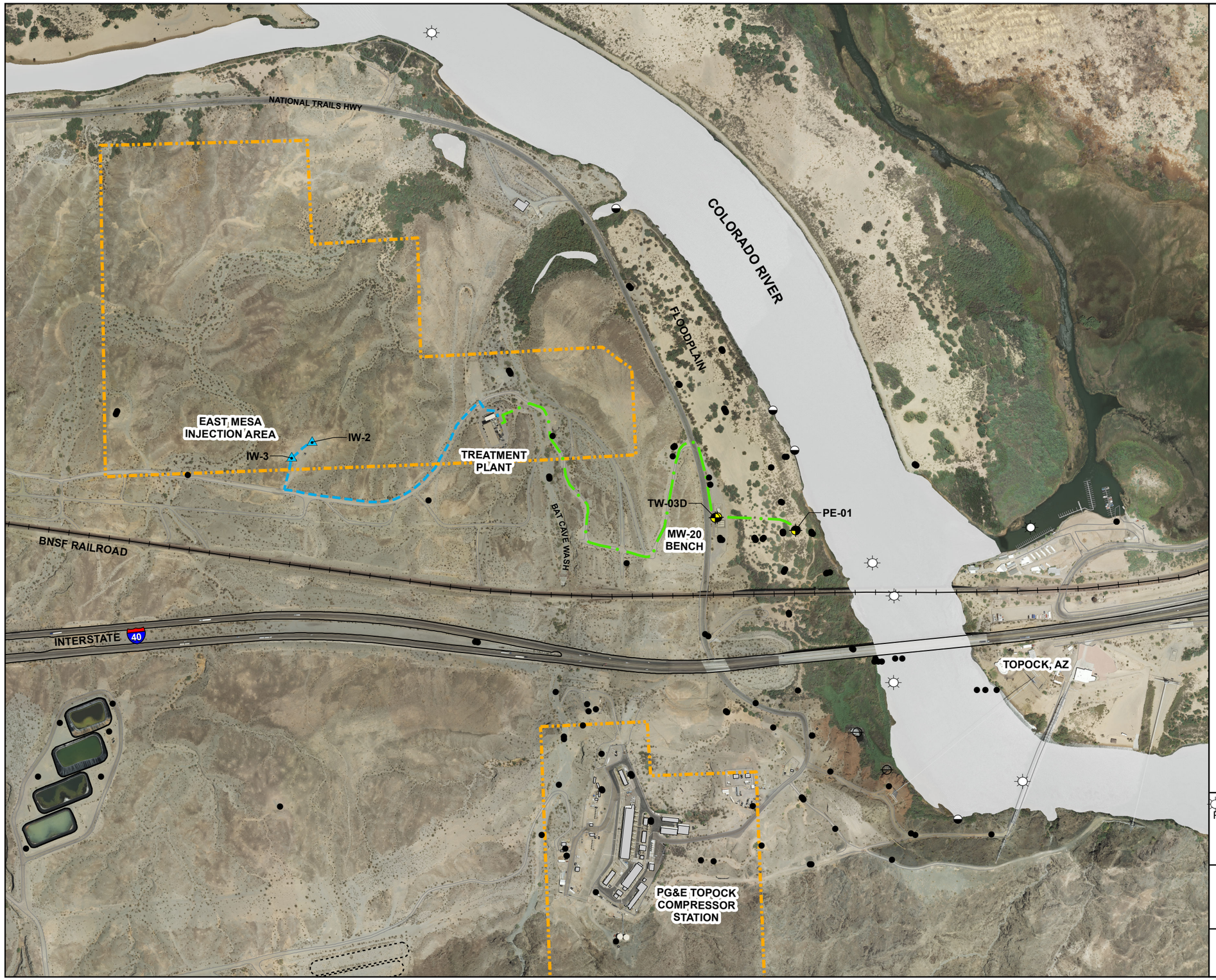
cfs = cubic feet per second.

ft amsl = feet above mean sea level.

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

NA = difference in predicted and actual river elevation not available due to incomplete dataset.

# FIGURES





**LEGEND**

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

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

0 500 1,000
Feet

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

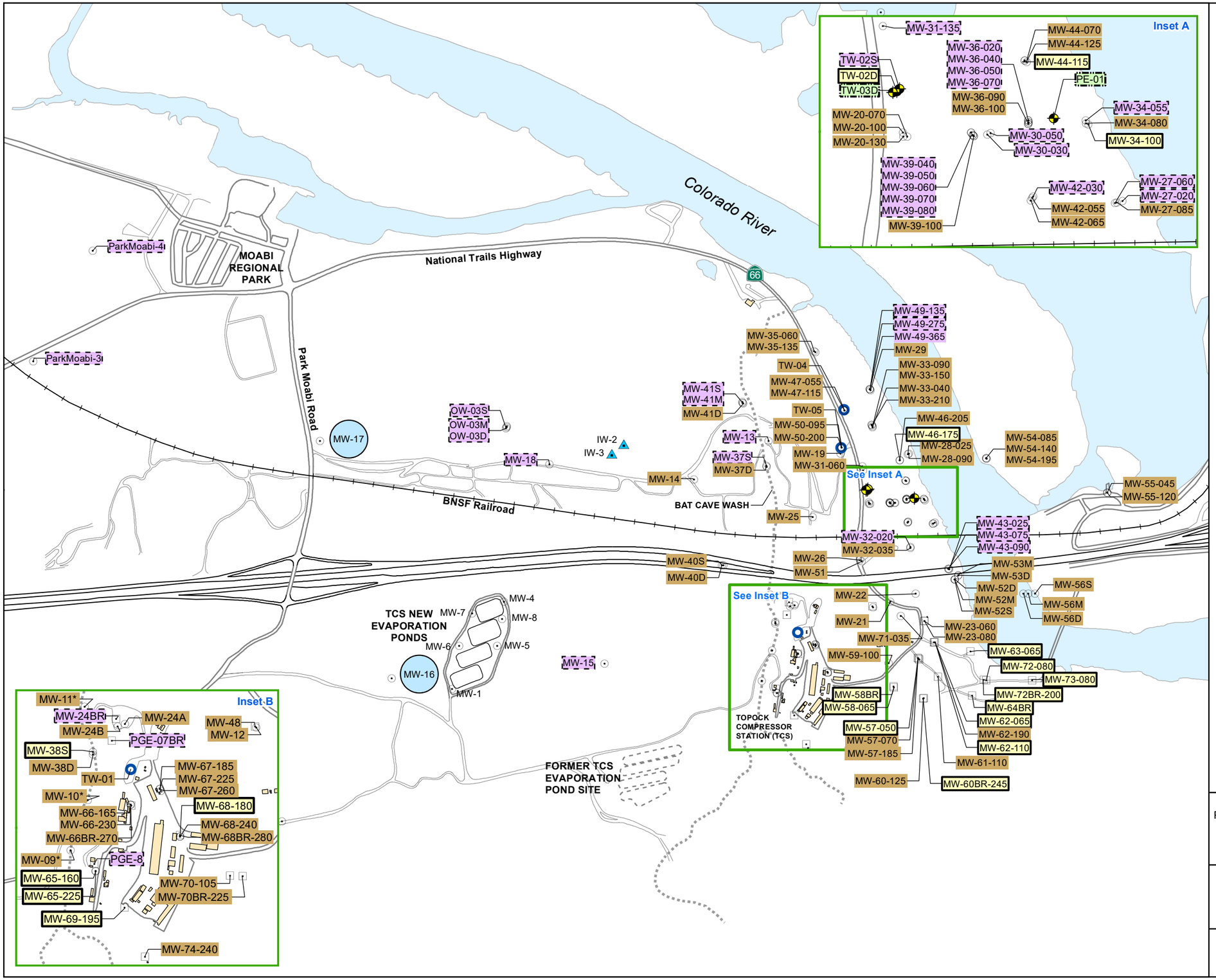
**PG&E TOPOCK COMPRESSOR STATION**
**NEEDLES, CALIFORNIA**

# LOCATIONS OF IM-3 FACILITIES AND MONITORING LOCATIONS

ARCADIS Design & Consultancy for natural and built assets

FIGURE
**1-1**

T:_ENV\PGE_TOPOCK\GEC\MXD\GMP\3Q20\FINAL\FIGURE1-1_IM3_GMP_LOCS_2020Q3.MXD 11/09/2020 11:36:32 AM




**LEGEND**

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

**Sampling Frequency for Groundwater Monitoring Program (GMP)**

| | |
|---|---|
| MW-17 | Biennial sampling |
| MW-13 | Annual sampling |
| MW-09* | Collect additional sample in quarter following a runoff event with flow through Bat Cave Wash culverts. |
| MW-21 | Semiannual sampling |
| MW-38S | Quarterly sampling |
| TW-3D | Monthly sampling |

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

0 500 1,000
Feet

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

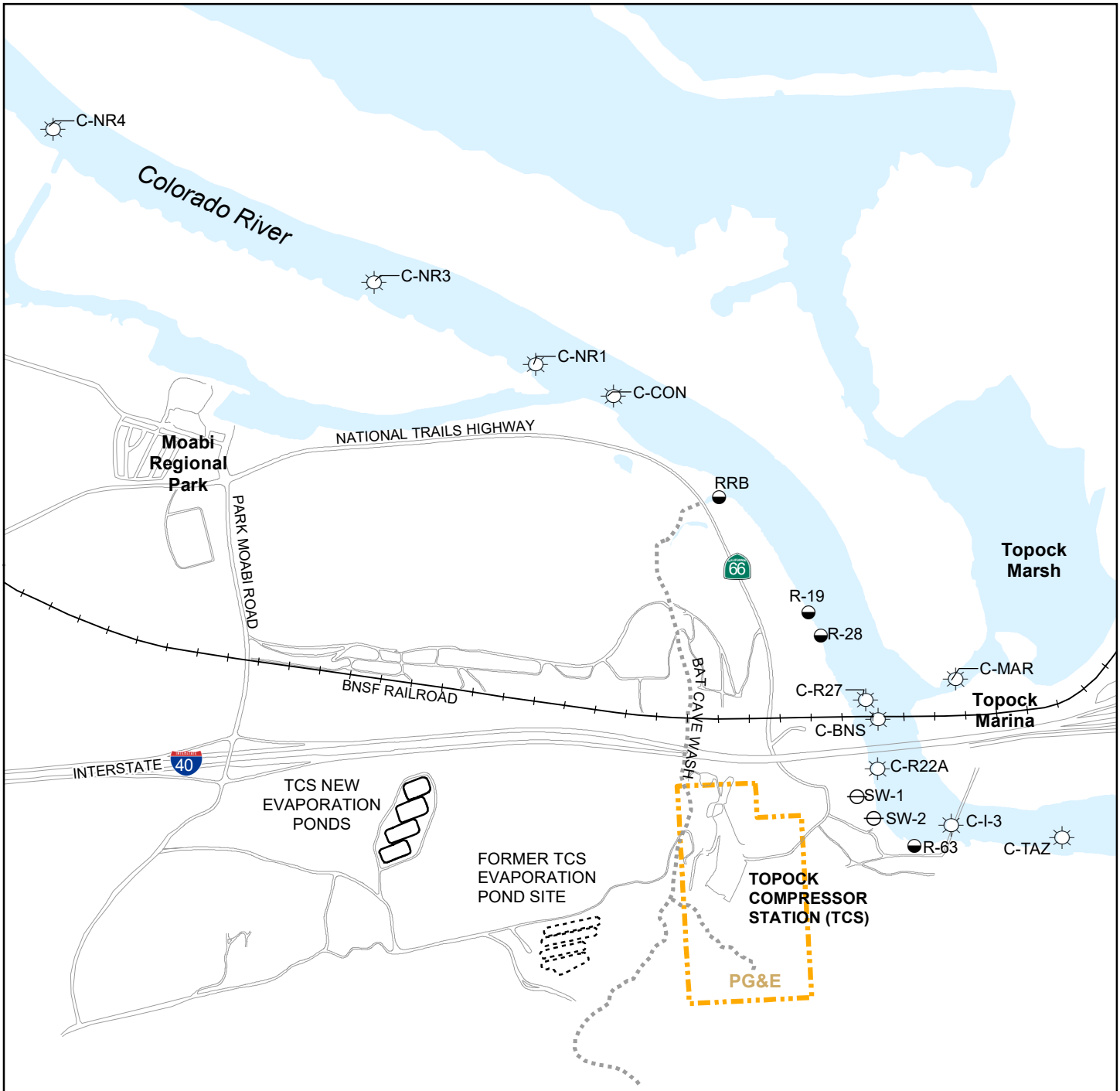
**PG&E TOPOCK COMPRESSOR STATION**
**NEEDLES, CALIFORNIA**

# MONITORING LOCATIONS AND SAMPLING FREQUENCY FOR GMP

ARCADIS Design & Consultancy for natural and built assets

FIGURE
**1-2**

T:_ENV\PGE_TOPOCK\GEC\MXD\GMP\3Q20\FINAL\FIGURE1-2_GMP_SAMPLING_FREQUENCY_2020Q3.MXD 11/09/2020 11:39:13 AM




**LEGEND**

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

0 600 1,200
Feet

**Notes:**

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

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

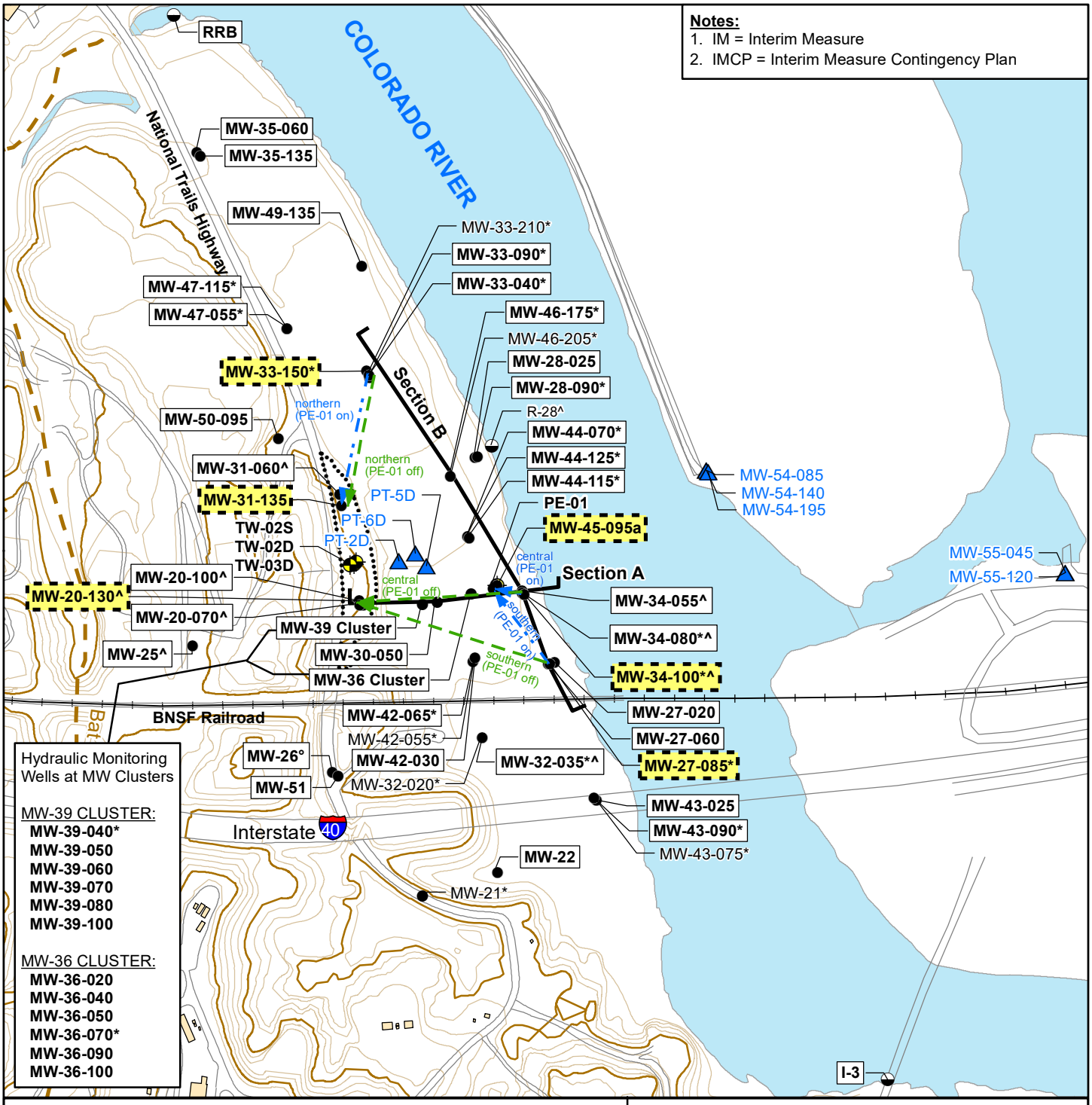
**PG&E TOPOCK COMPRESSOR STATION NEEDLES, CALIFORNIA**

# MONITORING LOCATIONS AND SAMPLING FREQUENCY FOR RMP

ARCADIS Design & Consultancy for natural and built assets

FIGURE **1-3**

T:_ENV\PGE_TOPOCK\GEC\MXD\GMP\3Q20\FINAL\FIGURE1-3_GMP_RIVER_SWLOCS_2020Q3.MXD 11/09/2020 11:39:47 AM




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

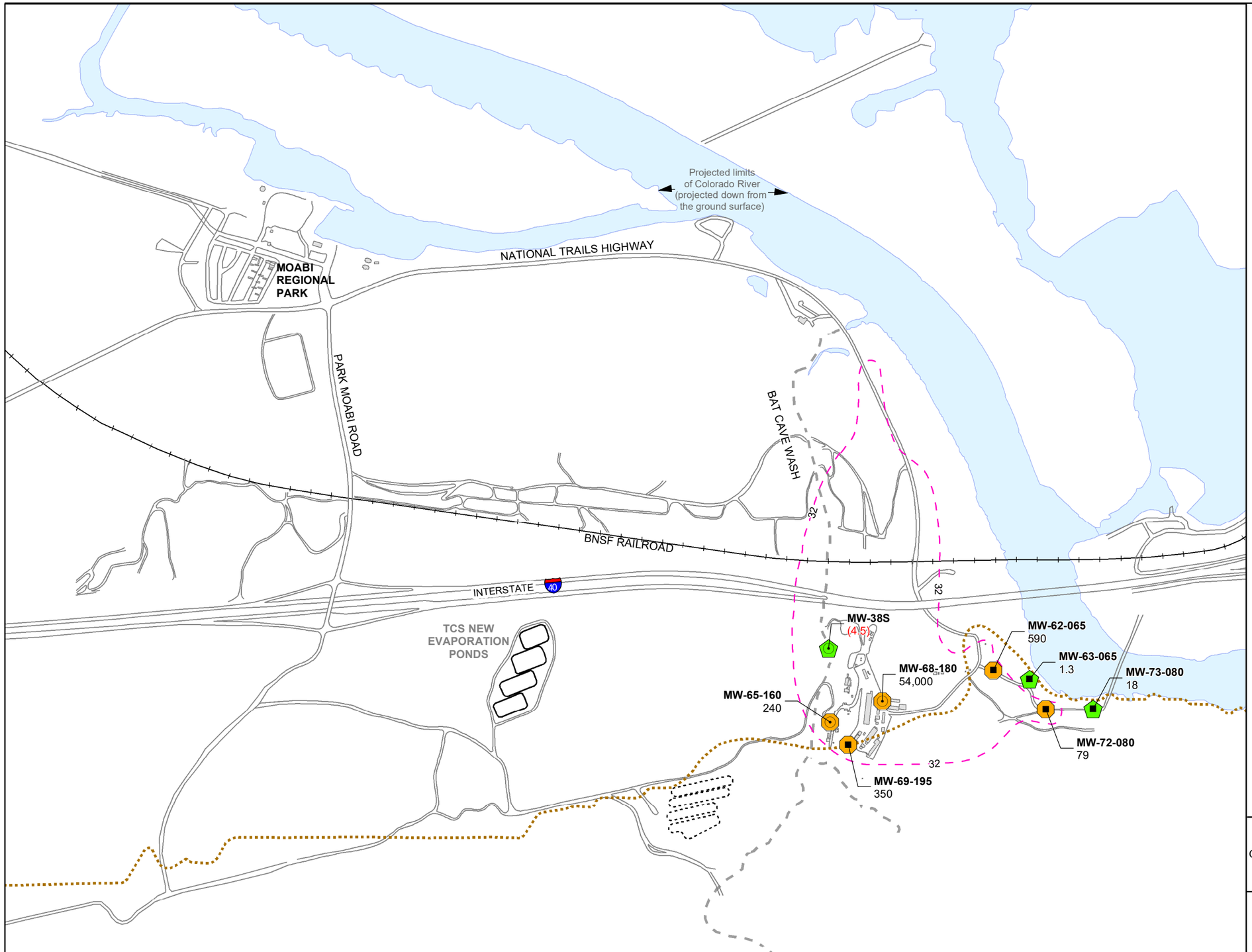
**PG&E TOPOCK COMPRESSOR STATION NEEDLES, CALIFORNIA**

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

ARCADIS Design & Consultancy for natural and built assets

FIGURE **1-4**

T:_ENV\PGE_TOPOCK\GEC\MXD\GMP\3Q20\FINAL\FIGURE1-4_IMP_XSECTION_2020Q3.MXD 11/09/2020 11:40:30 AM




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

**MW-65-160** ——— Sampling Location
240 ——— Groundwater Cr(VI) Concentration (µg/L)
(4.5) ——— Groundwater Cr(VI) Concentration (µg/L) not used for contouring

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

0 500 1,000
Feet

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

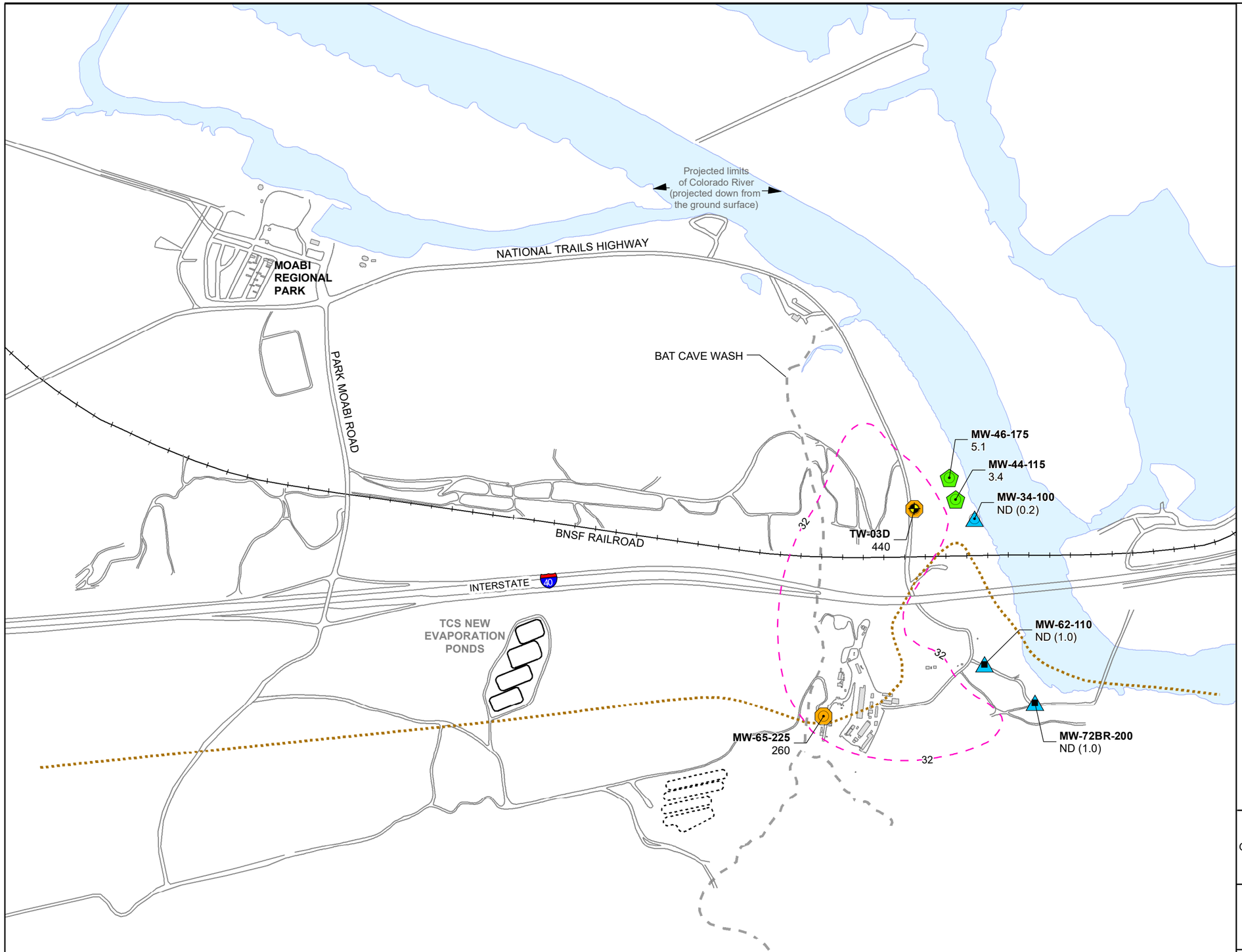
**PG&E TOPOCK COMPRESSOR STATION**
**NEEDLES, CALIFORNIA**

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

ARCADIS Design & Consultancy for natural and built assets

FIGURE
**3-1a**

T:_ENV\PGE_TOPOCK\GEC\MXD\GMP\3Q20\FINAL\FIGURE3-1A_CRVI_SHALLOW_2020Q3.MXD PSI01045 11/17/2020 3:09:41 PM




**LEGEND**

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

**Cr(VI) Concentrations**

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

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

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

0 500 1,000
Feet

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

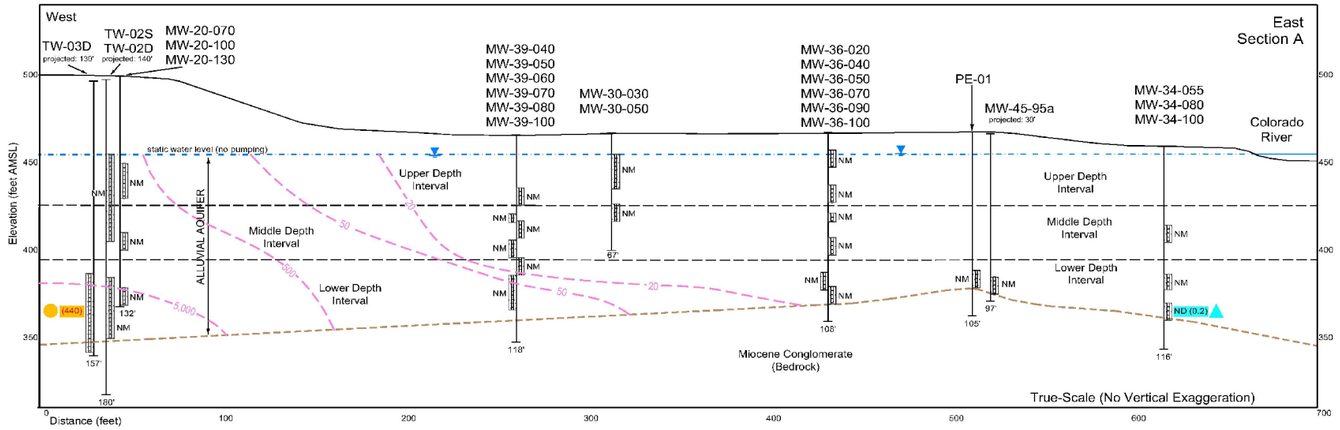
**PG&E TOPOCK COMPRESSOR STATION**
**NEEDLES, CALIFORNIA**

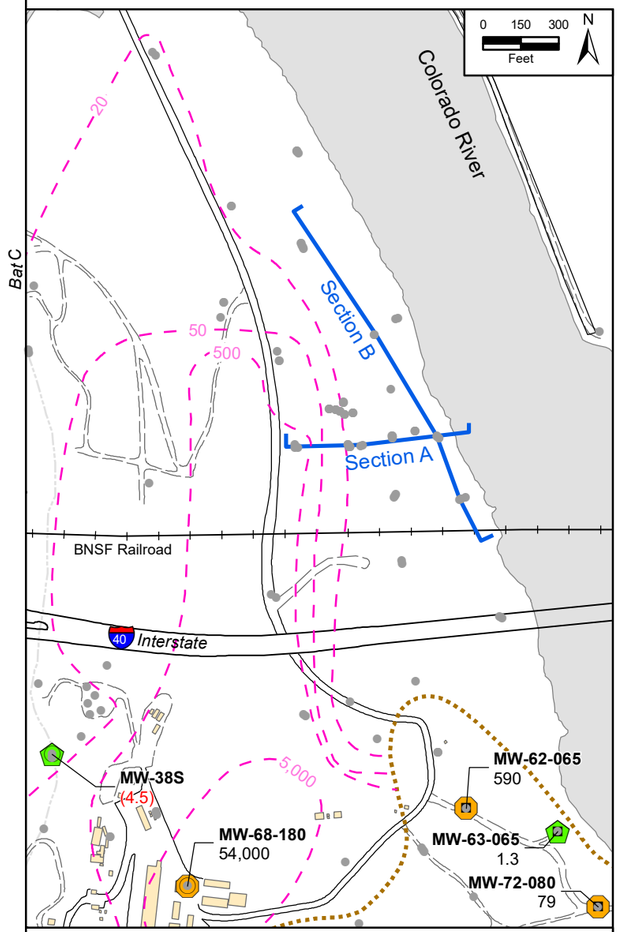
# Cr(VI) SAMPLING RESULTS, DEEP WELLS IN ALLUVIAL AQUIFER AND BEDROCK, THIRD QUARTER 2020

ARCADIS Design & Consultancy for natural and built assets

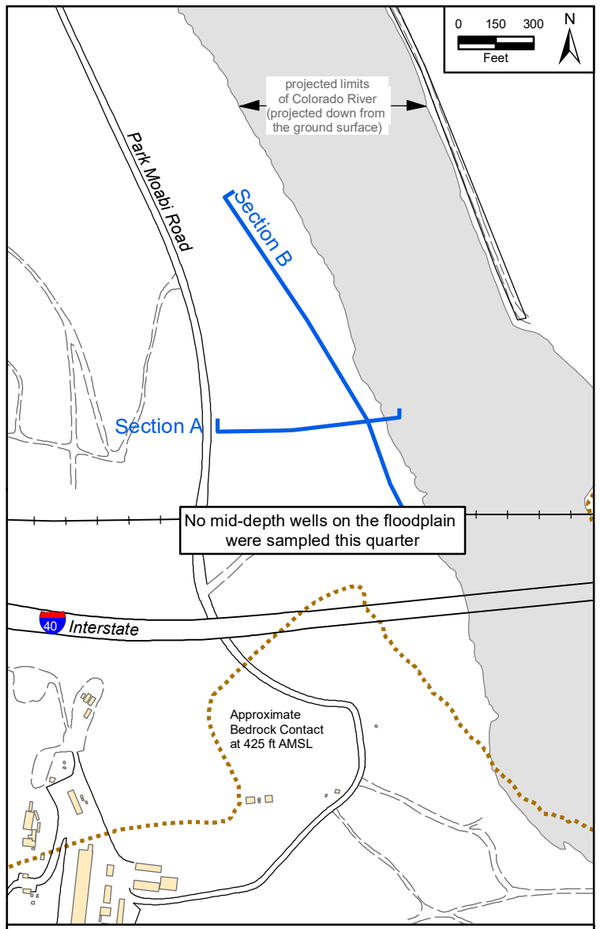
FIGURE
**3-1b**

T:_ENV\PGE_TOPOCK\GEC\MXD\GMP\3Q20\FINAL\FIGURE3-1B_CRVI_DEEP_2020Q3.MXD PSI01045 11/09/2020 12:38:58 PM

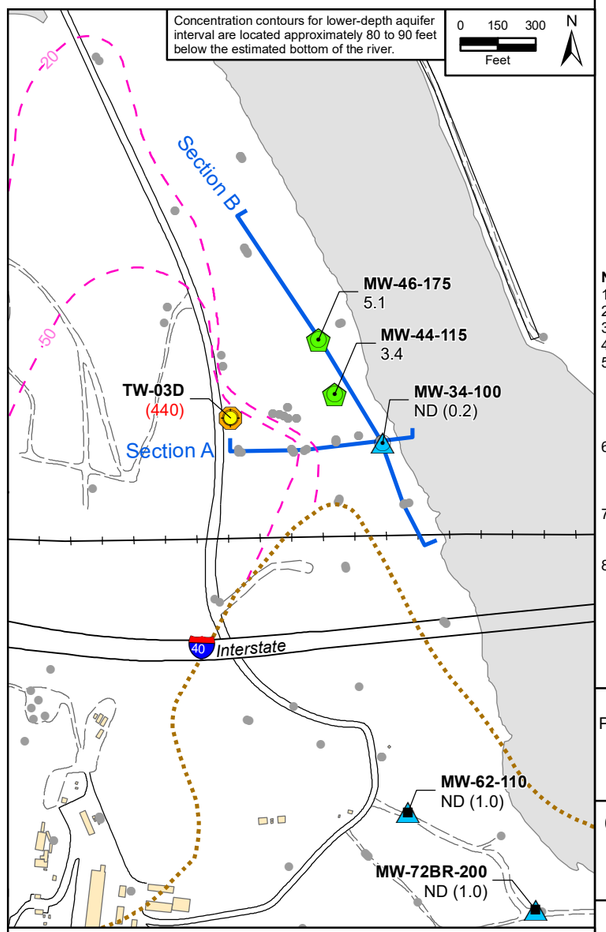



**Shallow Wells (Upper Depth Interval)**




**Mid-Depth Wells (Middle Depth Interval)**



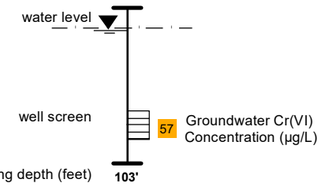

**Deep Wells (Lower Depth Interval)**

## 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




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

**Notes:**

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

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

**PG&E TOPOCK COMPRESSOR STATION NEEDLES, CALIFORNIA**

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

ARCADIS Design & Consultancy for natural and built assets

FIGURE 4-1

T:_ENV\PGE_TOPOCK\GEC\MXD\GMP\3Q20\FINAL\FIGURE4-1_GMP_CR6_2020Q3_MAX.MXD 11/17/2020 3:17:12 PM

North

South
Section B

## Cross-Section Parallel to the Colorado River

BNSF
Railroad

MW-33-040
MW-33-090
MW-33-150
MW-33-210

MW-46-175
MW-46-205

MW-28-025
MW-28-090
projected: 110'

MW-44-070
MW-44-115
MW-44-125

MW-34-055
MW-34-080
MW-34-100

MW-27-020
MW-27-060
MW-27-085

Elevation (feet AMSL)

700
600
500
400
300
200
100
0

water table (average 455' AMSL)

Upper Depth Interval
Middle Depth Interval
Lower Depth Interval

ALLUVIAL AQUIFER

Oldest Alluvium

Fluvial Deposits

Approximate geologic contact between alluvial fan and fluvial deposits

NM

5.1

3.4

ND (0.2)

237'
216'
134'
116'
107'

Miocene Conglomerate
(Bedrock)

True-Scale (No Vertical Exaggeration)

-100 0 100 200 300 400 500 600 700 800 900 1,000 1,100 1,200 1,300 1,400
Distance (feet)

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

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

Legend

water level

well screen

boring depth (feet) 103'

5.1 Groundwater Cr(VI) Concentration (µg/L)

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

Approximate bedrock contact (per depth interval)

Cr(VI) Concentrations

Not detected at analytical reporting limit

Concentration between reporting limit and 32 µg/L

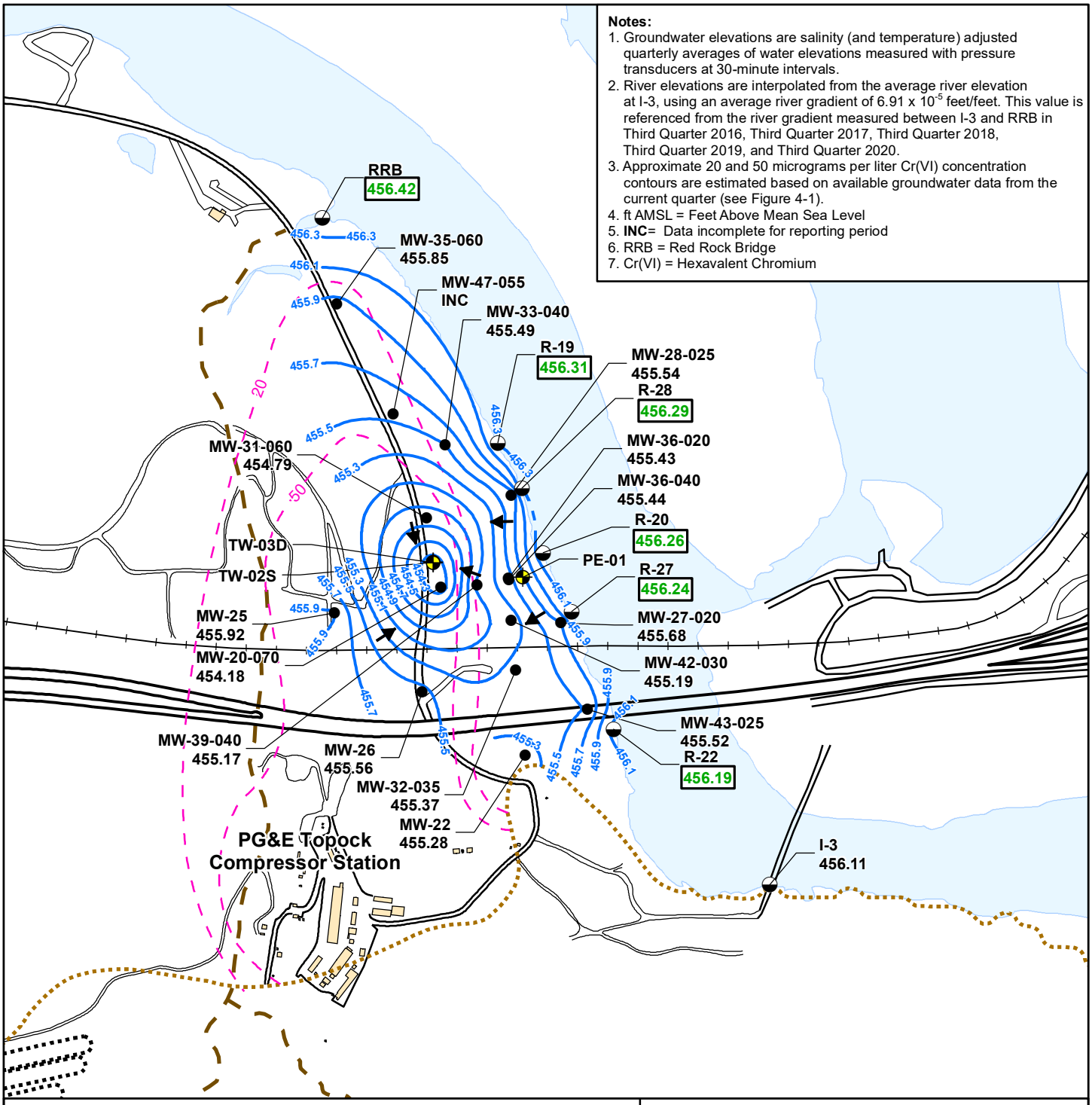
Concentration ≥ 32 µg/L

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

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

ARCADIS Design & Consultancy for natural and built assets

FIGURE
**4-2**




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

**PG&E TOPOCK COMPRESSOR STATION NEEDLES, CALIFORNIA**

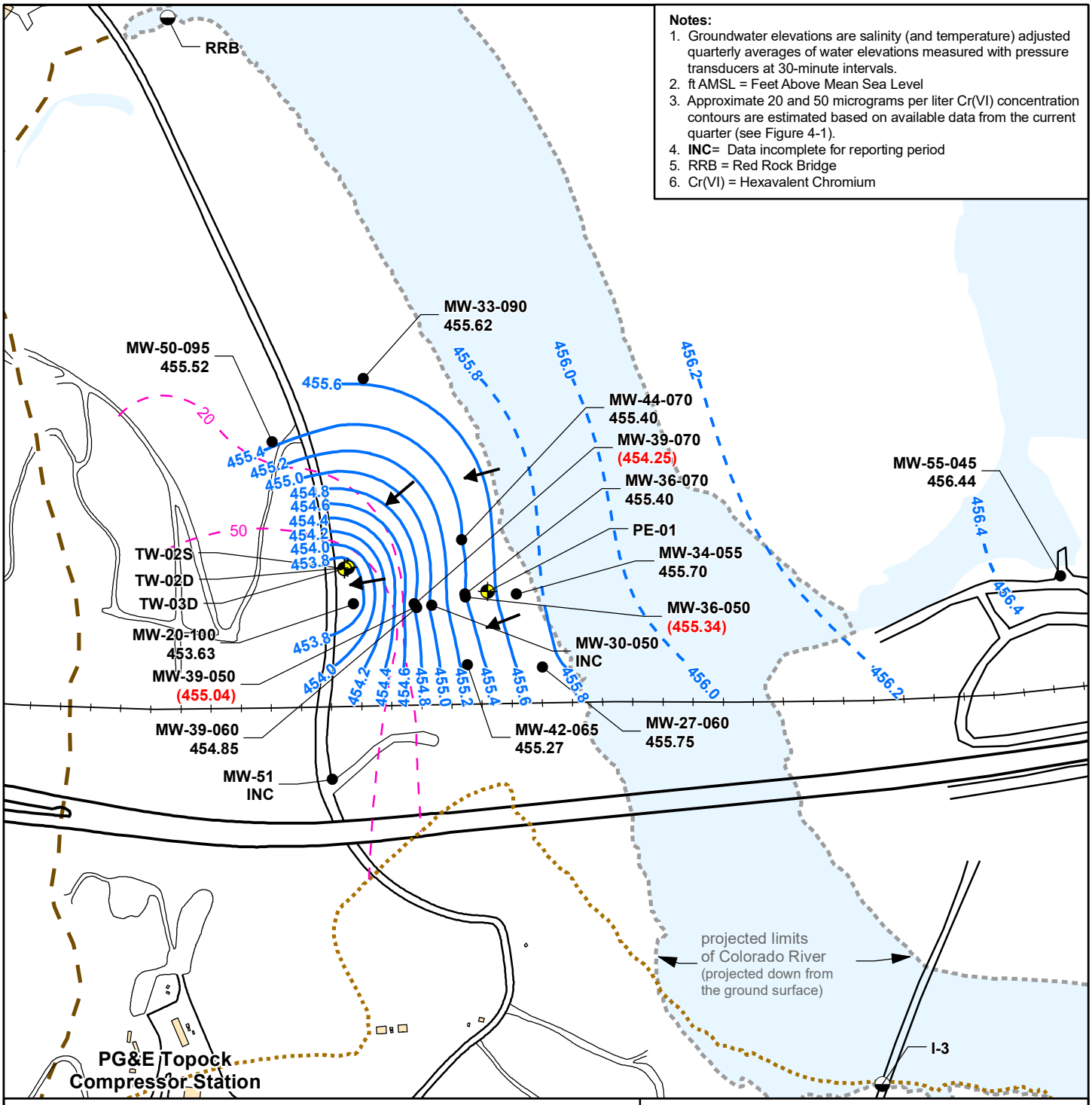
# AVERAGE GROUNDWATER ELEVATIONS IN SHALLOW WELLS AND RIVER ELEVATIONS, THIRD QUARTER 2020

ARCADIS Design & Consultancy for natural and built assets

FIGURE

**4-3a**

T:_ENV\PGE_TOPOCK\GEC\MXD\GMP\3Q20\FINAL\FIGURE4-3A_GWE_SHALLOW_2020Q3.MXD 11/25/2020 12:50:52 PM




**Notes:**

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

**LEGEND**

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

0 500 1,000
Feet

**MW-30-060** ——— Gauging Location
**454.85** ——— Average Groundwater Elevation (ft AMSL)
**(455.04)** ——— Elevation in red parentheses not used for contouring

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

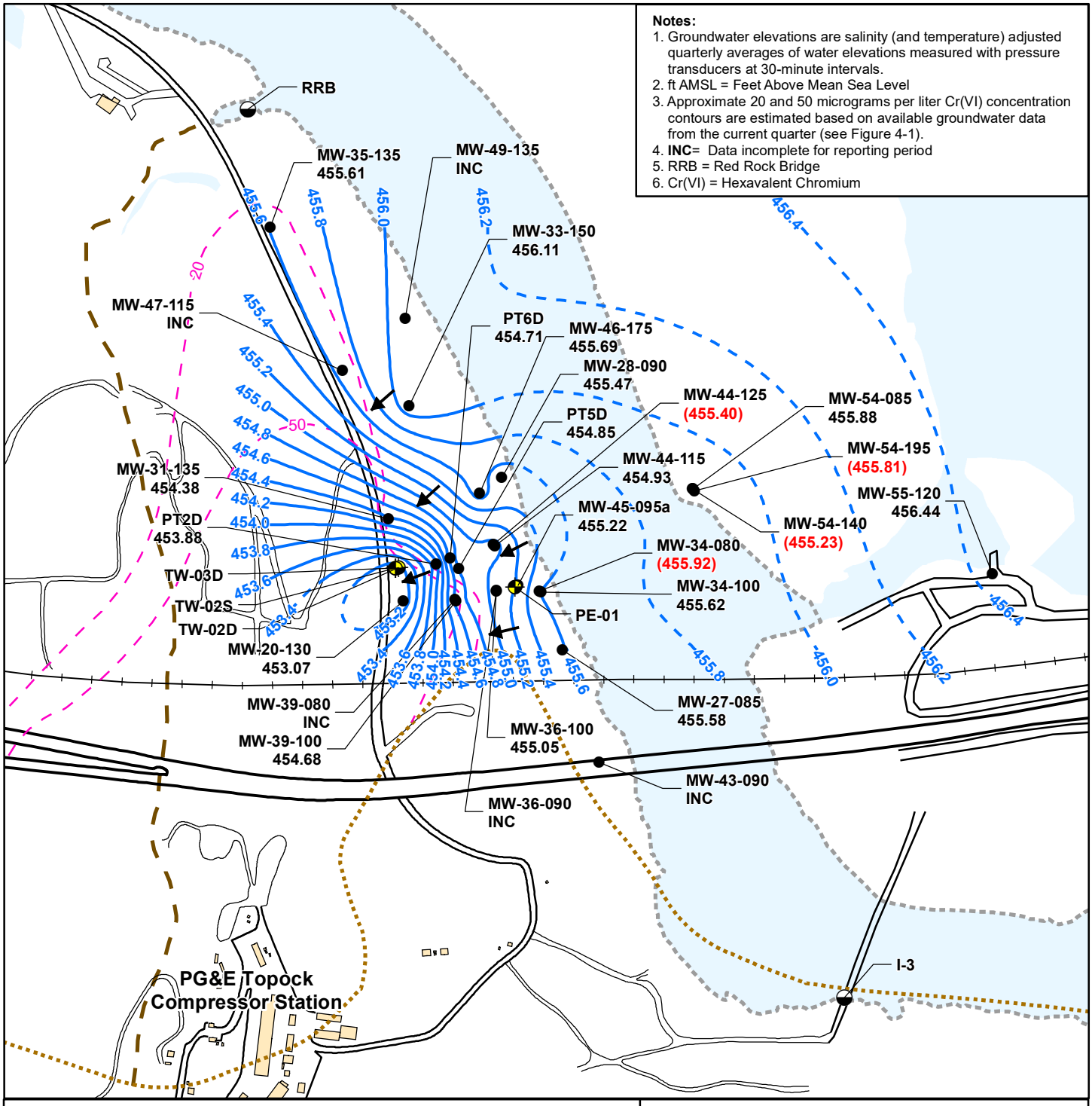
**PG&E TOPOCK COMPRESSOR STATION**
**NEEDLES, CALIFORNIA**

# AVERAGE GROUNDWATER ELEVATIONS IN MID-DEPTH WELLS, THIRD QUARTER 2020

ARCADIS Design & Consultancy for natural and built assets

FIGURE
**4-3b**

T:_ENV\PGE_TOPOCK\GEC\MXD\GMP\3Q20\FINAL\FIGURE4-3B_GWE_MIDDEPTH_2020Q3.MXD 11/24/2020 3:41:38 PM




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

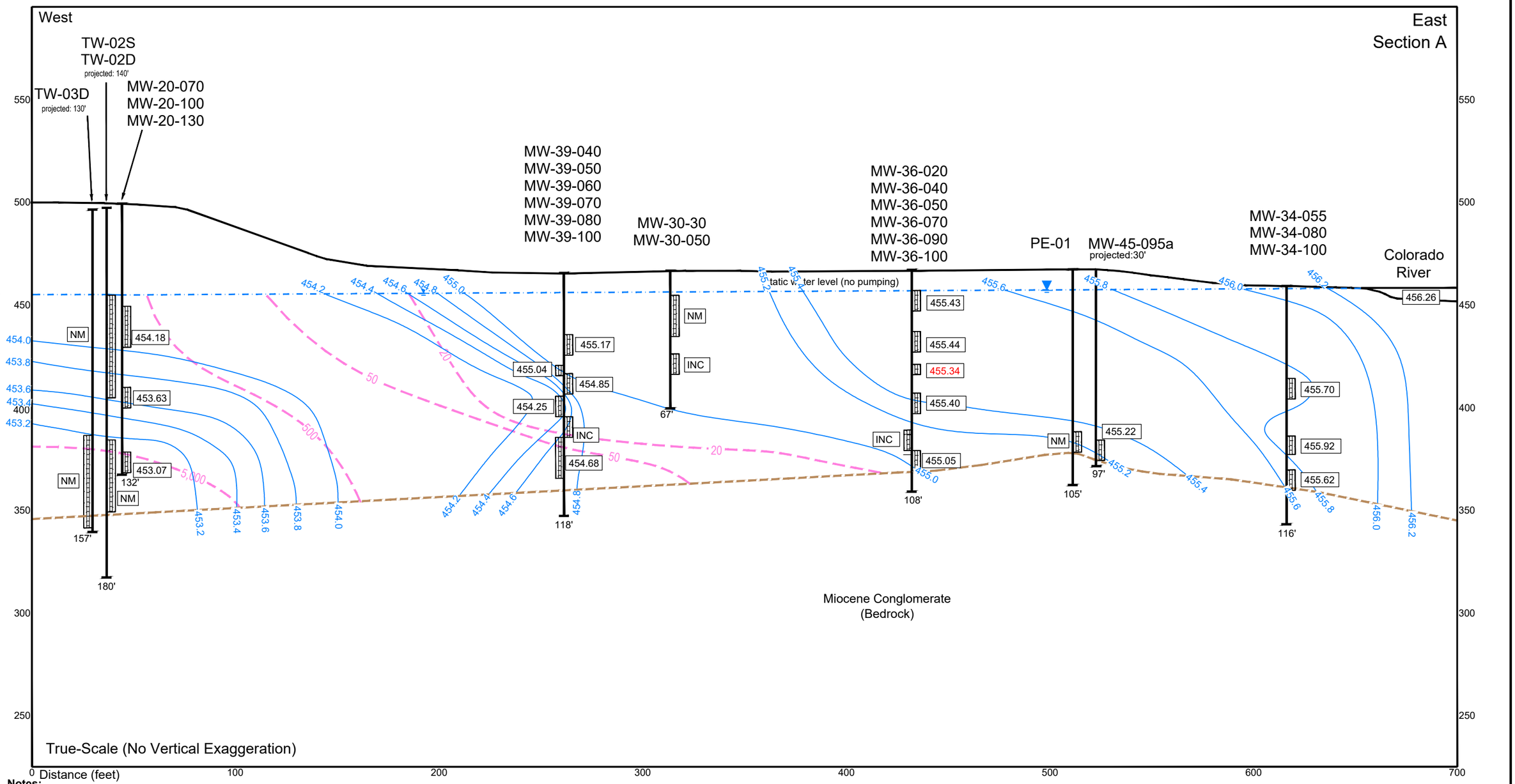
**PG&E TOPOCK COMPRESSOR STATION NEEDLES, CALIFORNIA**

## AVERAGE GROUNDWATER ELEVATIONS IN DEEP WELLS, THIRD QUARTER 2020

ARCADIS Design & Consultancy for natural and built assets

FIGURE **4-3c**

T:_ENV\PGE_TOPOCK\GEC\MXD\GMP\3Q20\FINAL\FIGURE4-3C_GWE_DEEP_2020Q3.MXD 11/24/2020 3:53:45 PM




**Notes:**

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

AMSL = above mean sea level.
NM = well not measured or used in contouring.

Legend

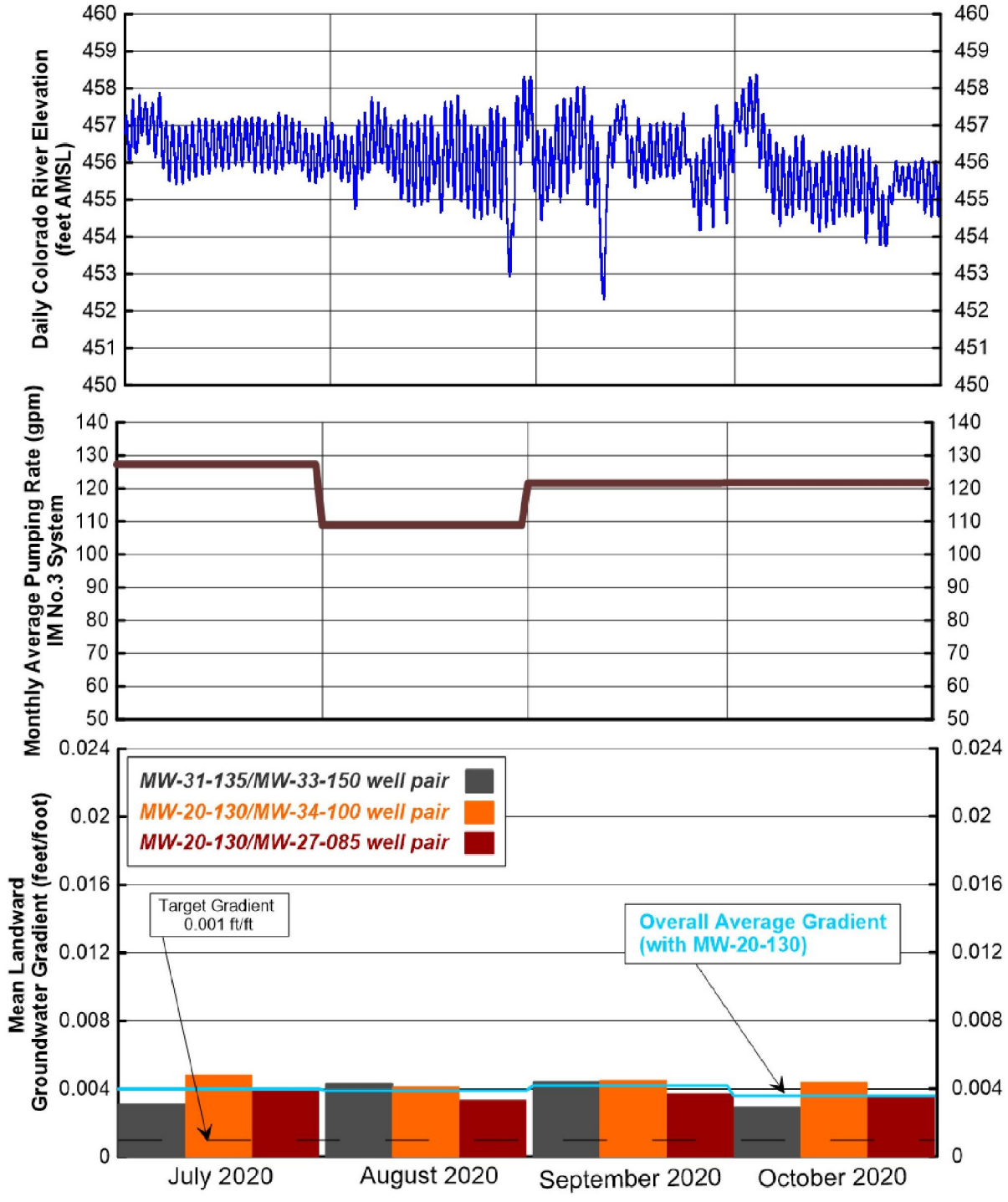
- Inferred water table
- well screen and associated average groundwater elevation (feet AMSL) — MW-030-050 / 456.26
- boring depth (feet) — 67'
- Inferred groundwater head contour
- Interpreted groundwater flow direction
- Inferred hexavalent chromium contour (ppb) in Alluvial Aquifer — 20

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

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

ARCADIS Design & Consultancy for natural and built assets

FIGURE
**4-4**




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

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

**PG&E TOPOCK COMPRESSOR STATION NEEDLES, CALIFORNIA**

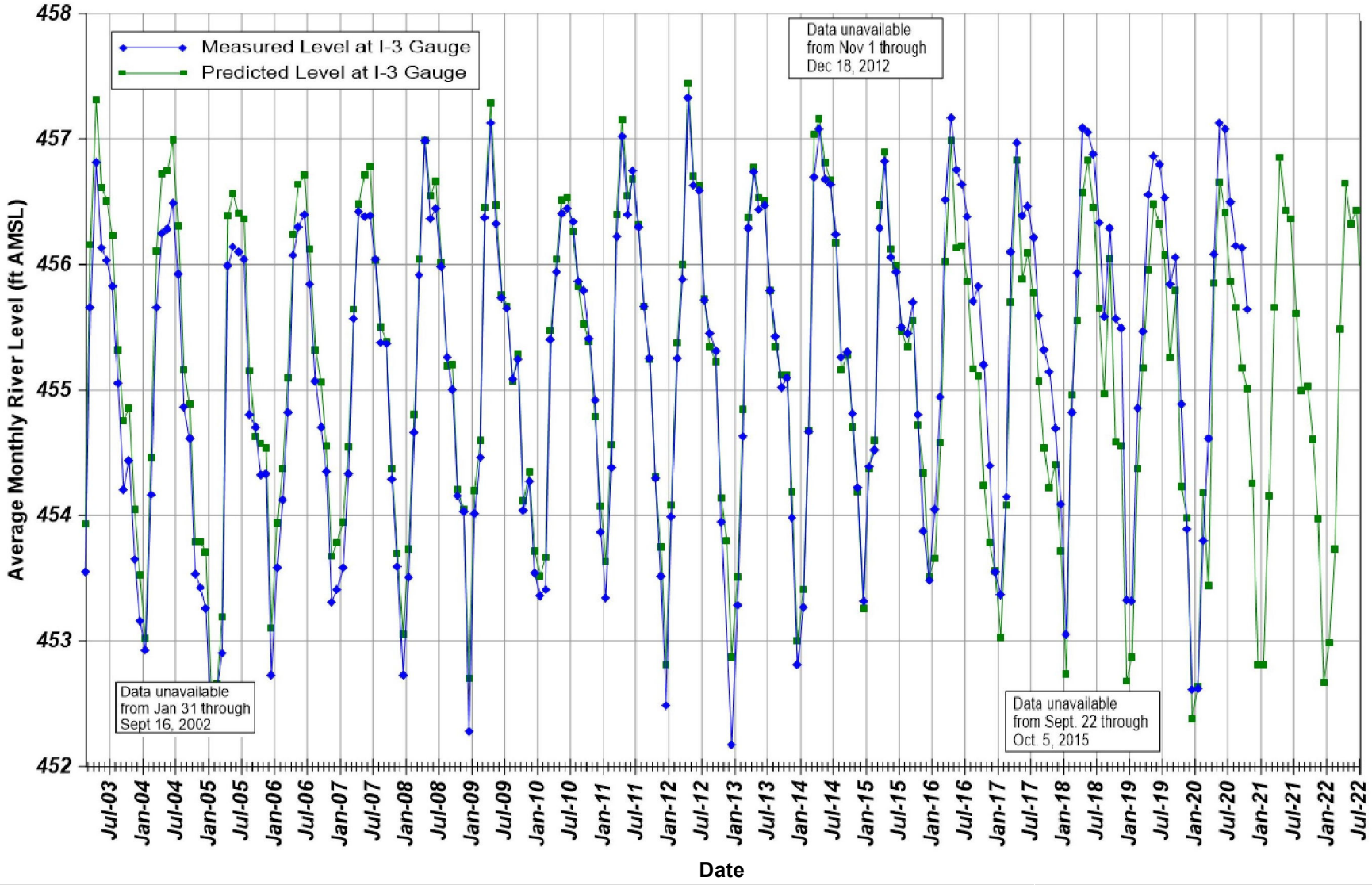
**MEASURED HYDRAULIC GRADIENTS, RIVER ELEVATION, AND PUMPING RATE, THIRD QUARTER 2020**

ARCADIS Design & Consultancy for natural and built assets

FIGURE

**4-5**

T:_ENV\PGE_TOPOCK\GEC\MXD\GMP\3Q20\FINAL\FIGURE4-5_RIVER_GRADIENTS_2020Q3.MXD 11/26/2020 1:07:01 PM




**Notes:**

Projected river level for each month in the past is calculated based on the preceding months United States Bureau of Reclamation (USBR) projections of Davis Dam release and stage in Lake Havasu. Future projections of river level at 1-3 are based upon USBR projections presented in the November 24-Month Study (Report dated November 10, 2020). These data are reported monthly by the US Department of Interior, at https://www.usbr.gov/uc/water/crsp/studies/24Month_11.pdf

ft AMSL = feet above mean sea level

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

**PG&E TOPOCK COMPRESSOR STATION NEEDLES, CALIFORNIA**

**PAST AND PREDICTED FUTURE RIVER LEVELS AT TOPOCK COMPRESSOR STATION**

ARCADIS Design & Consultancy for natural and built assets

FIGURE **4-6**

T:_ENV\PGE_TOPOCK\GEC\MXD\GMP\3Q20\FINAL\FIGURE4-6_PREDICTED_RIVER_LEVELS_2020Q3.MXD 11/26/2020 12:02:12 PM

# APPENDIX A

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

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

# APPENDIX B

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

**Appendix B**

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

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

| Location ID | Aquifer Zone | Sample Date | Sample Type | Sample Method | Hexavalent Chromium (µg/L) | Dissolved Chromium (µg/L) |
|---|---|---|---|---|---|---|
| MW-09 | SA | 02/23/2018 | | LF | 150 | 150 |
| MW-09 | SA | 05/02/2018 | | LF | 150 | 140 |
| MW-09 | SA | 12/12/2018 | | LF | 140 | 150 |
| MW-09 | SA | 03/18/2019 | | LF | 140 | 130 |
| MW-09 | SA | 05/17/2019 | | LF | 150 | 150 |
| MW-09 | SA | 09/30/2019 | | LF | 130 | 150 |
| MW-09 | SA | 12/18/2019 | | LF | 120 | 120 |
| MW-09 | SA | 04/24/2020 | | LF | 130 | 130 |
| MW-10 | SA | 02/23/2018 | | LF | 160 | 160 |
| MW-10 | SA | 05/02/2018 | | LF | 170 | 160 |
| MW-10 | SA | 12/12/2018 | | LF | 110 | 120 |
| MW-10 | SA | 03/18/2019 | | LF | 150 | 140 |
| MW-10 | SA | 03/18/2019 | FD | -- | 150 | 140 |
| MW-10 | SA | 05/17/2019 | | LF | 180 | 180 |
| MW-10 | SA | 05/17/2019 | FD | -- | 180 | 180 |
| MW-10 | SA | 09/30/2019 | | LF | 110 | 110 |
| MW-10 | SA | 12/18/2019 | | LF | 220 | 230 |
| MW-10 | SA | 04/23/2020 | | LF | 150 | 150 |
| MW-11 | SA | 02/23/2018 | | LF | 57 | 56 |
| MW-11 | SA | 05/02/2018 | | LF | 57 | 53 |
| MW-11 | SA | 05/02/2018 | FD | -- | 58 | 55 |
| MW-11 | SA | 12/12/2018 | | LF | 47 | 48 |
| MW-11 | SA | 12/12/2018 | FD | -- | 47 | 50 |
| MW-11 | SA | 03/18/2019 | | LF | 42 | 43 |
| MW-11 | SA | 05/17/2019 | | LF | 51 | 49 |
| MW-11 | SA | 09/30/2019 | | LF | 44 | 47 |
| MW-11 | SA | 12/18/2019 | | LF | 37 | 35 |
| MW-11 | SA | 04/23/2020 | | LF | 43 | 43 |
| MW-12 | SA | 05/01/2018 | | LF | 1,500 | 1,600 |
| MW-12 | SA | 12/11/2018 | | LF | 1,500 | 1,500 |
| MW-12 | SA | 05/22/2019 | | LF | 1,600 | 1,600 |
| MW-12 | SA | 12/17/2019 | | LF | 1,600 | 1,800 |
| MW-12 | SA | 04/28/2020 | | LF | 2,700 | 2,800 |
| MW-14 | SA | 05/01/2018 | | LF | 13 | 14 |
| MW-14 | SA | 12/11/2018 | | LF | 13 | 15 |
| MW-14 | SA | 05/15/2019 | | LF | 14 | 13 |
| MW-14 | SA | 12/09/2019 | | LF | 10 | 8.8 |
| MW-14 | SA | 06/24/2020 | | LF | 12 | 12 |
| MW-14 | SA | 06/24/2020 | FD | -- | 12 | 12 |
| MW-19 | SA | 04/27/2018 | | LF | 370 | 380 |
| MW-19 | SA | 12/10/2018 | | LF | 670 | 780 |
| MW-19 | SA | 05/15/2019 | | LF | 250 | 250 |
| MW-19 | SA | 12/12/2019 | | LF | 130 | 120 |
| MW-19 | SA | 04/27/2020 | | LF | 32 | 40 |
| MW-20-070 | SA | 04/27/2018 | | LF | 1,700 | 1,700 |
| MW-20-070 | SA | 12/11/2018 | | LF | 1,600 | 1,700 |

**Appendix B**

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

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

| Location ID | Aquifer Zone | Sample Date | Sample Type | Sample Method | Hexavalent Chromium (µg/L) | Dissolved Chromium (µg/L) |
|---|---|---|---|---|---|---|
| MW-20-070 | SA | 12/11/2018 | FD | -- | 1,600 | 1,800 |
| MW-20-070 | SA | 05/24/2019 | | LF | 1,700 | 1,800 |
| MW-20-070 | SA | 12/13/2019 | | LF | 2,300 | 2,200 |
| MW-20-070 | SA | 04/24/2020 | | LF | 2,500 | 2,500 |
| MW-20-100 | MA | 04/27/2018 | | LF | 1,800 | 1,800 |
| MW-20-100 | MA | 12/04/2018 | | LF | 1,400 | 1,500 |
| MW-20-100 | MA | 05/24/2019 | | LF | 1,300 | 1,500 |
| MW-20-100 | MA | 12/13/2019 | | LF | 750 | 780 |
| MW-20-100 | MA | 04/24/2020 | | LF | 750 | 760 |
| MW-20-130 | DA | 04/27/2018 | | LF | 6,900 | 7,000 |
| MW-20-130 | DA | 12/04/2018 | | LF | 5,800 | 6,100 |
| MW-20-130 | DA | 05/24/2019 | | LF | 5,900 | 6,800 |
| MW-20-130 | DA | 05/24/2019 | FD | -- | 6,000 | 6,800 |
| MW-20-130 | DA | 12/13/2019 | | LF | 5,900 | 6,000 |
| MW-20-130 | DA | 04/24/2020 | | LF | 5,900 | 6,100 |
| MW-21 | SA | 05/02/2018 | | LF | ND (1.0) | 1.0 |
| MW-21 | SA | 05/02/2018 | FD | -- | ND (1.0) | ND (1.0) |
| MW-21 | SA | 12/12/2018 | | LF | 1.1 | 1.2 |
| MW-21 | SA | 05/23/2019 | | LF | 6.5 | 6.7 |
| MW-21 | SA | 12/13/2019 | | LF | ND (1.0) | 8.9 |
| MW-21 | SA | 04/30/2020 | | LF | 4.6 | 5.4 |
| MW-22 | SA | 04/23/2018 | | LF | ND (1.0) | ND (5.0) |
| MW-22 | SA | 12/04/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-22 | SA | 12/04/2018 | FD | -- | ND (1.0) | ND (1.0) |
| MW-22 | SA | 04/23/2019 | | LF | ND (1.0) | ND (1.0) |
| MW-22 | SA | 12/11/2019 | | LF | ND (1.0) | ND (1.0) |
| MW-22 | SA | 12/11/2019 | FD | -- | ND (1.0) | ND (1.0) |
| MW-22 | SA | 06/16/2020 | | LF | ND (0.2) | ND (1.0) |
| MW-23-060 | BR | 04/26/2018 | | LF | 39 | 37 J |
| MW-23-060 | BR | 12/11/2018 | | LF | 39 | 40 |
| MW-23-060 | BR | 05/21/2019 | | LF | 40 | 35 |
| MW-23-060 | BR | 12/09/2019 | | LF | 41 | 34 |
| MW-23-060 | BR | 06/18/2020 | | LF | 40 | 37 |
| MW-23-080 | BR | 04/26/2018 | | LF | ND (1.0) | 1.5 |
| MW-23-080 | BR | 12/11/2018 | | LF | ND (1.0) | 3.2 |
| MW-23-080 | BR | 05/21/2019 | | LF | ND (1.0) | 1.1 |
| MW-23-080 | BR | 12/09/2019 | | LF | ND (1.0) | 1.1 |
| MW-23-080 | BR | 06/18/2020 | | LF | ND (1.0) | ND (1.0) |
| MW-24A | SA | 05/02/2018 | | LF | ND (0.2) | ND (1.0) |
| MW-24A | SA | 12/12/2018 | | LF | ND (0.2) | ND (1.0) |
| MW-24A | SA | 05/17/2019 | | LF | ND (0.2) | ND (1.0) |
| MW-24A | SA | 12/03/2019 | | LF | ND (0.2) | 1.8 |
| MW-24A | SA | 05/01/2020 | | LF | ND (0.2) | 2.9 |
| MW-24B | DA | 05/02/2018 | | LF | 200 | 200 |
| MW-24B | DA | 12/12/2018 | | LF | 160 | 150 |
| MW-24B | DA | 05/17/2019 | | LF | 86 | 73 |

**Appendix B**

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

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

| Location ID | Aquifer Zone | Sample Date | Sample Type | Sample Method | Hexavalent Chromium (µg/L) | Dissolved Chromium (µg/L) |
|---|---|---|---|---|---|---|
| MW-24B | DA | 05/17/2019 | FD | -- | 84 | 73 |
| MW-24B | DA | 12/03/2019 | | LF | 230 | 220 |
| MW-24B | DA | 12/03/2019 | FD | -- | 230 | 230 |
| MW-24B | DA | 05/01/2020 | | LF | 120 | 140 |
| MW-25 | SA | 05/01/2018 | | LF | 68 | 65 |
| MW-25 | SA | 12/10/2018 | | LF | 100 | 100 |
| MW-25 | SA | 12/10/2018 | FD | -- | 100 | 100 |
| MW-25 | SA | 05/15/2019 | | LF | 68 | 66 |
| MW-25 | SA | 12/09/2019 | | LF | 72 | 69 |
| MW-25 | SA | 12/09/2019 | FD | -- | 74 | 71 |
| MW-25 | SA | 06/24/2020 | | LF | 56 | 55 |
| MW-25 | SA | 06/24/2020 | FD | -- | 57 | 56 |
| MW-26 | SA | 05/01/2018 | | LF | 2,300 | 2,400 |
| MW-26 | SA | 12/07/2018 | | LF | 2,200 | 2,300 |
| MW-26 | SA | 05/22/2019 | | LF | 2,300 | 2,500 |
| MW-26 | SA | 12/12/2019 | | LF | 2,300 | 2,300 |
| MW-26 | SA | 12/12/2019 | FD | -- | 2,300 | 2,400 |
| MW-26 | SA | 04/27/2020 | | LF | 2,300 | 2,300 |
| MW-27-085 | DA | 04/24/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-27-085 | DA | 12/05/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-27-085 | DA | 04/22/2019 | | LF | ND (0.2) | ND (1.0) |
| MW-27-085 | DA | 12/10/2019 | | LF | ND (0.2) | ND (1.0) |
| MW-27-085 | DA | 06/18/2020 | | LF | ND (0.2) | ND (1.0) |
| MW-28-025 | SA | 04/25/2018 | | LF | ND (0.2) | ND (1.0) |
| MW-28-025 | SA | 04/25/2018 | FD | -- | ND (0.2) | ND (1.0) |
| MW-28-025 | SA | 12/14/2018 | | LF | ND (0.2) | ND (1.0) |
| MW-28-025 | SA | 05/21/2019 | | LF | ND (0.2) | ND (1.0) |
| MW-28-025 | SA | 12/09/2019 | | LF | ND (0.2) | ND (1.0) |
| MW-28-025 | SA | 06/23/2020 | | LF | ND (0.2) | ND (1.0) |
| MW-28-090 | DA | 04/25/2018 | | LF | ND (0.2) | ND (1.0) |
| MW-28-090 | DA | 12/14/2018 | | LF | ND (0.2) | ND (1.0) |
| MW-28-090 | DA | 05/21/2019 | | LF | ND (0.2) | ND (1.0) |
| MW-28-090 | DA | 12/09/2019 | | LF | ND (0.2) | ND (1.0) |
| MW-28-090 | DA | 06/23/2020 | | LF | ND (0.2) | ND (1.0) |
| MW-29 | SA | 04/25/2018 | | LF | ND (0.2) | ND (1.0) |
| MW-29 | SA | 12/10/2018 | | LF | ND (0.2) | ND (1.0) |
| MW-29 | SA | 05/21/2019 | | LF | ND (0.2) | ND (1.0) |
| MW-29 | SA | 12/10/2019 | | LF | ND (0.2) | ND (1.0) |
| MW-29 | SA | 06/23/2020 | | LF | ND (0.2) | ND (1.0) |
| MW-31-060 | SA | 04/27/2018 | | LF | 380 | 390 |
| MW-31-060 | SA | 12/10/2018 | | LF | 390 | 400 |
| MW-31-060 | SA | 05/20/2019 | | LF | 250 | 240 |
| MW-31-060 | SA | 05/20/2019 | FD | -- | 250 | 240 |
| MW-31-060 | SA | 12/12/2019 | | LF | 370 | 370 |
| MW-31-060 | SA | 12/12/2019 | FD | -- | 370 | 360 |
| MW-31-060 | SA | 06/24/2020 | | LF | 320 | 280 |

**Appendix B**

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

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

| Location ID | Aquifer Zone | Sample Date | Sample Type | Sample Method | Hexavalent Chromium (µg/L) | Dissolved Chromium (µg/L) |
|---|---|---|---|---|---|---|
| MW-32-035 | SA | 04/23/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-32-035 | SA | 12/04/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-32-035 | SA | 04/23/2019 | | LF | ND (0.2) | ND (1.0) |
| MW-32-035 | SA | 12/09/2019 | | LF | ND (1.0) | ND (1.0) |
| MW-32-035 | SA | 06/18/2020 | | LF | ND (0.2) | ND (1.0) |
| MW-33-040 | SA | 04/25/2018 | | LF | ND (1.0) | 1.2 |
| MW-33-040 | SA | 12/07/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-33-040 | SA | 04/23/2019 | | LF | ND (0.2) | ND (1.0) |
| MW-33-040 | SA | 12/05/2019 | | LF | ND (1.0) | ND (1.0) |
| MW-33-040 | SA | 12/05/2019 | FD | -- | ND (1.0) | ND (1.0) |
| MW-33-040 | SA | 06/17/2020 | | LF | ND (0.2) | ND (1.0) |
| MW-33-090 | MA | 04/24/2018 | | LF | 3.3 | 3.8 |
| MW-33-090 | MA | 12/07/2018 | | LF | 1.2 | 1.7 |
| MW-33-090 | MA | 12/07/2018 | FD | -- | 9.3 | 10 |
| MW-33-090 | MA | 04/22/2019 | | LF | 2.5 | 5.5 |
| MW-33-090 | MA | 12/05/2019 | | LF | 2.7 | 3.8 |
| MW-33-090 | MA | 12/05/2019 | FD | -- | 2.8 | 3.9 |
| MW-33-090 | MA | 06/17/2020 | | LF | 3.3 | 6.3 |
| MW-33-150 | DA | 04/25/2018 | | LF | 5.2 | 5.0 |
| MW-33-150 | DA | 12/07/2018 | | LF | 3.9 | 6.2 |
| MW-33-150 | DA | 05/21/2019 | | LF | 5.5 | 21 |
| MW-33-150 | DA | 12/05/2019 | | LF | 2.0 | 7.7 |
| MW-33-150 | DA | 12/05/2019 | FD | -- | 1.9 | 7.6 |
| MW-33-150 | DA | 06/17/2020 | | LF | 4.9 | 11 |
| MW-33-210 | DA | 04/25/2018 | | LF | 6.0 | 5.9 |
| MW-33-210 | DA | 12/07/2018 | | LF | 6.7 | 10 |
| MW-33-210 | DA | 04/22/2019 | | LF | 10 | 9.2 |
| MW-33-210 | DA | 12/05/2019 | | LF | 13 | 15 |
| MW-33-210 | DA | 12/05/2019 | FD | -- | 13 | 15 |
| MW-33-210 | DA | 06/17/2020 | | LF | 7.2 | 15 |
| MW-34-080 | DA | 04/24/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-34-080 | DA | 12/05/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-34-080 | DA | 04/24/2019 | | LF | ND (0.2) | ND (1.0) |
| MW-34-080 | DA | 12/10/2019 | | LF | ND (0.2) | ND (1.0) |
| MW-34-080 | DA | 12/10/2019 | FD | -- | ND (0.2) | ND (1.0) |
| MW-34-080 | DA | 06/18/2020 | | LF | ND (0.2) | ND (1.0) |
| MW-34-100 | DA | 02/20/2018 | | LF | ND (1.0) | 1.5 |
| MW-34-100 | DA | 04/24/2018 | | LF | ND (1.0) | 1.1 |
| MW-34-100 | DA | 04/24/2018 | FD | -- | ND (1.0) | 1.3 |
| MW-34-100 | DA | 10/01/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-34-100 | DA | 12/05/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-34-100 | DA | 02/14/2019 | | LF | ND (1.0) | 1.7 |
| MW-34-100 | DA | 04/24/2019 | | LF | ND (0.2) | ND (1.0) |
| MW-34-100 | DA | 10/01/2019 | | LF | ND (0.2) | ND (1.0) |
| MW-34-100 | DA | 12/10/2019 | | LF | ND (1.0) | 1.6 |
| MW-34-100 | DA | 12/10/2019 | FD | -- | ND (1.0) | 1.9 |

**Appendix B**

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

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

| Location ID | Aquifer Zone | Sample Date | Sample Type | Sample Method | Hexavalent Chromium (µg/L) | Dissolved Chromium (µg/L) |
|---|---|---|---|---|---|---|
| MW-34-100 | DA | 02/20/2020 | | LF | ND (0.2) | 4.0 |
| MW-34-100 | DA | 06/18/2020 | | LF | ND (0.2) | ND (1.0) |
| MW-34-100 | DA | 10/01/2020 | | LF | ND (0.2) | ND (1.0) |
| MW-35-060 | SA | 04/27/2018 | | LF | 22 | 24 |
| MW-35-060 | SA | 12/10/2018 | | LF | 20 | 20 |
| MW-35-060 | SA | 05/24/2019 | | LF | 24 | 22 |
| MW-35-060 | SA | 12/13/2019 | | LF | 24 | 21 |
| MW-35-060 | SA | 04/27/2020 | | LF | 32 | 32 |
| MW-35-135 | DA | 04/27/2018 | | LF | 26 | 25 |
| MW-35-135 | DA | 12/10/2018 | | LF | 25 | 25 |
| MW-35-135 | DA | 05/24/2019 | | LF | 28 | 24 |
| MW-35-135 | DA | 12/13/2019 | | LF | 28 | 25 |
| MW-35-135 | DA | 12/13/2019 | FD | -- | 28 | 24 |
| MW-35-135 | DA | 04/27/2020 | | LF | 25 | 24 |
| MW-36-090 | DA | 04/24/2018 | | LF | ND (0.2) | ND (1.0) |
| MW-36-090 | DA | 12/06/2018 | | LF | ND (0.2) | ND (1.0) |
| MW-36-090 | DA | 12/06/2018 | FD | -- | ND (0.2) | ND (1.0) |
| MW-36-090 | DA | 04/24/2019 | | LF | ND (0.2) | ND (1.0) |
| MW-36-090 | DA | 12/04/2019 | | LF | ND (0.2) | ND (1.0) |
| MW-36-090 | DA | 06/16/2020 | | LF | ND (0.2) | ND (1.0) |
| MW-36-100 | DA | 04/24/2018 | | LF | 6.6 | 11 |
| MW-36-100 | DA | 12/06/2018 | | LF | 3.3 | 6.8 |
| MW-36-100 | DA | 04/24/2019 | | LF | 7.4 | 11 |
| MW-36-100 | DA | 04/24/2019 | FD | -- | 7.1 | 11 |
| MW-36-100 | DA | 12/04/2019 | | LF | 7.5 | 10 |
| MW-36-100 | DA | 06/16/2020 | | LF | 12 | 11 |
| MW-37D | DA | 05/03/2018 | | LF | 7.4 | 7.1 |
| MW-37D | DA | 12/06/2018 | | LF | 5.1 | 5.0 |
| MW-37D | DA | 05/20/2019 | | LF | 6.2 | 6.0 |
| MW-37D | DA | 12/19/2019 | | LF | 4.8 | 4.5 |
| MW-37D | DA | 06/24/2020 | | LF | 5.0 | 6.5 |
| MW-38D | DA | 05/02/2018 | | LF | 15 | 14 |
| MW-38D | DA | 05/02/2018 | | 3V | 15 | 14 |
| MW-38D | DA | 12/12/2018 | | 3V | 20 | 20 |
| MW-38D | DA | 12/12/2018 | | LF | 21 | 21 |
| MW-38D | DA | 05/17/2019 | | LF | 21 | 17 |
| MW-38D | DA | 12/18/2019 | | LF | 19 | 21 |
| MW-38D | DA | 04/23/2020 | | LF | 19 | 16 |
| MW-38S | SA | 02/23/2018 | | LF | 2.8 | 2.5 |
| MW-38S | SA | 02/23/2018 | | 3V | 2.8 | 2.4 |
| MW-38S | SA | 05/02/2018 | | LF | 1.8 | 2.0 |
| MW-38S | SA | 05/02/2018 | | 3V | 1.1 | 1.3 |
| MW-38S | SA | 09/27/2018 | | LF | 3.0 | 3.3 |
| MW-38S | SA | 09/27/2018 | | 3V | 2.7 | 2.8 |
| MW-38S | SA | 12/12/2018 | | LF | 4.2 | 4.7 |
| MW-38S | SA | 12/12/2018 | | 3V | 3.9 | 4.3 |

**Appendix B**

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

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

| Location ID | Aquifer Zone | Sample Date | Sample Type | Sample Method | Hexavalent Chromium (µg/L) | Dissolved Chromium (µg/L) |
|---|---|---|---|---|---|---|
| MW-38S | SA | 02/13/2019 | | LF | 5.1 | 5.6 |
| MW-38S | SA | 05/17/2019 | | LF | 6.0 | 5.7 |
| MW-38S | SA | 09/25/2019 | | LF | 4.8 | 4.7 |
| MW-38S | SA | 12/18/2019 | | LF | 4.7 | 4.5 |
| MW-38S | SA | 02/25/2020 | | LF | 3.8 | 3.3 |
| MW-38S | SA | 02/25/2020 | FD | -- | 3.9 | 3.2 |
| MW-38S | SA | 04/23/2020 | | LF | 4.0 | 4.4 |
| MW-38S | SA | 04/23/2020 | FD | -- | 4.0 | 4.6 |
| MW-38S | SA | 02/13/2019 | | 3V | 3.7 | 3.8 |
| MW-38S | SA | 09/30/2020 | | LF | 4.5 | 5.4 |
| MW-39-100 | DA | 04/24/2018 | | LF | 57 | 54 |
| MW-39-100 | DA | 12/06/2018 | | LF | 63 | 70 |
| MW-39-100 | DA | 04/24/2019 | | LF | 88 | 89 |
| MW-39-100 | DA | 12/05/2019 | | LF | 87 | 82 |
| MW-39-100 | DA | 06/18/2020 | | LF | 93 | 91 |
| MW-40D | DA | 04/25/2018 | | H | 25 | 31 |
| MW-40D | DA | 04/25/2018 | | LF | 120 | 120 |
| MW-40D | DA | 12/12/2018 | | H | ND (1.0) | ND (1.0) |
| MW-40D | DA | 12/12/2018 | | LF | 140 | 140 |
| MW-40D | DA | 05/22/2019 | | LF | 120 | 120 |
| MW-40D | DA | 05/22/2019 | FD | -- | 120 | 120 |
| MW-40D | DA | 12/11/2019 | | LF | 150 | 130 |
| MW-40D | DA | 06/17/2020 | | LF | 12 | 11 |
| MW-40S | SA | 04/25/2018 | | H | 18 | 17 |
| MW-40S | SA | 04/25/2018 | | LF | 20 | 20 |
| MW-40S | SA | 12/12/2018 | | H | 17 | 29 |
| MW-40S | SA | 12/12/2018 | | LF | 11 | 11 |
| MW-40S | SA | 05/22/2019 | | H | 12 | 15 |
| MW-40S | SA | 12/11/2019 | | H | 17 | 17 |
| MW-40S | SA | 06/17/2020 | | H | 18 | 28 |
| MW-41D | DA | 05/04/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-41D | DA | 12/13/2018 | | LF | ND (1.0) | ND (5.0) |
| MW-41D | DA | 05/15/2019 | | LF | ND (1.0) | ND (1.0) |
| MW-41D | DA | 12/17/2019 | | LF | ND (1.0) | 1.8 |
| MW-41D | DA | 06/24/2020 | | LF | ND (1.0) | ND (1.0) |
| MW-41D | DA | 06/24/2020 | FD | -- | ND (1.0) | ND (1.0) |
| MW-42-055 | MA | 04/24/2018 | | LF | ND (0.2) | ND (1.0) |
| MW-42-055 | MA | 12/05/2018 | | LF | ND (0.2) | ND (1.0) |
| MW-42-055 | MA | 04/23/2019 | | LF | ND (0.2) | ND (1.0) |
| MW-42-055 | MA | 12/11/2019 | | LF | ND (0.2) | ND (1.0) |
| MW-42-055 | MA | 06/18/2020 | | LF | ND (0.2) | ND (1.0) |
| MW-42-065 | MA | 04/24/2018 | | LF | ND (0.2) | ND (1.0) |
| MW-42-065 | MA | 12/05/2018 | | LF | ND (0.2) | ND (1.0) |
| MW-42-065 | MA | 04/23/2019 | | LF | ND (0.2) | ND (1.0) |
| MW-42-065 | MA | 12/11/2019 | | LF | ND (0.2) | ND (1.0) |
| MW-42-065 | MA | 06/18/2020 | | LF | ND (0.2) | ND (1.0) |

**Appendix B**

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

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

| Location ID | Aquifer Zone | Sample Date | Sample Type | Sample Method | Hexavalent Chromium (µg/L) | Dissolved Chromium (µg/L) |
|---|---|---|---|---|---|---|
| MW-44-070 | MA | 04/24/2018 | | LF | ND (0.2) | ND (1.0) |
| MW-44-070 | MA | 12/05/2018 | | LF | ND (0.2) | ND (1.0) |
| MW-44-070 | MA | 04/24/2019 | | LF | ND (0.2) | ND (1.0) |
| MW-44-070 | MA | 12/11/2019 | | LF | ND (0.2) | ND (1.0) |
| MW-44-070 | MA | 06/23/2020 | | LF | ND (0.2) | ND (1.0) |
| MW-44-115 | DA | 02/20/2018 | | LF | 13 | 12 |
| MW-44-115 | DA | 02/20/2018 | FD | -- | 13 | 12 |
| MW-44-115 | DA | 04/24/2018 | | LF | 8.9 | 10 |
| MW-44-115 | DA | 10/01/2018 | | LF | 6.4 | 7.0 |
| MW-44-115 | DA | 12/05/2018 | | LF | 6.4 | 5.8 |
| MW-44-115 | DA | 02/15/2019 | | LF | 10 | 17 |
| MW-44-115 | DA | 04/24/2019 | | LF | 6.0 | 6.1 |
| MW-44-115 | DA | 10/01/2019 | | LF | 6.2 | 6.3 |
| MW-44-115 | DA | 12/11/2019 | | LF | 6.7 | 7.3 |
| MW-44-115 | DA | 02/21/2020 | | LF | 4.8 | 5.9 |
| MW-44-115 | DA | 06/23/2020 | | LF | 4.0 | 3.7 |
| MW-44-115 | DA | 10/01/2020 | | LF | 3.4 | 4.1 |
| MW-44-115 | DA | 10/01/2020 | FD | -- | 3.4 | 3.9 |
| MW-44-125 | DA | 04/24/2018 | | LF | ND (0.2) | 3.1 |
| MW-44-125 | DA | 12/05/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-44-125 | DA | 12/05/2018 | FD | -- | ND (1.0) | ND (1.0) |
| MW-44-125 | DA | 04/24/2019 | | LF | 1.9 | 10 |
| MW-44-125 | DA | 12/11/2019 | | LF | 2.6 | 3.8 |
| MW-44-125 | DA | 06/23/2020 | | LF | ND (0.2) | 1.0 |
| MW-46-175 | DA | 02/20/2018 | | LF | 13 | 12 |
| MW-46-175 | DA | 04/25/2018 | | LF | 7.4 | 8.3 |
| MW-46-175 | DA | 10/02/2018 | | LF | 6.5 | 7.0 |
| MW-46-175 | DA | 10/02/2018 | FD | -- | 6.5 | 7.0 |
| MW-46-175 | DA | 12/13/2018 | | LF | 8.2 | 12 |
| MW-46-175 | DA | 02/15/2019 | | LF | 8.1 | 18 |
| MW-46-175 | DA | 02/15/2019 | FD | -- | 7.9 | 20 |
| MW-46-175 | DA | 05/21/2019 | | LF | 7.6 | 9.1 |
| MW-46-175 | DA | 10/01/2019 | | LF | 6.0 | 6.1 |
| MW-46-175 | DA | 12/04/2019 | | LF | 5.1 | 6.3 |
| MW-46-175 | DA | 02/21/2020 | | LF | 9.1 | 17 |
| MW-46-175 | DA | 06/23/2020 | | LF | 5.3 | 23 |
| MW-46-175 | DA | 10/01/2020 | | LF | 5.1 | 5.5 |
| MW-46-205 | DA | 04/25/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-46-205 | DA | 12/13/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-46-205 | DA | 05/21/2019 | | LF | 2.4 | 2.7 |
| MW-46-205 | DA | 12/04/2019 | | LF | ND (1.0) | 6.2 |
| MW-46-205 | DA | 06/23/2020 | | LF | 1.2 | 2.1 |
| MW-47-055 | SA | 04/26/2018 | | LF | 15 | 15 |
| MW-47-055 | SA | 04/26/2018 | FD | -- | 14 | 14 |
| MW-47-055 | SA | 12/10/2018 | | LF | 21 | 21 |
| MW-47-055 | SA | 05/16/2019 | | LF | 17 | 15 |

**Appendix B**

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

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

| Location ID | Aquifer Zone | Sample Date | Sample Type | Sample Method | Hexavalent Chromium (µg/L) | Dissolved Chromium (µg/L) |
|---|---|---|---|---|---|---|
| MW-47-055 | SA | 05/16/2019 | FD | -- | 17 | 15 |
| MW-47-055 | SA | 12/04/2019 | | LF | 21 | 18 |
| MW-47-055 | SA | 06/25/2020 | | LF | 16 | 16 |
| MW-47-115 | DA | 04/25/2018 | | LF | 23 | 23 |
| MW-47-115 | DA | 12/10/2018 | | LF | 15 | 15 |
| MW-47-115 | DA | 12/10/2018 | FD | -- | 15 | 15 |
| MW-47-115 | DA | 05/16/2019 | | LF | 27 | 23 |
| MW-47-115 | DA | 12/04/2019 | | LF | 16 | 22 |
| MW-47-115 | DA | 06/25/2020 | | LF | 24 | 24 |
| MW-48 | BR | 05/03/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-48 | BR | 12/13/2018 | | LF | ND (1.0) | ND (5.0) |
| MW-48 | BR | 05/23/2019 | | LF | ND (1.0) | ND (1.0) |
| MW-48 | BR | 12/19/2019 | | 3V | ND (1.0) | ND (1.0) |
| MW-48 | BR | 05/01/2020 | | 3V | ND (1.0) | ND (1.0) |
| MW-50-095 | MA | 04/27/2018 | | LF | 11 | 10 |
| MW-50-095 | MA | 12/10/2018 | | LF | 13 | 14 |
| MW-50-095 | MA | 05/20/2019 | | LF | 13 | 12 |
| MW-50-095 | MA | 12/12/2019 | | LF | 13 | 14 |
| MW-50-095 | MA | 06/24/2020 | | LF | 13 | 14 |
| MW-50-200 | DA | 04/27/2018 | | LF | 6,500 | 6,800 |
| MW-50-200 | DA | 12/10/2018 | | LF | 3,100 | 3,700 |
| MW-50-200 | DA | 05/20/2019 | | LF | 5,800 | 6,200 |
| MW-50-200 | DA | 12/12/2019 | | LF | 2,200 | 2,100 |
| MW-50-200 | DA | 12/12/2019 | FD | -- | 2,200 | 2,100 |
| MW-50-200 | DA | 06/24/2020 | | LF | 3,600 | 3,500 |
| MW-51 | MA | 05/01/2018 | | LF | 3,500 | 3,700 |
| MW-51 | MA | 12/10/2018 | | LF | 3,300 | 3,800 |
| MW-51 | MA | 05/22/2019 | | LF | 3,300 | 3,800 |
| MW-51 | MA | 12/12/2019 | | LF | 3,600 | 3,900 |
| MW-51 | MA | 12/12/2019 | FD | -- | 3,600 | 4,000 |
| MW-51 | MA | 04/27/2020 | | LF | 3,200 | 3,200 |
| MW-51 | MA | 04/27/2020 | FD | -- | 3,300 | 3,200 |
| MW-52D | DA | 04/23/2018 | | LF | ND (1.0) | ND (5.0) |
| MW-52D | DA | 12/04/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-52D | DA | 04/23/2019 | | LF | ND (1.0) | ND (1.0) |
| MW-52D | DA | 04/23/2019 | FD | -- | ND (1.0) | ND (1.0) |
| MW-52D | DA | 12/12/2019 | | LF | ND (1.0) | ND (1.0) |
| MW-52D | DA | 06/16/2020 | | LF | ND (1.0) | ND (1.0) |
| MW-52M | DA | 04/23/2018 | | LF | ND (1.0) | ND (5.0) |
| MW-52M | DA | 12/04/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-52M | DA | 04/23/2019 | | LF | ND (1.0) | ND (1.0) |
| MW-52M | DA | 12/12/2019 | | LF | ND (1.0) | ND (1.0) |
| MW-52M | DA | 06/16/2020 | | LF | ND (1.0) | ND (1.0) |
| MW-52S | MA | 04/24/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-52S | MA | 12/04/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-52S | MA | 04/23/2019 | | LF | ND (0.2) | ND (1.0) |

**Appendix B**

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

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

| Location ID | Aquifer Zone | Sample Date | Sample Type | Sample Method | Hexavalent Chromium (µg/L) | Dissolved Chromium (µg/L) |
|---|---|---|---|---|---|---|
| MW-52S | MA | 12/12/2019 | | LF | ND (0.2) | ND (1.0) |
| MW-52S | MA | 06/16/2020 | | LF | ND (0.2) | ND (1.0) |
| MW-53D | DA | 04/23/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-53D | DA | 12/04/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-53D | DA | 04/23/2019 | | LF | ND (1.0) | ND (1.0) |
| MW-53D | DA | 12/12/2019 | | LF | ND (1.0) | ND (1.0) |
| MW-53D | DA | 06/16/2020 | | LF | ND (1.0) | ND (1.0) |
| MW-53M | DA | 04/23/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-53M | DA | 12/04/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-53M | DA | 04/23/2019 | | LF | ND (1.0) | ND (1.0) |
| MW-53M | DA | 12/12/2019 | | LF | ND (1.0) | ND (1.0) |
| MW-53M | DA | 06/16/2020 | | LF | ND (1.0) | ND (1.0) |
| MW-54-085 | DA | 05/04/2018 | (a) | LF | ND (0.1) | ND (0.2) |
| MW-54-085 | DA | 12/13/2018 | (a) | LF | ND (0.1 J) | ND (2.0) |
| MW-54-085 | DA | 05/23/2019 | (a) | LF | ND (0.1) | ND (2.0) |
| MW-54-085 | DA | 12/10/2019 | (a) | LF | ND (0.1) | ND (1.0) |
| MW-54-085 | DA | 06/19/2020 | (a) | LF | ND (0.1) | ND (0.2) |
| MW-54-140 | DA | 05/04/2018 | (a) | LF | 5.0 | ND (0.2) |
| MW-54-140 | DA | 12/13/2018 | (a) | LF | ND (0.5 J) | ND (2.0) |
| MW-54-140 | DA | 05/23/2019 | (a) | LF | ND (0.5) | ND (2.0) |
| MW-54-140 | DA | 12/10/2019 | (a) | LF | ND (0.5) | ND (1.0) |
| MW-54-140 | DA | 06/19/2020 | (a) | LF | ND (0.5) | ND (0.2) |
| MW-54-195 | DA | 05/04/2018 | (a) | LF | 5.1 | ND (0.2) |
| MW-54-195 | DA | 12/13/2018 | (a) | LF | ND (0.5 J) | ND (2.0) |
| MW-54-195 | DA | 05/23/2019 | (a) | LF | ND (0.5) | 15 |
| MW-54-195 | DA | 08/22/2019 | (a) | LF | ND (0.5) | ND (2.0) |
| MW-54-195 | DA | 08/22/2019 | (a) | LF | ND (0.5) | ND (2.0) |
| MW-54-195 | DA | 12/10/2019 | (a) | LF | ND (0.5) | ND (1.0) |
| MW-54-195 | DA | 06/19/2020 | (a) | LF | ND (0.5) | ND (0.2) |
| MW-55-045 | MA | 05/03/2018 | (a) | LF | ND (0.1) | ND (0.2) |
| MW-55-045 | MA | 12/13/2018 | (a) | LF | ND (0.1 J) | ND (0.2) |
| MW-55-045 | MA | 05/23/2019 | (a) | LF | ND (0.1) | ND (2.0) |
| MW-55-045 | MA | 12/10/2019 | (a) | LF | ND (0.1) | ND (1.0) |
| MW-55-045 | MA | 06/19/2020 | (a) | LF | ND (0.1) | ND (0.2) |
| MW-55-120 | DA | 05/03/2018 | (a) | LF | 8.0 | 8.4 |
| MW-55-120 | DA | 12/13/2018 | (a) | LF | 8.29 J | ND (2.0) |
| MW-55-120 | DA | 05/23/2019 | (a) | LF | 7.5 | ND (2.0) |
| MW-55-120 | DA | 12/10/2019 | (a) | LF | 6.6 | 8.2 |
| MW-55-120 | DA | 06/19/2020 | (a) | LF | 7.9 | 9.2 |
| MW-55-120 | DA | 06/19/2020 | FD(a) | -- | 8.0 | 9.2 |
| MW-56D | DA | 05/02/2018 | (a) | LF | 5.0 | ND (0.2) |
| MW-56D | DA | 12/13/2018 | (a) | LF | ND (0.5 J) | ND (2.0) |
| MW-56D | DA | 12/13/2018 | FD(a) | -- | ND (0.5 J) | ND (2.0) |
| MW-56D | DA | 05/23/2019 | (a) | LF | ND (0.5) | ND (2.0) |
| MW-56D | DA | 12/10/2019 | (a) | LF | ND (0.5) | ND (1.0) |
| MW-56D | DA | 12/10/2019 | FD(a) | -- | ND (0.5) | ND (1.0) |

**Appendix B**

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

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

| Location ID | Aquifer Zone | Sample Date | Sample Type | Sample Method | Hexavalent Chromium (µg/L) | Dissolved Chromium (µg/L) |
|---|---|---|---|---|---|---|
| MW-56D | DA | 06/19/2020 | (a) | LF | ND (0.5) | ND (0.2) |
| MW-56M | DA | 05/02/2018 | (a) | LF | 5.0 | ND (0.2) |
| MW-56M | DA | 12/13/2018 | (a) | LF | ND (0.5 J) | ND (2.0) |
| MW-56M | DA | 05/23/2019 | (a) | LF | ND (0.5) | ND (2.0) |
| MW-56M | DA | 12/10/2019 | (a) | LF | ND (0.5) | ND (1.0) |
| MW-56M | DA | 06/19/2020 | (a) | LF | ND (0.5) | ND (0.2) |
| MW-56S | SA | 05/02/2018 | (a) | LF | ND (0.1) | ND (0.2) |
| MW-56S | SA | 12/13/2018 | (a) | LF | ND (0.1 J) | ND (2.0) |
| MW-56S | SA | 05/23/2019 | (a) | LF | ND (0.1) | ND (2.0) |
| MW-56S | SA | 12/10/2019 | (a) | LF | ND (0.1) | ND (1.0) |
| MW-56S | SA | 06/19/2020 | (a) | LF | ND (0.1) | ND (0.2) |
| MW-57-070 | BR | 05/03/2018 | | LF | 340 | 360 |
| MW-57-070 | BR | 12/07/2018 | | LF | 410 | 420 |
| MW-57-070 | BR | 05/20/2019 | | LF | 380 | 400 |
| MW-57-070 | BR | 12/06/2019 | | LF | 420 | 390 |
| MW-57-070 | BR | 06/22/2020 | | LF | 610 | 530 |
| MW-57-185 | BR | 05/03/2018 | | 3V | 7.7 | 7.5 |
| MW-57-185 | BR | 12/07/2018 | | 3V | 6.4 | 5.7 |
| MW-57-185 | BR | 05/20/2019 | | LF | 4.6 | 5.2 |
| MW-57-185 | BR | 05/20/2019 | FD | -- | 4.7 | 5.1 |
| MW-57-185 | BR | 12/06/2019 | | LF | 3.7 | 3.4 |
| MW-57-185 | BR | 06/22/2020 | | LF | 1.3 | 1.9 |
| MW-57-185 | BR | 06/22/2020 | FD | -- | 1.4 | 2.0 |
| MW-57-185_D | BR | 05/03/2018 | | LF | 4.8 | 4.7 |
| MW-57-185_D | BR | 12/07/2018 | | LF | 6.2 | 5.9 |
| MW-57-185_S | BR | 05/03/2018 | | LF | 5.3 | 5.2 |
| MW-57-185_S | BR | 12/07/2018 | | LF | 5.4 | 6.0 |
| MW-58BR | BR | 02/19/2018 | | LF | 13 | 11 |
| MW-58BR | BR | 05/03/2018 | | LF | 9.3 | 9.2 |
| MW-58BR | BR | 09/27/2018 | | LF | 9.7 | 9.6 |
| MW-58BR | BR | 12/13/2018 | | LF | 10 | 11 |
| MW-58BR | BR | 02/14/2019 | | LF | 7.4 | 9.4 |
| MW-58BR | BR | 05/21/2019 | | LF | 12 | 14 |
| MW-58BR | BR | 08/19/2019 | | LF | 90 | 88 J |
| MW-58BR | BR | 08/19/2019 | FD | -- | 90 | 89 J |
| MW-58BR | BR | 12/13/2019 | | LF | 76 | 70 |
| MW-58BR | BR | 02/17/2020 | | LF | 120 | 120 |
| MW-58BR | BR | 05/01/2020 | | LF | 43 | 41 |
| MW-58BR | BR | 09/29/2020 | | LF | 3.9 | 4.5 |
| MW-59-100 | SA | 05/03/2018 | | LF | 2,800 | 3,000 |
| MW-59-100 | SA | 12/07/2018 | | LF | 3,100 | 3,300 |
| MW-59-100 | SA | 12/07/2018 | FD | -- | 3,100 | 3,100 |
| MW-59-100 | SA | 05/20/2019 | | LF | 2,000 | 2,200 |
| MW-59-100 | SA | 05/20/2019 | FD | -- | 2,200 | 2,300 |
| MW-59-100 | SA | 12/13/2019 | | LF | 2,700 | 2,800 |
| MW-59-100 | SA | 12/13/2019 | FD | -- | 2,700 | 2,700 |

**Appendix B**

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

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

| Location ID | Aquifer Zone | Sample Date | Sample Type | Sample Method | Hexavalent Chromium (µg/L) | Dissolved Chromium (µg/L) |
|---|---|---|---|---|---|---|
| MW-59-100 | SA | 06/22/2020 | | LF | 2,100 | 2,200 |
| MW-60-125 | BR | 05/02/2018 | | LF | 510 | 470 |
| MW-60-125 | BR | 12/06/2018 | | LF | 980 | 950 |
| MW-60-125 | BR | 05/22/2019 | | LF | 880 | 890 |
| MW-60-125 | BR | 12/06/2019 | | LF | 580 | 540 |
| MW-60-125 | BR | 06/24/2020 | | LF | 660 | 630 |
| MW-60BR-245 | BR | 02/21/2018 | | 3V | 69 | 59 |
| MW-60BR-245 | BR | 05/02/2018 | | 3V | 73 | 67 |
| MW-60BR-245 | BR | 09/25/2018 | | 3V | 76 | 81 |
| MW-60BR-245 | BR | 12/06/2018 | | 3V | 110 | 120 |
| MW-60BR-245 | BR | 02/14/2019 | | 3V | 110 | 110 |
| MW-60BR-245 | BR | 05/22/2019 | | 3V | 130 | 120 |
| MW-60BR-245 | BR | 12/12/2019 | | 3V | 64 | 52 |
| MW-60BR-245 | BR | 02/20/2020 | | 3V | 52 | 44 |
| MW-60BR-245 | BR | 09/30/2020 | | LF | 21 | 22 |
| MW-60BR-245_D | BR | 02/21/2018 | | LF | 4.1 | 39 |
| MW-60BR-245_D | BR | 05/02/2018 | | LF | 1.2 | 1.7 |
| MW-60BR-245_D | BR | 09/25/2018 | | LF | 6.4 | 6.2 |
| MW-60BR-245_D | BR | 12/06/2018 | | LF | 20 | 21 |
| MW-60BR-245_D | BR | 02/14/2019 | | LF | 18 | 17 |
| MW-60BR-245_D | BR | 05/23/2019 | | LF | 68 | 61 |
| MW-60BR-245_D | BR | 12/13/2019 | | LF | 75 | 61 |
| MW-60BR-245_D | BR | 02/21/2020 | | LF | 72 | 62 |
| MW-60BR-245_S | BR | 02/21/2018 | | LF | ND (1.0) | 7.7 |
| MW-60BR-245_S | BR | 05/02/2018 | | LF | 1.1 | 1.5 |
| MW-60BR-245_S | BR | 09/25/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-60BR-245_S | BR | 12/06/2018 | | LF | 17 | 17 |
| MW-60BR-245_S | BR | 02/14/2019 | | LF | 25 | 29 |
| MW-60BR-245_S | BR | 05/23/2019 | | LF | 85 | 74 |
| MW-60BR-245_S | BR | 12/13/2019 | | LF | 86 | 76 |
| MW-60BR-245_S | BR | 02/21/2020 | | LF | 96 | 85 |
| MW-61-110 | BR | 05/04/2018 | | LF | 330 | 340 |
| MW-61-110 | BR | 12/13/2018 | | LF | 430 | 460 |
| MW-61-110 | BR | 12/13/2018 | FD | -- | 460 | 470 |
| MW-61-110 | BR | 05/23/2019 | | LF | 280 | 280 |
| MW-61-110 | BR | 12/06/2019 | | LF | 480 | 460 |
| MW-62-065 | BR | 02/19/2018 | | LF | 560 | 510 |
| MW-62-065 | BR | 02/19/2018 | FD | -- | 550 | 530 |
| MW-62-065 | BR | 05/01/2018 | | LF | 520 | 530 |
| MW-62-065 | BR | 09/26/2018 | | LF | 540 | 570 |
| MW-62-065 | BR | 12/07/2018 | | LF | 540 | 610 |
| MW-62-065 | BR | 02/11/2019 | | LF | 470 | 550 |
| MW-62-065 | BR | 05/21/2019 | | LF | 570 | 560 |
| MW-62-065 | BR | 10/01/2019 | | LF | 490 | 530 |
| MW-62-065 | BR | 12/03/2019 | | LF | 560 | 540 |
| MW-62-065 | BR | 02/19/2020 | | LF | 480 | 460 |

**Appendix B**

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

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

| Location ID | Aquifer Zone | Sample Date | Sample Type | Sample Method | Hexavalent Chromium (µg/L) | Dissolved Chromium (µg/L) |
|---|---|---|---|---|---|---|
| MW-62-065 | BR | 04/28/2020 | | LF | 580 | 550 |
| MW-62-065 | BR | 09/30/2020 | | LF | 590 | 610 |
| MW-62-110 | BR | 02/21/2018 | | Tap | ND (1.0) | ND (1.0) |
| MW-62-110 | BR | 05/03/2018 | | G | ND (1.0) | ND (1.0) |
| MW-62-110 | BR | 09/26/2018 | | 3V | ND (1.0) | ND (1.0) |
| MW-62-110 | BR | 12/13/2018 | | G | 0.32 | 3.0 |
| MW-62-110 | BR | 02/14/2019 | | LF | ND (1.0) | ND (1.0) |
| MW-62-110 | BR | 05/22/2019 | | G | ND (1.0) | ND (1.0) |
| MW-62-110 | BR | 09/25/2019 | | G | ND (1.0) | ND (1.0) |
| MW-62-110 | BR | 12/04/2019 | | G | 0.59 | ND (1.0) |
| MW-62-110 | BR | 02/18/2020 | | LF | ND (0.2) | ND (1.0) |
| MW-62-110 | BR | 04/29/2020 | | Tap | ND (1.0) | ND (1.0) |
| MW-62-110 | BR | 09/30/2020 | | LF | ND (1.0) | ND (1.0) |
| MW-62-190 | BR | 05/03/2018 | | G | ND (1.0) | ND (1.0) |
| MW-62-190 | BR | 12/13/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-62-190 | BR | 05/22/2019 | | G | ND (1.0) | ND (1.0) |
| MW-62-190 | BR | 12/04/2019 | | LF | ND (1.0) | ND (1.0) |
| MW-62-190 | BR | 04/29/2020 | | Tap | ND (1.0) | ND (1.0) |
| MW-62-190 | BR | 04/29/2020 | FD | -- | ND (1.0) | ND (1.0) |
| MW-63-065 | BR | 02/21/2018 | | LF | 0.5 | 1.6 |
| MW-63-065 | BR | 04/26/2018 | | LF | 0.9 | 1.3 |
| MW-63-065 | BR | 09/24/2018 | | LF | 1.0 | 1.4 |
| MW-63-065 | BR | 09/24/2018 | FD | -- | 1.0 | 1.5 |
| MW-63-065 | BR | 12/12/2018 | | LF | 1.0 | 1.7 |
| MW-63-065 | BR | 02/14/2019 | | LF | 1.1 | 1.3 |
| MW-63-065 | BR | 05/21/2019 | | LF | 1.3 | 2.8 |
| MW-63-065 | BR | 09/26/2019 | | LF | 1.2 | 1.0 |
| MW-63-065 | BR | 09/26/2019 | FD | -- | 1.2 | 1.1 |
| MW-63-065 | BR | 12/06/2019 | | LF | 1.4 | 3.0 |
| MW-63-065 | BR | 02/19/2020 | | LF | 1.2 | 2.5 |
| MW-63-065 | BR | 02/19/2020 | FD | -- | 1.2 | 2.8 |
| MW-63-065 | BR | 06/24/2020 | | LF | 1.3 | 2.6 |
| MW-63-065 | BR | 09/30/2020 | | LF | 1.3 | 2.3 |
| MW-64BR | BR | 02/19/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-64BR | BR | 02/19/2018 | FD | -- | ND (1.0) | ND (1.0) |
| MW-64BR | BR | 05/02/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-64BR | BR | 09/24/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-64BR | BR | 12/13/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-64BR | BR | 02/13/2019 | | LF | ND (1.0) | ND (1.0) |
| MW-64BR | BR | 05/21/2019 | | LF | ND (1.0) | ND (1.0) |
| MW-64BR | BR | 08/22/2019 | | LF | ND (1.0) | ND (1.0) |
| MW-64BR | BR | 12/06/2019 | | LF | ND (1.0) | ND (1.0) |
| MW-64BR | BR | 02/21/2020 | | LF | ND (1.0) | ND (1.0) |
| MW-64BR | BR | 05/01/2020 | | LF | ND (0.2) | 1.8 |
| MW-64BR | BR | 09/30/2020 | | LF | ND (1.0) | ND (1.0) |
| MW-65-160 | SA | 02/22/2018 | | LF | 190 | 170 |

**Appendix B**

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

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

| Location ID | Aquifer Zone | Sample Date | Sample Type | Sample Method | Hexavalent Chromium (µg/L) | Dissolved Chromium (µg/L) |
|---|---|---|---|---|---|---|
| MW-65-160 | SA | 04/30/2018 | | LF | 160 | 170 |
| MW-65-160 | SA | 09/27/2018 | | LF | 170 | 170 |
| MW-65-160 | SA | 12/05/2018 | | LF | 160 | 220 |
| MW-65-160 | SA | 02/13/2019 | | LF | 220 | 220 |
| MW-65-160 | SA | 05/16/2019 | | LF | 160 | 190 |
| MW-65-160 | SA | 09/26/2019 | | LF | 150 | 160 |
| MW-65-160 | SA | 12/03/2019 | | LF | 260 | 260 |
| MW-65-160 | SA | 02/20/2020 | | LF | 250 | 250 |
| MW-65-160 | SA | 04/29/2020 | | LF | 190 | 210 |
| MW-65-160 | SA | 09/29/2020 | | LF | 240 | 240 |
| MW-65-225 | DA | 02/22/2018 | | LF | 510 | 520 |
| MW-65-225 | DA | 04/30/2018 | | LF | 110 | 100 |
| MW-65-225 | DA | 09/27/2018 | | LF | 180 | 170 |
| MW-65-225 | DA | 09/27/2018 | FD | -- | 180 | 170 |
| MW-65-225 | DA | 12/05/2018 | | LF | 220 | 220 |
| MW-65-225 | DA | 02/13/2019 | | LF | 490 | 490 |
| MW-65-225 | DA | 05/16/2019 | | LF | 180 | 160 |
| MW-65-225 | DA | 09/26/2019 | | LF | 330 | 340 |
| MW-65-225 | DA | 09/26/2019 | FD | -- | 330 | 320 |
| MW-65-225 | DA | 12/03/2019 | | LF | 480 | 450 |
| MW-65-225 | DA | 02/20/2020 | | LF | 460 | 470 |
| MW-65-225 | DA | 04/29/2020 | | LF | 280 | 260 |
| MW-65-225 | DA | 09/29/2020 | | LF | 260 | 250 |
| MW-66-165 | SA | 04/30/2018 | | LF | 540 | 540 |
| MW-66-165 | SA | 12/05/2018 | | LF | 480 | 500 |
| MW-66-165 | SA | 05/16/2019 | | LF | 550 | 570 |
| MW-66-165 | SA | 05/16/2019 | FD | -- | 540 | 580 |
| MW-66-165 | SA | 12/03/2019 | | LF | 480 | 480 |
| MW-66-165 | SA | 04/29/2020 | | LF | 530 | 520 |
| MW-66-230 | DA | 04/30/2018 | | LF | 6,700 | 6,900 |
| MW-66-230 | DA | 04/30/2018 | FD | -- | 6,800 | 6,900 |
| MW-66-230 | DA | 12/05/2018 | | LF | 6,100 | 6,200 |
| MW-66-230 | DA | 05/16/2019 | | LF | 6,400 | 7,000 |
| MW-66-230 | DA | 12/03/2019 | | LF | 6,800 | 6,600 |
| MW-66-230 | DA | 04/29/2020 | | LF | 6,700 | 6,300 |
| MW-66-230 | DA | 04/29/2020 | FD | -- | 6,600 | 6,600 |
| MW-66BR-270 | BR | 05/02/2018 | | 3V | ND (1.0) | ND (1.0) |
| MW-66BR-270 | BR | 12/07/2018 | | 3V | ND (1.0) | ND (1.0) |
| MW-66BR-270 | BR | 05/22/2019 | | 3V | ND (1.0) | ND (1.0) |
| MW-66BR-270 | BR | 12/10/2019 | | 3V | ND (1.0) | ND (1.0) |
| MW-66BR-270 | BR | 06/24/2020 | | 3V | ND (1.0) | ND (1.0) |
| MW-67-185 | SA | 04/30/2018 | | LF | 1,800 | 1,700 |
| MW-67-185 | SA | 12/05/2018 | | LF | 1,800 | 2,000 |
| MW-67-185 | SA | 05/16/2019 | | LF | 2,100 | 2,200 |
| MW-67-185 | SA | 12/04/2019 | | LF | 3,100 | 2,900 J |
| MW-67-185 | SA | 04/30/2020 | | LF | 2,000 | 2,000 |

**Appendix B**

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

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

| Location ID | Aquifer Zone | Sample Date | Sample Type | Sample Method | Hexavalent Chromium (µg/L) | Dissolved Chromium (µg/L) |
|---|---|---|---|---|---|---|
| MW-67-225 | MA | 04/30/2018 | | LF | 2,800 | 2,800 |
| MW-67-225 | MA | 12/05/2018 | | LF | 2,900 | 3,000 |
| MW-67-225 | MA | 05/16/2019 | | LF | 3,100 | 3,300 |
| MW-67-225 | MA | 12/04/2019 | | LF | 3,300 | 3,300 |
| MW-67-225 | MA | 04/30/2020 | | LF | 3,000 | 3,200 |
| MW-67-260 | DA | 04/30/2018 | | LF | 820 | 830 |
| MW-67-260 | DA | 12/05/2018 | | LF | 660 | 710 J |
| MW-67-260 | DA | 05/16/2019 | | LF | 800 | 850 |
| MW-67-260 | DA | 12/04/2019 | | LF | 390 | 360 |
| MW-67-260 | DA | 04/30/2020 | | LF | 1,100 | 1,100 |
| MW-68-180 | SA | 02/22/2018 | | LF | 24,000 | 24,000 |
| MW-68-180 | SA | 05/01/2018 | | LF | 5,600 | 6,100 |
| MW-68-180 | SA | 09/27/2018 | | LF | 8,500 | 8,900 |
| MW-68-180 | SA | 12/07/2018 | | LF | 22,000 | 24,000 |
| MW-68-180 | SA | 02/13/2019 | | LF | 37,000 | 42,000 |
| MW-68-180 | SA | 05/22/2019 | | LF | 5,400 | 6,200 |
| MW-68-180 | SA | 09/26/2019 | | LF | 9,700 | 11,000 |
| MW-68-180 | SA | 12/04/2019 | | LF | 34,000 | 37,000 |
| MW-68-180 | SA | 02/20/2020 | | LF | 25,000 | 27,000 |
| MW-68-180 | SA | 04/30/2020 | | LF | 41,000 | 43,000 |
| MW-68-180 | SA | 09/29/2020 | | LF | 54,000 | 51,000 |
| MW-68-240 | DA | 02/22/2018 | | LF | 2,100 | 2,000 |
| MW-68-240 | DA | 05/01/2018 | | LF | 2,000 | 2,100 |
| MW-68-240 | DA | 12/05/2018 | | LF | 2,000 | 1,900 |
| MW-68-240 | DA | 05/23/2019 | | LF | 2,000 | 2,000 |
| MW-68-240 | DA | 05/23/2019 | FD | -- | 1,900 | 2,100 |
| MW-68-240 | DA | 12/04/2019 | | LF | 2,100 | 1,900 |
| MW-68-240 | DA | 04/30/2020 | | LF | 2,000 | 2,000 |
| MW-68BR-280 | BR | 02/22/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-68BR-280 | BR | 05/01/2018 | | LF | ND (1.0) | ND (5.0) |
| MW-68BR-280 | BR | 12/05/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-68BR-280 | BR | 05/22/2019 | | LF | ND (1.0) | ND (1.0) |
| MW-68BR-280 | BR | 12/04/2019 | | LF | ND (1.0) | ND (1.0) |
| MW-68BR-280 | BR | 04/30/2020 | | 3V | ND (1.0) | ND (1.0) |
| MW-69-195 | BR | 02/22/2018 | | LF | 120 | 110 |
| MW-69-195 | BR | 05/01/2018 | | LF | 210 | 210 |
| MW-69-195 | BR | 09/27/2018 | | LF | 460 | 450 |
| MW-69-195 | BR | 12/07/2018 | | LF | 460 | 470 |
| MW-69-195 | BR | 02/13/2019 | | LF | 110 | 100 |
| MW-69-195 | BR | 05/16/2019 | | LF | 120 | 120 |
| MW-69-195 | BR | 09/26/2019 | | LF | 78 | 77 |
| MW-69-195 | BR | 12/03/2019 | | LF | 180 | 150 |
| MW-69-195 | BR | 02/25/2020 | | LF | 150 | 140 |
| MW-69-195 | BR | 05/01/2020 | | LF | 170 | 170 |
| MW-69-195 | BR | 05/01/2020 | FD | -- | 180 | 170 |
| MW-69-195 | BR | 09/29/2020 | | LF | 350 | 380 |

**Appendix B**

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

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

| Location ID | Aquifer Zone | Sample Date | Sample Type | Sample Method | Hexavalent Chromium (µg/L) | Dissolved Chromium (µg/L) |
|---|---|---|---|---|---|---|
| MW-70-105 | BR | 05/03/2018 | | LF | 160 | 150 |
| MW-70-105 | BR | 12/13/2018 | | LF | 120 | 130 |
| MW-70-105 | BR | 05/21/2019 | | LF | 170 | 170 |
| MW-70-105 | BR | 12/17/2019 | | LF | 60 | 55 |
| MW-70BR-225 | BR | 05/03/2018 | | LF | 1,300 | 1,300 |
| MW-70BR-225 | BR | 05/03/2018 | | 3V | 1,800 | 1,800 |
| MW-70BR-225 | BR | 12/13/2018 | | LF | 1,200 | 1,400 |
| MW-70BR-225 | BR | 12/13/2018 | | 3V | 1,800 | 1,900 |
| MW-70BR-225 | BR | 05/21/2019 | | LF | 1,600 | 1,700 |
| MW-70BR-225 | BR | 12/17/2019 | | LF | 1,300 | 1,200 |
| MW-71-035 | SA | 05/02/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-71-035 | SA | 12/11/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-71-035 | SA | 12/11/2018 | FD | -- | ND (1.0) | 1.0 |
| MW-71-035 | SA | 05/23/2019 | | LF | ND (1.0) | ND (1.0) |
| MW-71-035 | SA | 12/18/2019 | | LF | ND (1.0) | ND (1.0) |
| MW-71-035 | SA | 05/01/2020 | | LF | ND (1.0) | ND (1.0) |
| MW-72-080 | BR | 02/20/2018 | | LF | 90 | 78 |
| MW-72-080 | BR | 04/26/2018 | | LF | 68 | 62 |
| MW-72-080 | BR | 09/26/2018 | | LF | 91 | 100 |
| MW-72-080 | BR | 12/06/2018 | | LF | 82 | 73 |
| MW-72-080 | BR | 02/11/2019 | | LF | 77 | 92 |
| MW-72-080 | BR | 05/24/2019 | | LF | 55 | 51 |
| MW-72-080 | BR | 08/22/2019 | | LF | 93 | 91 |
| MW-72-080 | BR | 12/06/2019 | | LF | 120 | 110 |
| MW-72-080 | BR | 02/20/2020 | | LF | 96 | 85 |
| MW-72-080 | BR | 04/28/2020 | | LF | 100 | 95 |
| MW-72-080 | BR | 09/29/2020 | | LF | 79 | 75 |
| MW-72BR-200 | BR | 02/20/2018 | | 3V | 4.5 | 4.4 |
| MW-72BR-200 | BR | 04/26/2018 | | 3V | 3.3 | 2.6 |
| MW-72BR-200 | BR | 09/26/2018 | | 3V | 3.0 | 2.9 |
| MW-72BR-200 | BR | 12/06/2018 | | 3V | 4.9 | 3.3 |
| MW-72BR-200 | BR | 02/12/2019 | | 3V | 5.3 | 5.4 |
| MW-72BR-200 | BR | 08/22/2019 | | LF | ND (1.0) | ND (1.0) |
| MW-72BR-200 | BR | 12/06/2019 | | LF | 2.4 | 3.5 |
| MW-72BR-200 | BR | 02/20/2020 | | LF | 1.2 | 2.9 |
| MW-72BR-200 | BR | 04/28/2020 | | LF | ND (1.0) | 2.1 |
| MW-72BR-200 | BR | 09/29/2020 | | LF | ND (1.0) | 1.7 |
| MW-72BR-200_D | BR | 02/20/2018 | | LF | 1.6 | 2.1 |
| MW-72BR-200_D | BR | 04/26/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-72BR-200_D | BR | 09/26/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-72BR-200_D | BR | 12/06/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-72BR-200_D | BR | 02/12/2019 | | LF | ND (1.0) | ND (1.0) |
| MW-72BR-200_S | BR | 02/20/2018 | | LF | ND (1.0) | 1.1 |
| MW-72BR-200_S | BR | 04/26/2018 | | LF | ND (1.0) | 2.0 |
| MW-72BR-200_S | BR | 09/26/2018 | | LF | ND (1.0) | ND (1.0) |
| MW-72BR-200_S | BR | 12/06/2018 | | LF | ND (1.0) | ND (1.0) |

**Appendix B**

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

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

| Location ID | Aquifer Zone | Sample Date | Sample Type | Sample Method | Hexavalent Chromium (µg/L) | Dissolved Chromium (µg/L) |
|---|---|---|---|---|---|---|
| MW-72BR-200_S | BR | 02/12/2019 | | LF | ND (1.0) | 1.3 |
| MW-72BR-200_S | BR | 05/23/2019 | | LF | ND (1.0) | ND (1.0) |
| MW-73-080 | BR | 02/20/2018 | | LF | 22 | 21 |
| MW-73-080 | BR | 05/01/2018 | | LF | 57 | 58 |
| MW-73-080 | BR | 09/24/2018 | | LF | 36 | 39 |
| MW-73-080 | BR | 12/06/2018 | | LF | 29 | 26 |
| MW-73-080 | BR | 02/11/2019 | | LF | 29 | 34 J |
| MW-73-080 | BR | 05/23/2019 | | LF | 34 | 35 |
| MW-73-080 | BR | 08/22/2019 | | LF | 20 | 18 |
| MW-73-080 | BR | 12/06/2019 | | LF | 19 | 19 |
| MW-73-080 | BR | 02/20/2020 | | LF | 21 | 19 |
| MW-73-080 | BR | 04/28/2020 | | LF | 26 | 24 |
| MW-73-080 | BR | 09/30/2020 | | LF | 18 | 21 |
| MW-74-240 | BR | 05/02/2018 | | LF | 0.46 | ND (1.0) |
| MW-74-240 | BR | 12/07/2018 | | LF | 0.33 | ND (1.0) |
| MW-74-240 | BR | 05/22/2019 | | LF | 0.55 | ND (1.0) |
| MW-74-240 | BR | 12/05/2019 | | LF | ND (0.2) | ND (1.0) |
| MW-74-240 | BR | 04/30/2020 | | 3V | ND (0.2) | 1.5 |
| PE-01 | DA | 01/04/2018 | | Tap | ND (0.2) | ND (1.0) |
| PE-01 | DA | 02/07/2018 | | Tap | 0.7 | ND (1.0) |
| PE-01 | DA | 03/07/2018 | | Tap | 2.3 | 2.0 |
| PE-01 | DA | 04/03/2018 | | Tap | ND (0.2) | ND (1.0) |
| PE-01 | DA | 05/04/2018 | | Tap | ND (0.2) | 1.8 |
| PE-01 | DA | 06/07/2018 | | Tap | ND (0.2) | ND (1.0) |
| PE-01 | DA | 07/03/2018 | | Tap | ND (0.2) | ND (1.0) |
| PE-01 | DA | 08/01/2018 | | Tap | ND (0.2) | ND (1.0) |
| PE-01 | DA | 09/06/2018 | | Tap | ND (0.2) | ND (1.0) |
| PE-01 | DA | 10/02/2018 | | Tap | 7.6 | 5.6 |
| PE-01 | DA | 11/07/2018 | | Tap | ND (0.2) | ND (1.0) |
| PE-01 | DA | 12/04/2018 | | Tap | 0.68 | 2.9 |
| PE-01 | DA | 01/03/2019 | | Tap | ND (0.2) | ND (1.0) |
| PE-01 | DA | 02/14/2019 | | Tap | ND (0.2) | ND (1.0) |
| PE-01 | DA | 03/05/2019 | | Tap | ND (0.2) | ND (1.0) |
| PE-01 | DA | 04/23/2019 | | Tap | ND (0.2) | ND (1.0) |
| PE-01 | DA | 05/09/2019 | | Tap | ND (0.2) | ND (1.0) |
| PE-01 | DA | 06/05/2019 | | Tap | ND (0.2) | ND (1.0) |
| PE-01 | DA | 07/24/2019 | | Tap | ND (0.2) | ND (1.0) |
| PE-01 | DA | 08/22/2019 | | Tap | ND (0.2) | ND (1.0) |
| PE-01 | DA | 09/04/2019 | | Tap | 0.69 | ND (1.0) |
| PE-01 | DA | 10/03/2019 | | Tap | ND (0.2) | ND (1.0) |
| PE-01 | DA | 11/07/2019 | | Tap | ND (0.2) | ND (1.0) |
| PE-01 | DA | 12/04/2019 | | Tap | ND (0.2) | ND (1.0) |
| TW-01 | SA | 05/01/2018 | | 3V | 2,400 | 3,100 |
| TW-01 | SA | 12/05/2018 | | 3V | 2,100 | 2,100 |
| TW-01 | SA | 05/24/2019 | | LF | 2,300 | 2,400 |
| TW-01 | SA | 12/03/2019 | | LF | 2,200 | 2,100 |

**Appendix B**

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

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

| Location ID | Aquifer Zone | Sample Date | Sample Type | Sample Method | Hexavalent Chromium (µg/L) | Dissolved Chromium (µg/L) |
|---|---|---|---|---|---|---|
| TW-02D | DA | 02/23/2018 | | LF | 140 | 140 |
| TW-02D | DA | 02/23/2018 | FD | -- | 150 | 140 |
| TW-02D | DA | 05/04/2018 | | Tap | 150 | 150 |
| TW-02D | DA | 05/04/2018 | FD | -- | 150 | 140 |
| TW-02D | DA | 09/26/2018 | | Tap | ND (0.2) | ND (1.0) |
| TW-02D | DA | 09/26/2018 | FD | -- | ND (0.2) | ND (1.0) |
| TW-02D | DA | 12/04/2018 | | Tap | 140 | 110 |
| TW-02D | DA | 02/14/2019 | | Tap | 120 | 140 |
| TW-02D | DA | 02/14/2019 | FD | -- | 120 | 130 |
| TW-02D | DA | 04/23/2019 | | Tap | 93 | 46 |
| TW-02D | DA | 10/03/2019 | | Tap | 95 | 110 |
| TW-02D | DA | 12/04/2019 | | Tap | 2.3 | 52 |
| TW-02D | DA | 02/19/2020 | | Tap | 740 | 670 |
| TW-03D | DA | 01/04/2018 | | Tap | 550 | 590 |
| TW-03D | DA | 02/07/2018 | | Tap | 550 | 540 |
| TW-03D | DA | 03/07/2018 | | Tap | 530 | 520 |
| TW-03D | DA | 04/03/2018 | | Tap | 570 | 550 |
| TW-03D | DA | 05/04/2018 | | Tap | 490 | 490 |
| TW-03D | DA | 06/07/2018 | | Tap | 470 | 480 |
| TW-03D | DA | 07/03/2018 | | Tap | 480 | 500 |
| TW-03D | DA | 08/01/2018 | | Tap | 480 | 480 |
| TW-03D | DA | 09/06/2018 | | Tap | 500 | 510 |
| TW-03D | DA | 10/02/2018 | | Tap | 480 | 500 |
| TW-03D | DA | 11/07/2018 | | Tap | 490 | 510 |
| TW-03D | DA | 12/04/2018 | | Tap | 480 | 490 |
| TW-03D | DA | 01/03/2019 | | Tap | 500 | 480 |
| TW-03D | DA | 02/14/2019 | | Tap | 420 | 520 |
| TW-03D | DA | 03/05/2019 | | Tap | 500 | 520 |
| TW-03D | DA | 04/23/2019 | | Tap | 470 | 480 |
| TW-03D | DA | 05/09/2019 | | Tap | 460 | 440 |
| TW-03D | DA | 06/05/2019 | | Tap | 450 | 440 |
| TW-03D | DA | 07/24/2019 | | Tap | 450 | 430 |
| TW-03D | DA | 08/22/2019 | | Tap | 410 | 430 |
| TW-03D | DA | 09/04/2019 | | Tap | 500 | 450 |
| TW-03D | DA | 10/03/2019 | | Tap | 410 | 430 |
| TW-03D | DA | 11/07/2019 | | Tap | 440 | 430 |
| TW-03D | DA | 12/04/2019 | | Tap | 480 | 480 |
| TW-03D | DA | 01/08/2020 | | G | 470 | 460 |
| TW-03D | DA | 02/05/2020 | | G | 460 | 480 |
| TW-03D | DA | 03/04/2020 | | G | 450 | 390 |
| TW-03D | DA | 04/07/2020 | | Tap | 440 | 420 |
| TW-03D | DA | 05/05/2020 | | Tap | 450 | 410 |
| TW-03D | DA | 07/23/2020 | | Tap | 390 | 410 |
| TW-03D | DA | 08/04/2020 | | Tap | 440 | 430 |
| TW-03D | DA | 09/01/2020 | | Tap | 430 | 420 |
| TW-03D | DA | 10/07/2020 | | Tap | 420 | 400 |

**Appendix B**

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

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

| Location ID | Aquifer Zone | Sample Date | Sample Type | Sample Method | Hexavalent Chromium (µg/L) | Dissolved Chromium (µg/L) |
|---|---|---|---|---|---|---|
| TW-04 | DA | 04/26/2018 | | LF | ND (1.0) | ND (5.0) |
| TW-04 | DA | 04/26/2018 | | 3V | 8.9 | 9.4 |
| TW-04 | DA | 12/11/2018 | | LF | 4.2 | 5.0 |
| TW-04 | DA | 12/11/2018 | | 3V | 8.2 | 8.1 |
| TW-04 | DA | 12/11/2018 | FD | -- | 8.4 | 8.1 |
| TW-04 | DA | 05/16/2019 | | LF | 5.1 | 4.5 |
| TW-04 | DA | 12/12/2019 | | LF | 5.8 | 5.6 |
| TW-04 | DA | 06/25/2020 | | LF | 3.7 | 4.1 |
| TW-05 | DA | 05/01/2018 | | LF | 8.8 | 9.1 |
| TW-05 | DA | 05/01/2018 | | 3V | 11 | 11 |
| TW-05 | DA | 12/04/2018 | | LF | 10 | 9.3 |
| TW-05 | DA | 12/04/2018 | | 3V | 14 | 14 |
| TW-05 | DA | 05/20/2019 | | LF | 11 | 10 |
| TW-05 | DA | 05/20/2019 | FD | -- | 11 | 10 |
| TW-05 | DA | 12/12/2019 | | LF | 18 | 17 |
| TW-05 | DA | 06/25/2020 | | LF | 12 | 12 |

**Notes:**

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

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

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

# APPENDIX C

## Well Inspection and Maintenance Log, Third Quarter 2020

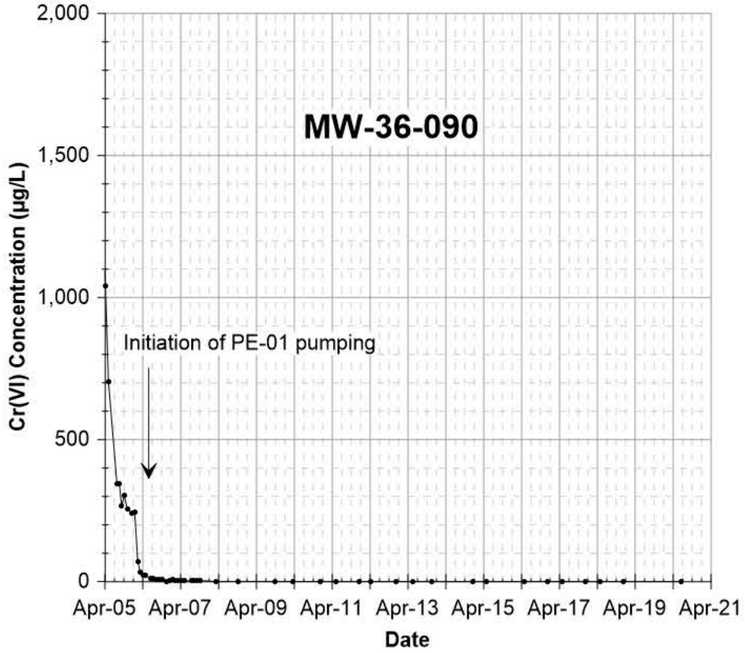
**Appendix C**
**Well Inspection and Maintenance Log, Third Quarter 2020**
*Third Quarter 2020 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles, California*

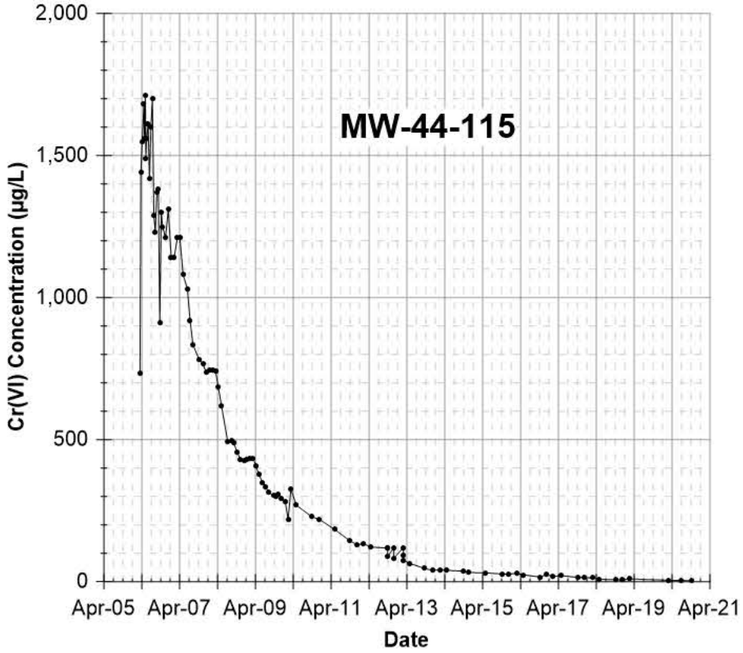
| Well/Piezometer | Inspection Date | Survey Mark Present? (Yes/No) | Standing or Ponded Water? (Yes/No) | Lock in Place? (Yes/No) | Evidence of Well Subsidence? (Yes/No) | Well Labeled on Casing or Pad? (Yes/No) | Traffic Poles Intact? (Yes/No) | Concrete Pad Intact? (Yes/No) | Erosion Around Wellhead? (Yes/No) | Steel Casing Intact? (Yes/No) | PVC Cap Present? (Yes/No) | Standing Water in Annulus? (Yes/No) | Well Casing Intact? (Yes/No) | Photo Taken? (Yes/No) | Action Completed? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-34-100 | 10/01/2020 | Yes | No | Yes | No | Yes | -- | Yes | No | Yes | Yes | No | Yes | Yes | -- |
| MW-38S-SMT | 09/30/2020 | Yes | No | Yes | No | Yes | -- | Yes | No | Yes | Yes | No | Yes | Yes | -- |
| MW-44-115 | 10/01/2020 | Yes | No | Yes | No | Yes | -- | Yes | No | Yes | Yes | -- | Yes | Yes | -- |
| MW-46-175 | 10/01/2020 | Yes | No | Yes | No | Yes | -- | Yes | No | Yes | Yes | No | Yes | Yes | -- |
| MW-57-050 | 09/29/2020 | Yes | No | Yes | No | Yes | -- | Yes | No | -- | Yes | No | Yes | No | -- |
| MW-58-065 | 09/29/2020 | Yes | No | Yes | No | Yes | -- | Yes | No | Yes | Yes | No | Yes | Yes | -- |
| MW-58BR | 09/29/2020 | Yes | No | Yes | No | Yes | -- | Yes | No | Yes | Yes | No | Yes | Yes | -- |
| MW-60BR-245 | 09/30/2020 | Yes | No | Yes | No | Yes | -- | Yes | No | Yes | Yes | No | Yes | Yes | -- |
| MW-62-065 | 09/30/2020 | Yes | No | Yes | No | Yes | -- | Yes | No | -- | Yes | No | Yes | Yes | -- |
| MW-62-110 | 09/29/2020 | -- | No | -- | No | Yes | -- | Yes | No | -- | Yes | No | Yes | Yes | -- |
| MW-63-065 | 09/30/2020 | Yes | No | Yes | No | Yes | -- | Yes | No | -- | Yes | No | Yes | Yes | -- |
| MW-64BR | 09/30/2020 | Yes | No | Yes | No | Yes | -- | Yes | No | -- | Yes | No | Yes | Yes | -- |
| MW-65-160 | 09/29/2020 | Yes | No | Yes | No | Yes | -- | Yes | No | -- | Yes | No | Yes | Yes | -- |
| MW-65-225 | 09/29/2020 | Yes | No | Yes | No | Yes | -- | Yes | No | -- | Yes | No | Yes | Yes | -- |
| MW-68-180 | 09/29/2020 | Yes | No | Yes | No | Yes | -- | Yes | No | -- | Yes | No | Yes | Yes | -- |
| MW-69-195 | 09/29/2020 | Yes | No | Yes | No | Yes | -- | Yes | No | -- | Yes | No | Yes | Yes | -- |
| MW-72-080 | 09/29/2020 | Yes | No | Yes | No | Yes | -- | Yes | No | -- | Yes | No | Yes | Yes | -- |
| MW-72BR-200 | 09/29/2020 | Yes | No | Yes | No | Yes | -- | Yes | No | -- | Yes | No | Yes | Yes | -- |
| MW-73-080 | 09/30/2020 | Yes | No | Yes | No | Yes | -- | Yes | No | -- | Yes | No | Yes | Yes | -- |
| TW-03D | 08/04/2020 | Yes | No | Yes | No | Yes | -- | Yes | No | Yes | Yes | No | Yes | No | -- |
| TW-03D | 09/01/2020 | Yes | No | Yes | No | Yes | -- | Yes | No | Yes | Yes | No | Yes | No | -- |

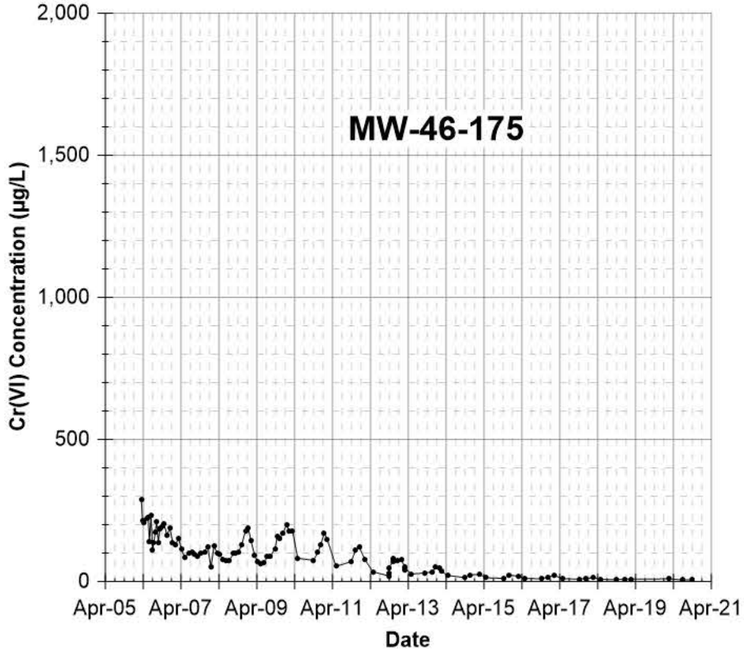
**Notes:**
-- = not applicable

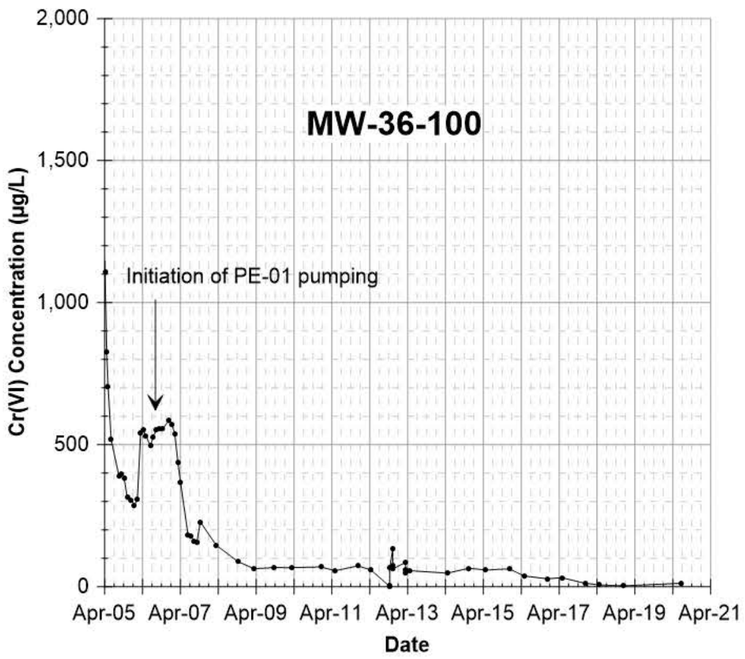
# APPENDIX D

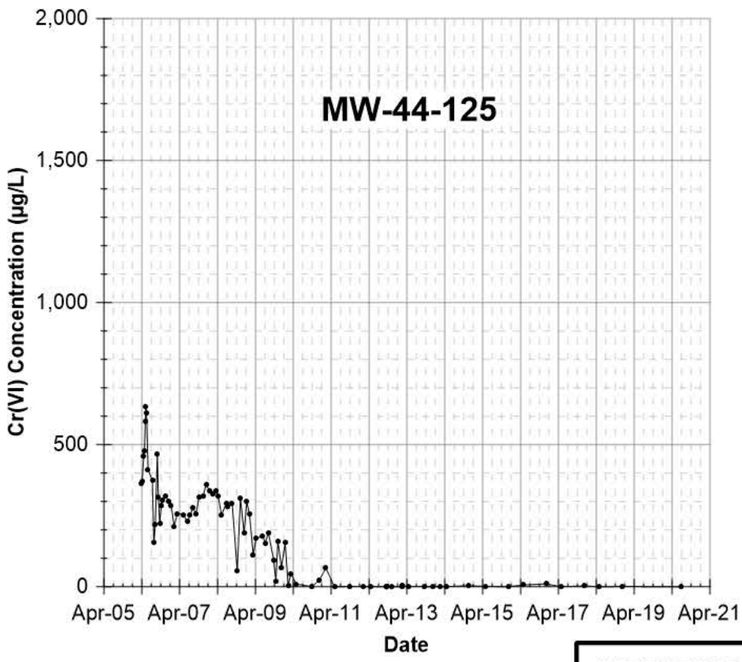
## Concentration Time Series Charts, Third Quarter 2020

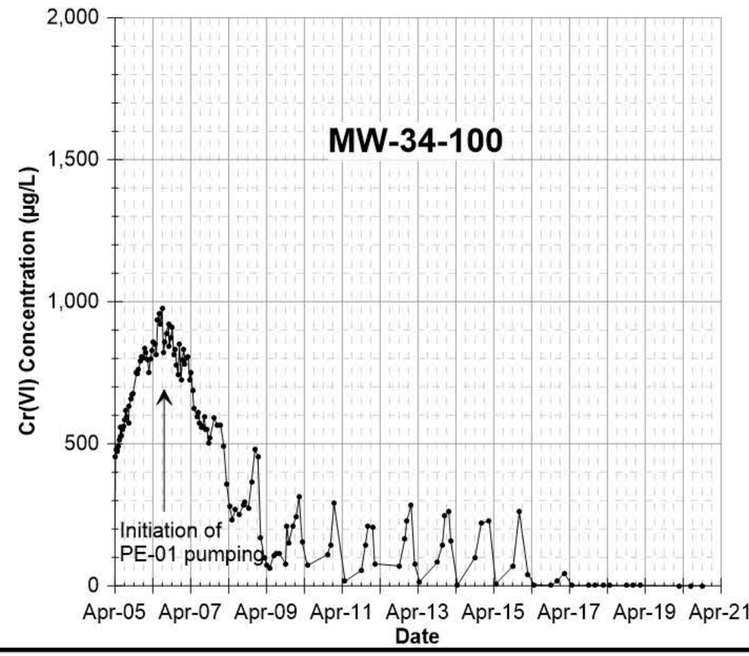



**Notes:**
1. Hexavalent chromium [Cr(VI)] results in micrograms per liter (µg/L), equivalent to parts per billion (ppb).
2. Results plotted are maximum concentrations from primary and duplicate samples; see Table 3-1 for complete results.
3. MW-36 wells selected to monitor effects of PE-01 pumping on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

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

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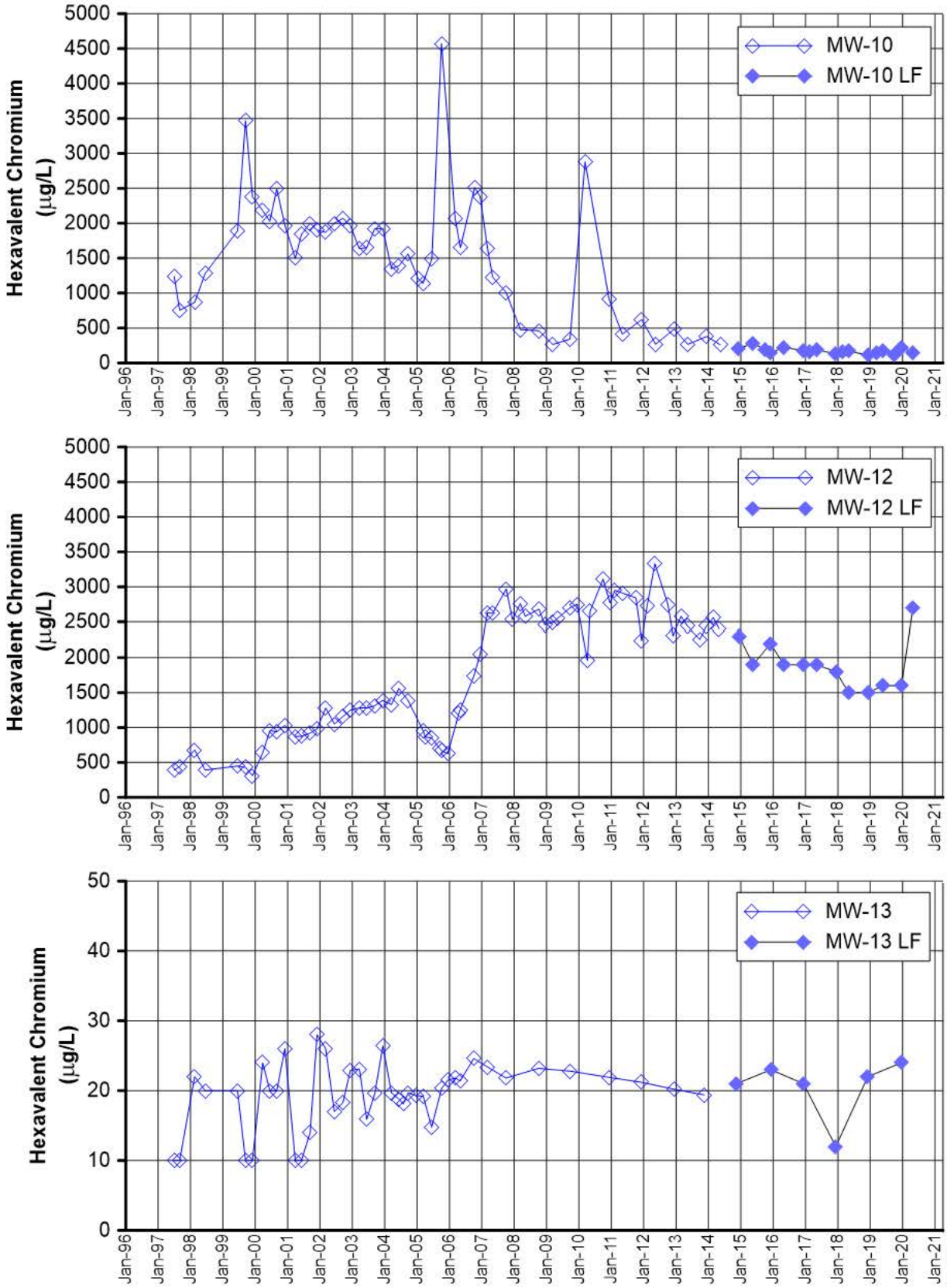


**Notes:**

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

**FIGURE D-1**
**HEXAVALENT CHROMIUM**
**IN MW-10, MW-12, AND MW-13**
THIRD QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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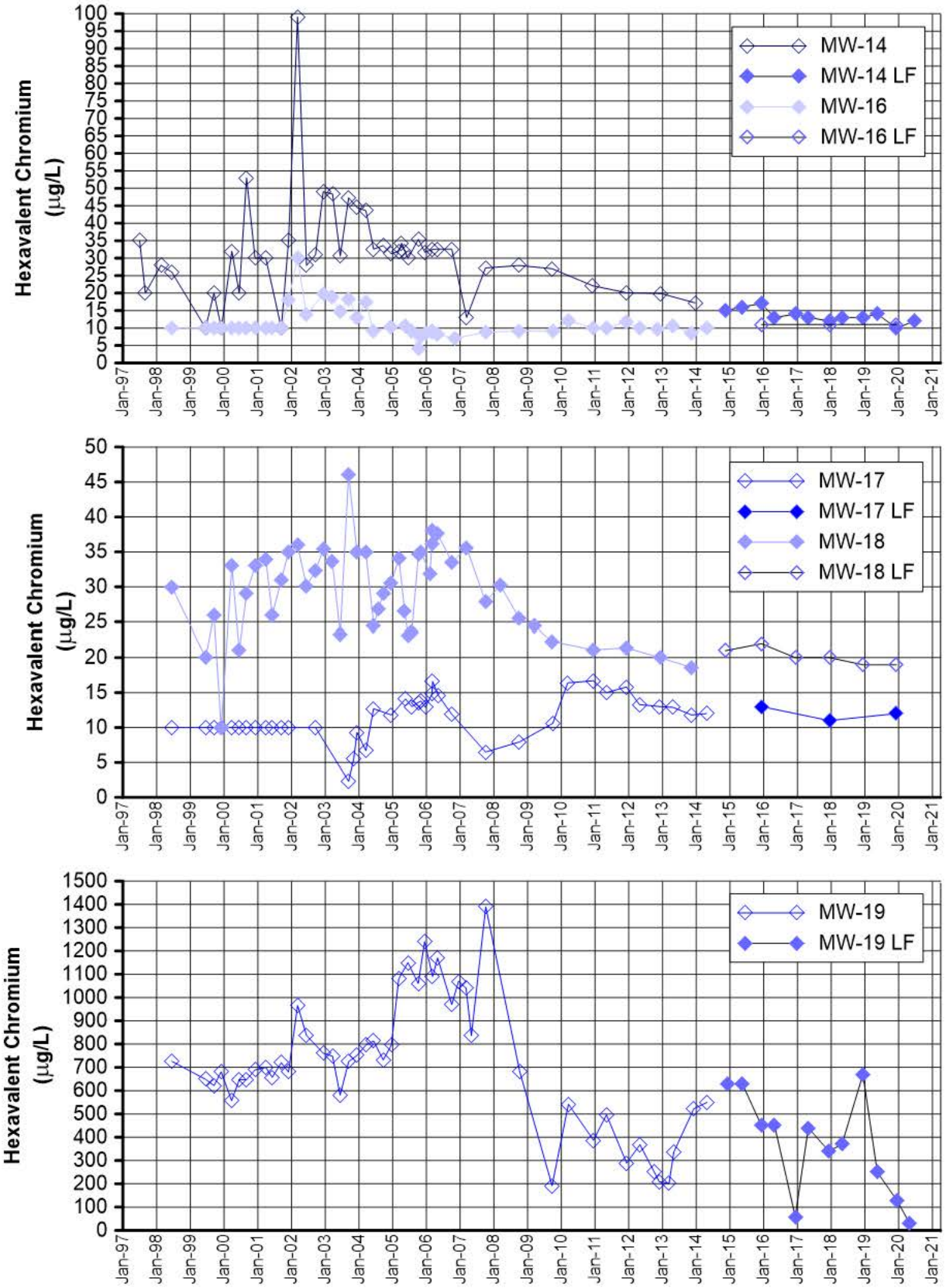


**Notes:**

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

**FIGURE D-2**
**HEXAVALENT CHROMIUM**
**IN MW-14, MW-16, MW-17, MW-18, AND MW-19**
THIRD QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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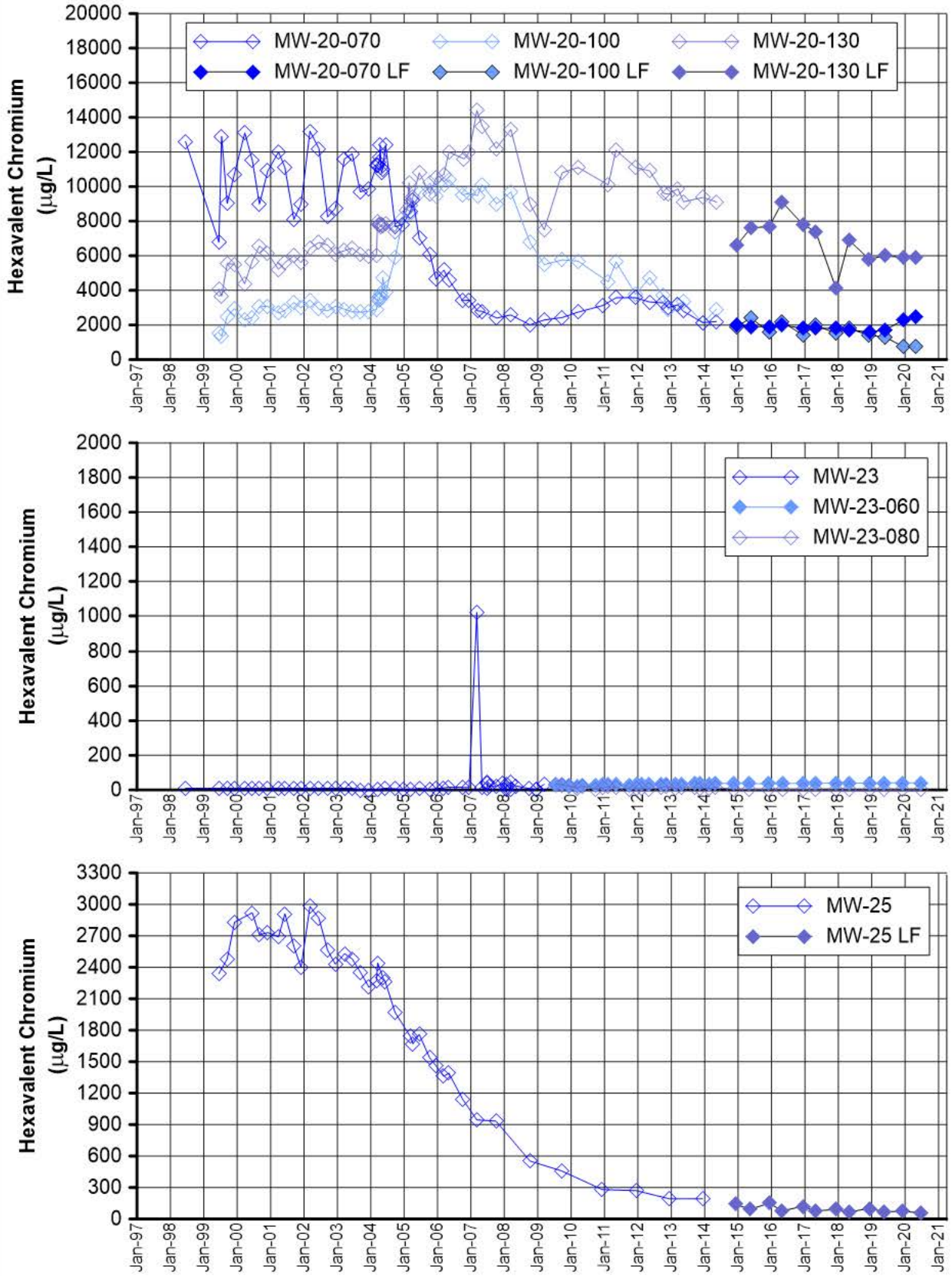


**Notes:**

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

**FIGURE D-3**
**HEXAVALENT CHROMIUM**
**IN MW-20 AND MW-23 CLUSTERS AND MW-25**
SECOND QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

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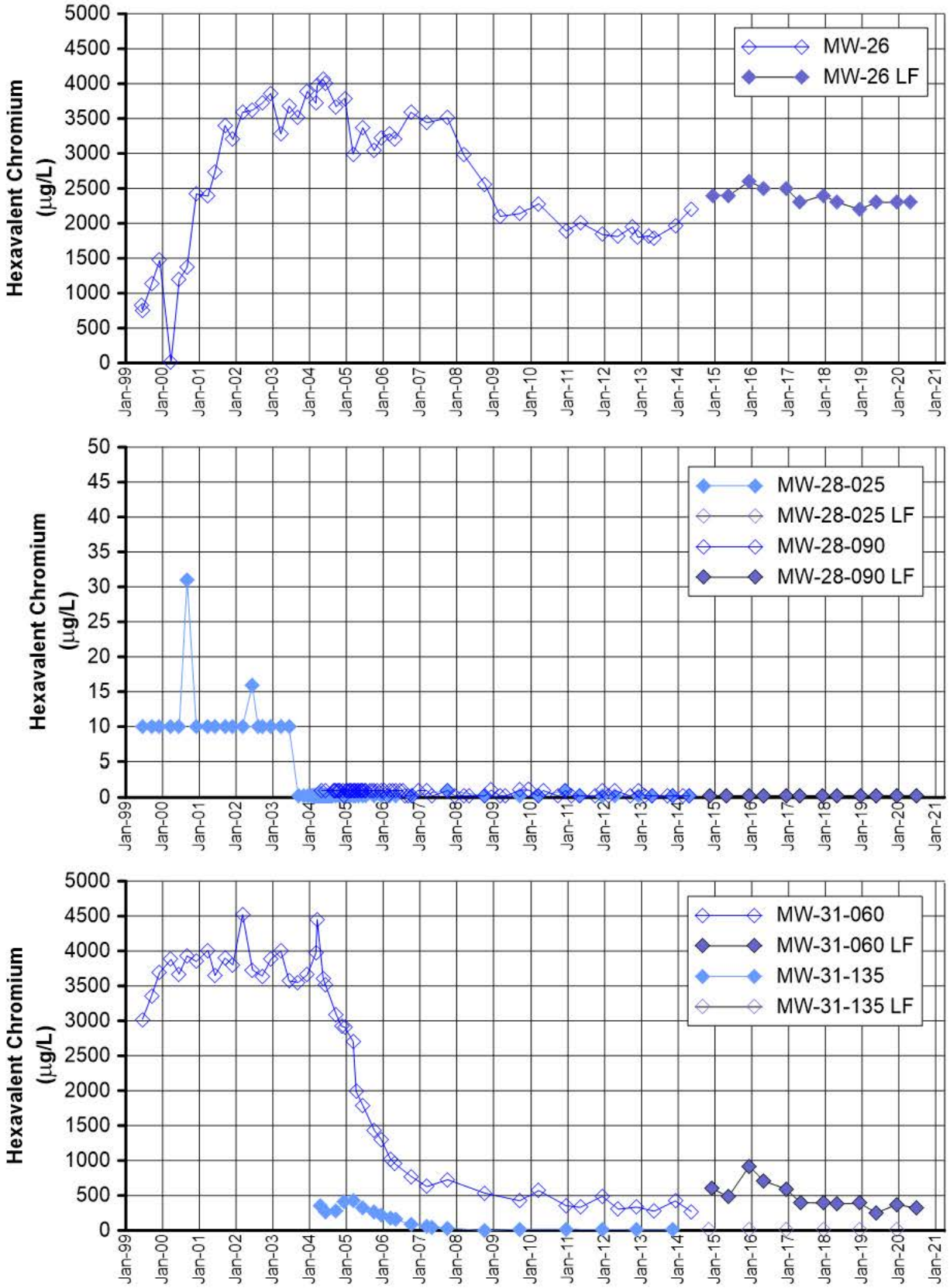


**Notes:**

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

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

**FIGURE D-4**
**HEXAVALENT CHROMIUM**
**IN MW-26, MW-28, AND MW-31 CLUSTERS**
THIRD QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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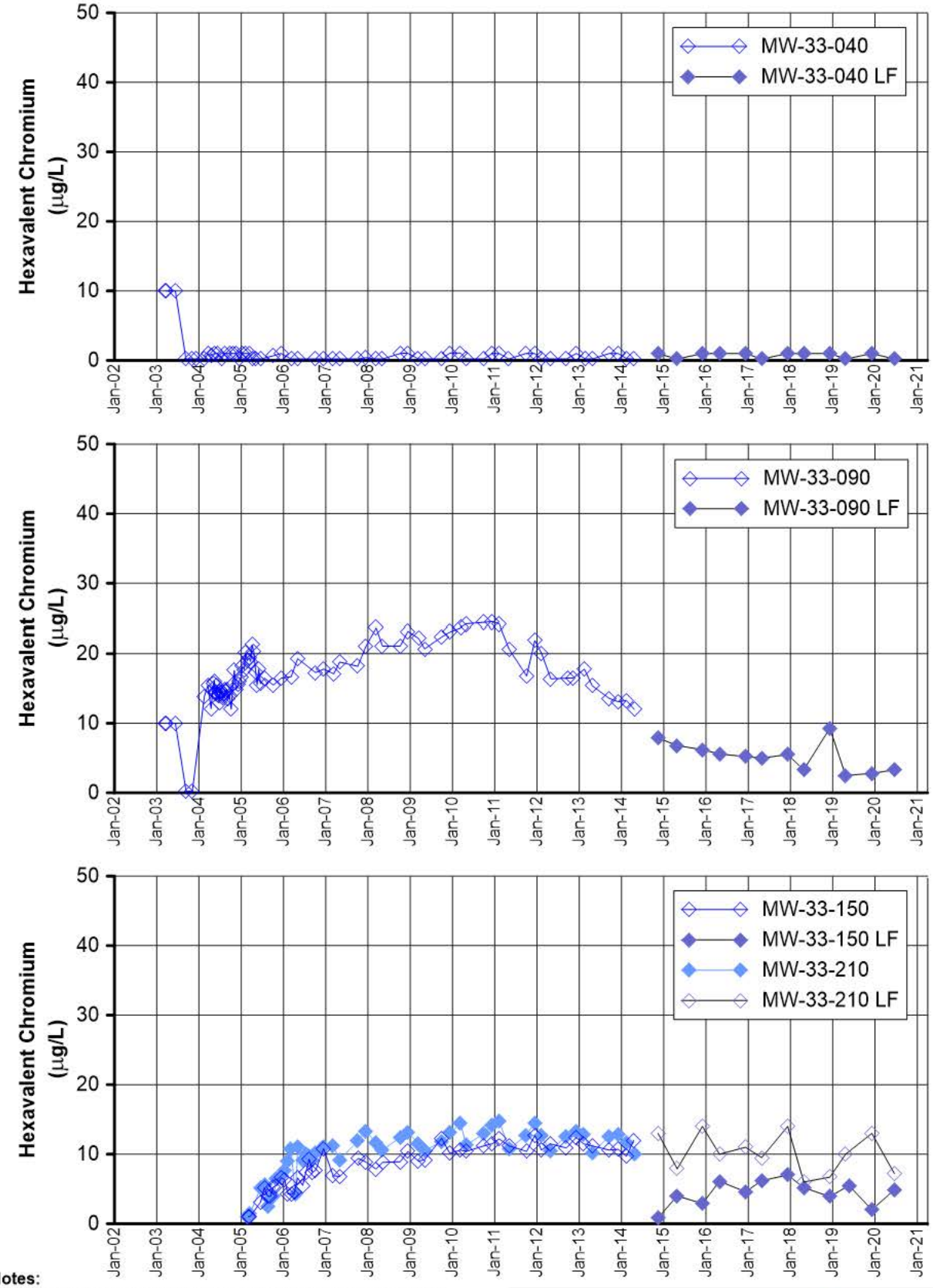


**Notes:**

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

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

**FIGURE D-5**
**HEXAVALENT CHROMIUM IN MW-33 CLUSTER**
THIRD QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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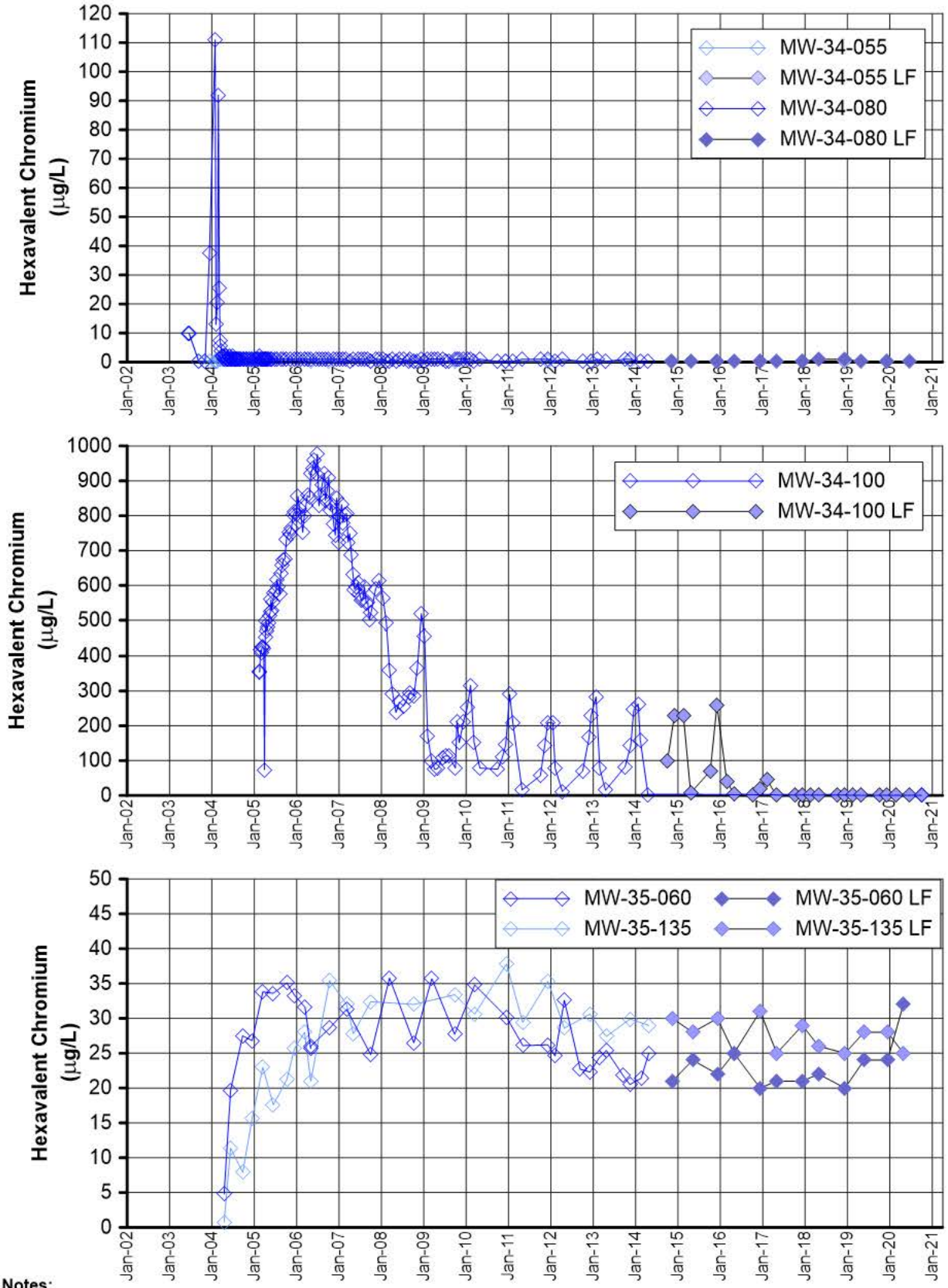


**Notes:**

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

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

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

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

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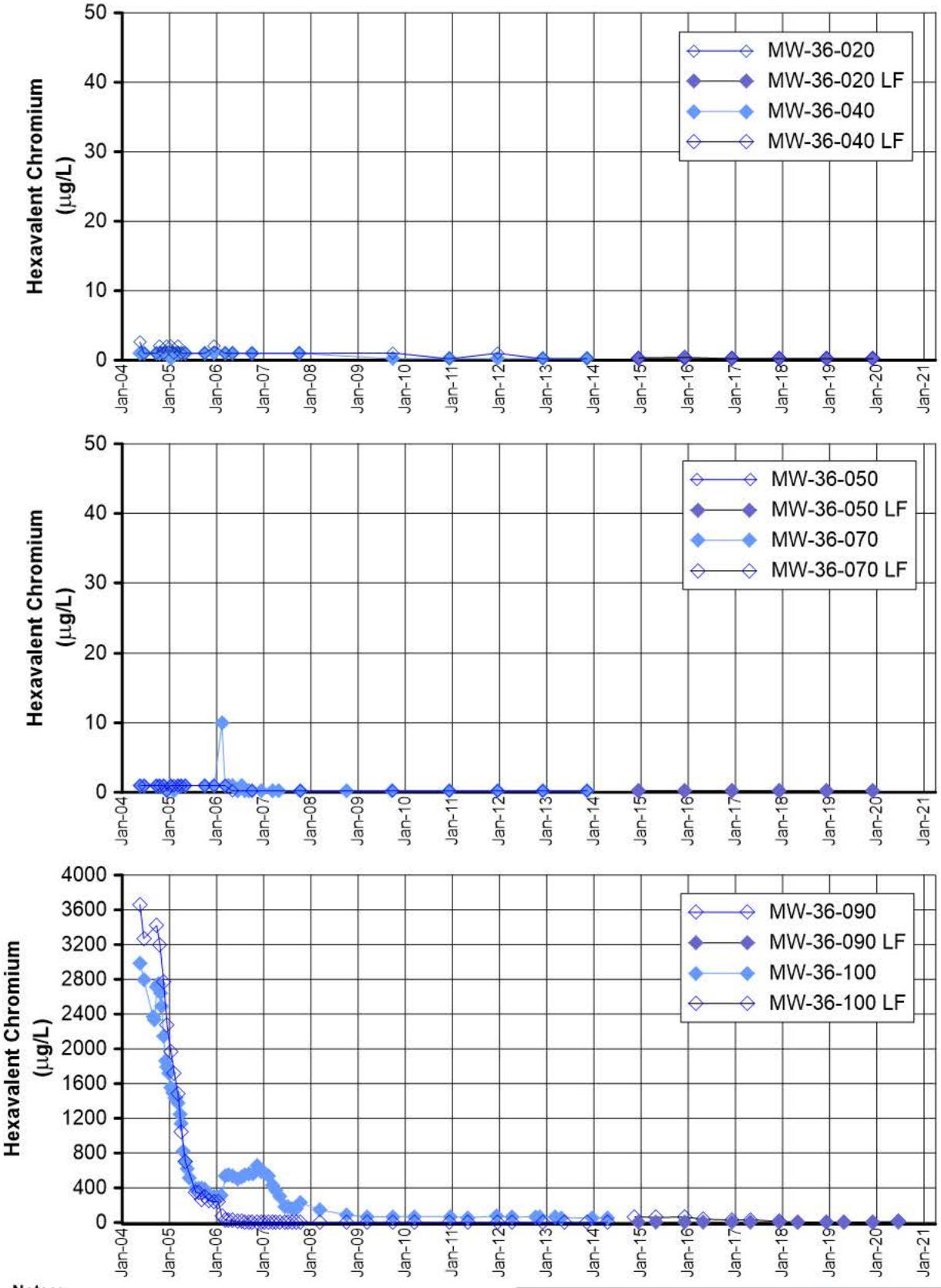


**Notes:**
1) The IM Contingency Plan and hexavalent chromium [Cr(VI)] trigger levels were updated July 17, 2008 (DTSC, 2008b).
2) The trigger level for MW-36-070 is 20 µg/L.

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

**FIGURE D-7**
**HEXAVALENT CHROMIUM IN MW-36 CLUSTER**
THIRD QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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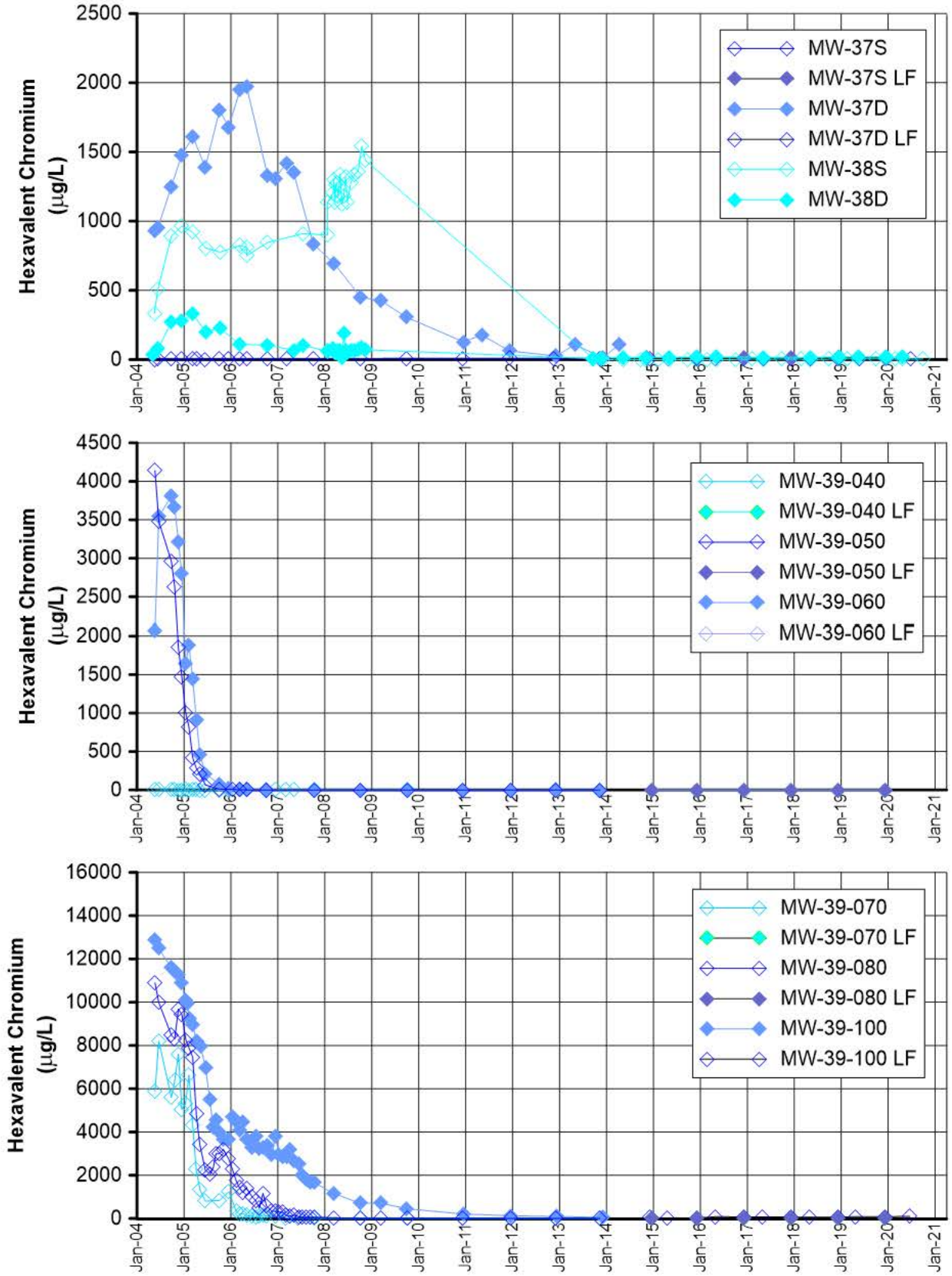


**Notes:**
1) The IM Contingency Plan and hexavalent chromium [Cr(VI)] trigger levels were updated July 17, 2008 (DTSC, 2008b).
2) The trigger level for MW-39-040 is 20 µg/L.

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

**FIGURE D-8**
**HEXAVALENT CHROMIUM IN MW-37, MW-38 AND MW-39 CLUSTERS**
THIRD QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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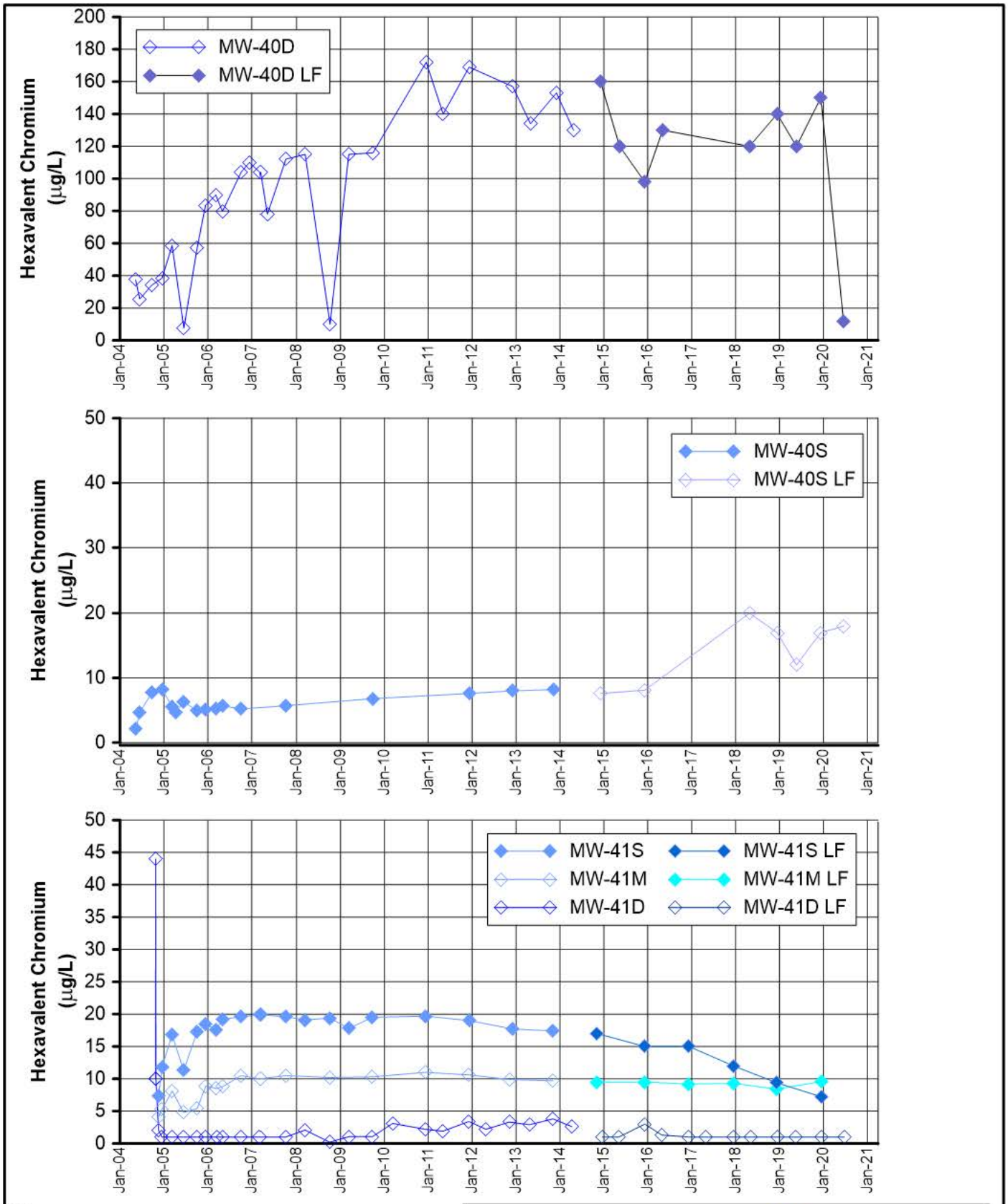


**Notes:**

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

**FIGURE D-9**
**HEXAVALENT CHROMIUM**
**IN MW-40 AND MW-41 CLUSTERS**
THIRD QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

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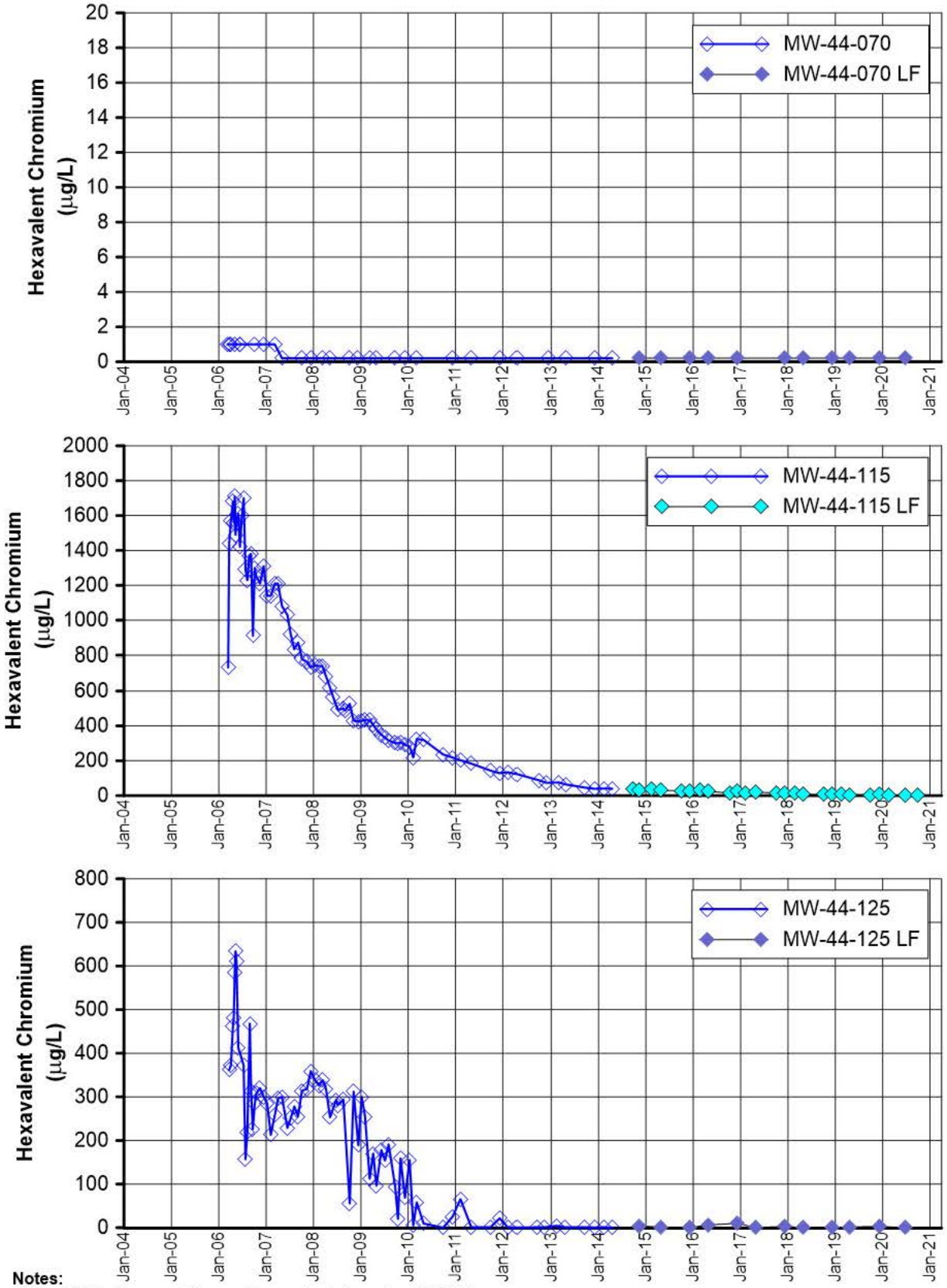


**Notes:**

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

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

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

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

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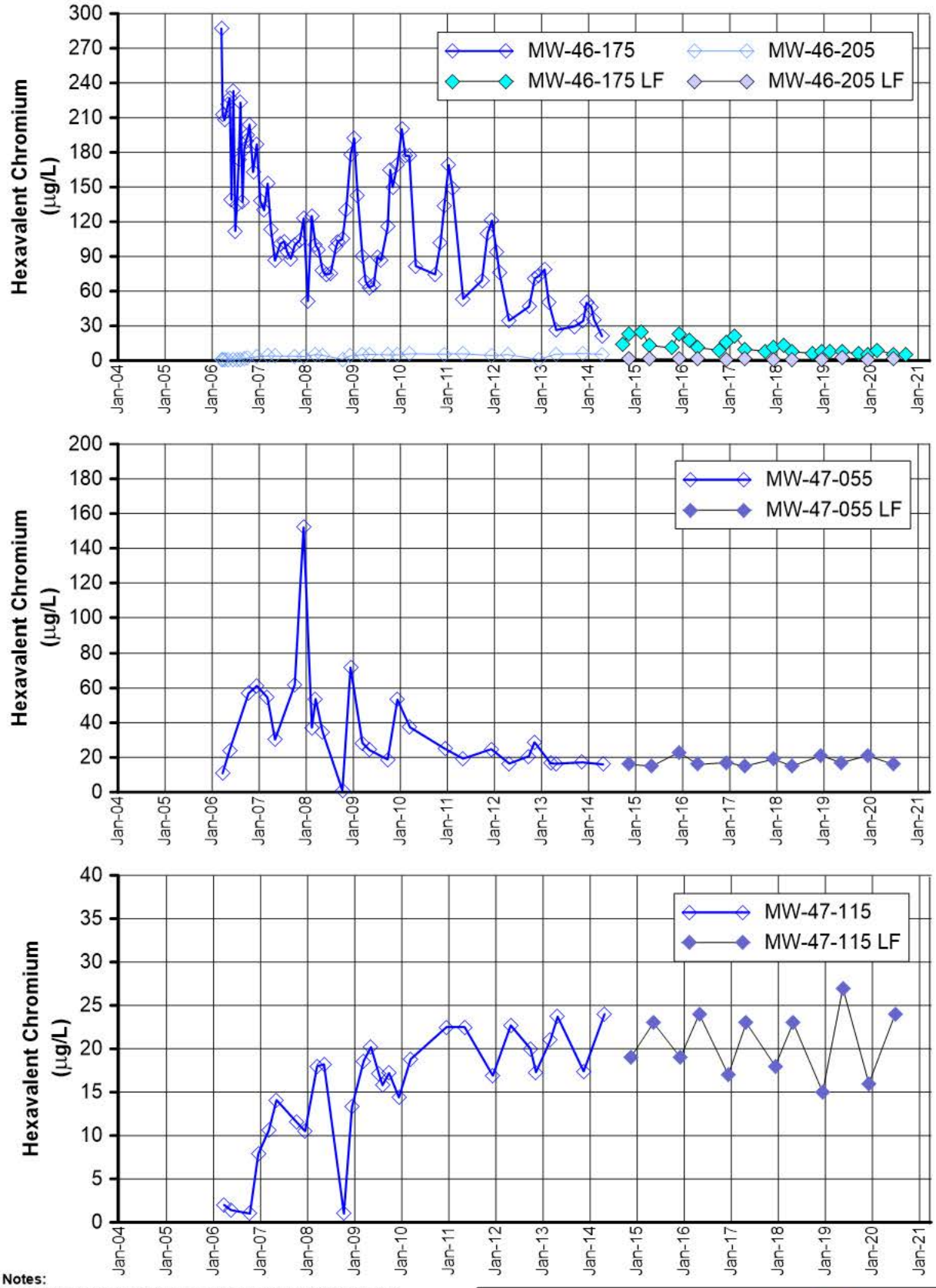


**Notes:**

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

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

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

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

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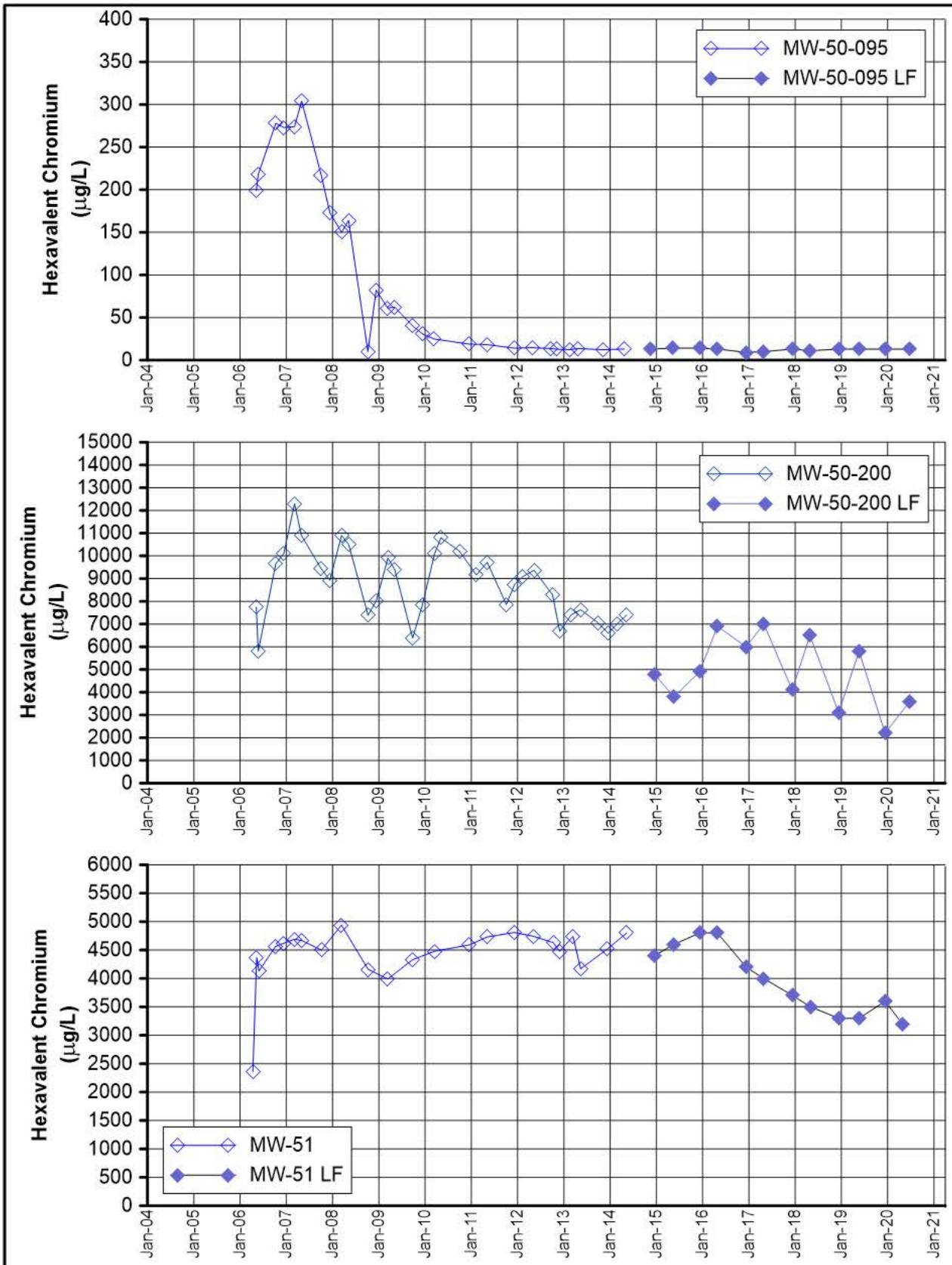


**Notes:**

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

**FIGURE D-12**
**HEXAVALENT CHROMIUM**
**IN MW-50 AND MW-51 CLUSTERS**
THIRD QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

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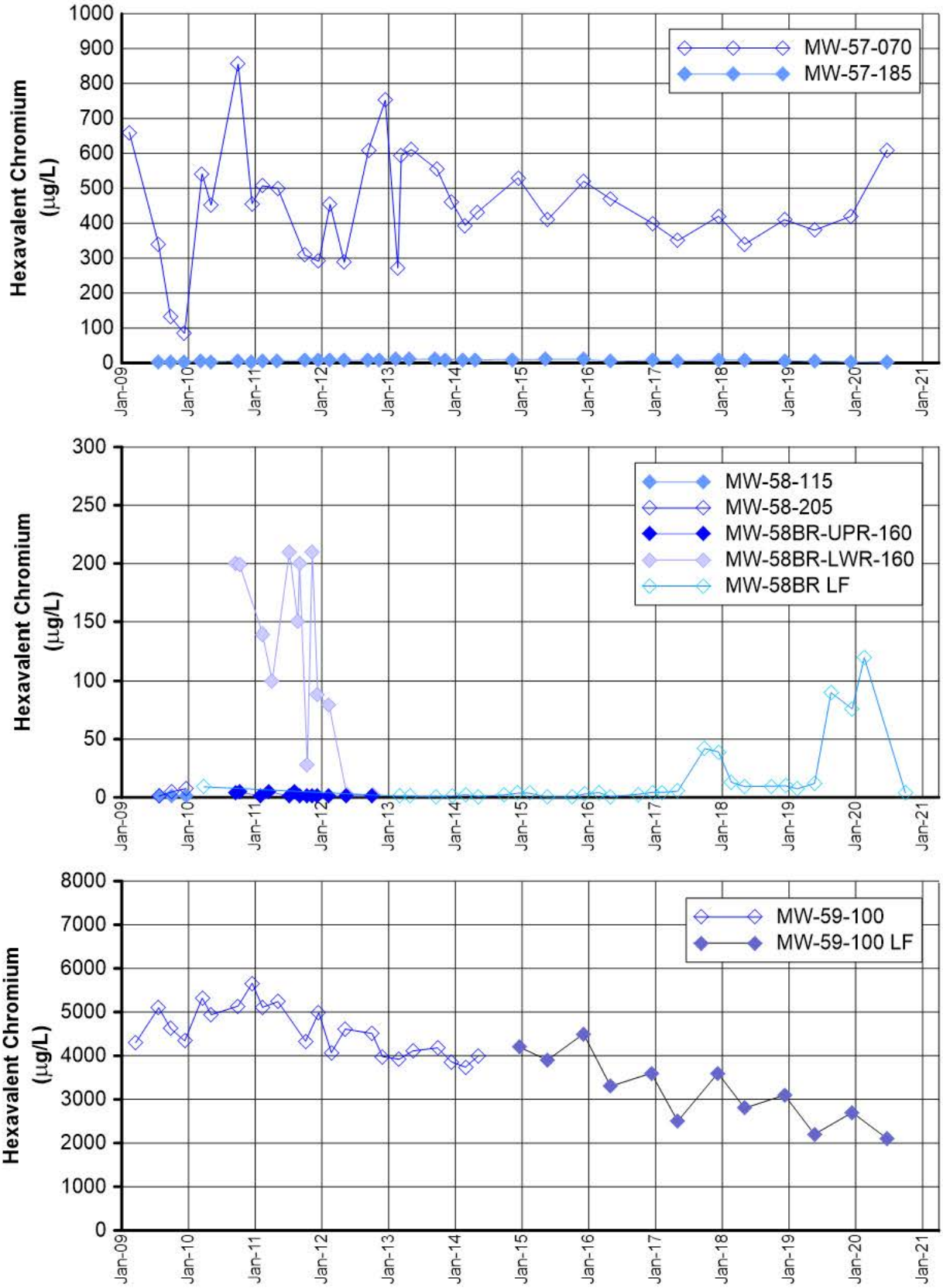


**Note:**

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

**FIGURE D-13**
**HEXAVALENT CHROMIUM**
**IN MW-57 CLUSTER, MW-58 CLUSTER AND MW-59-100**
THIRD QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

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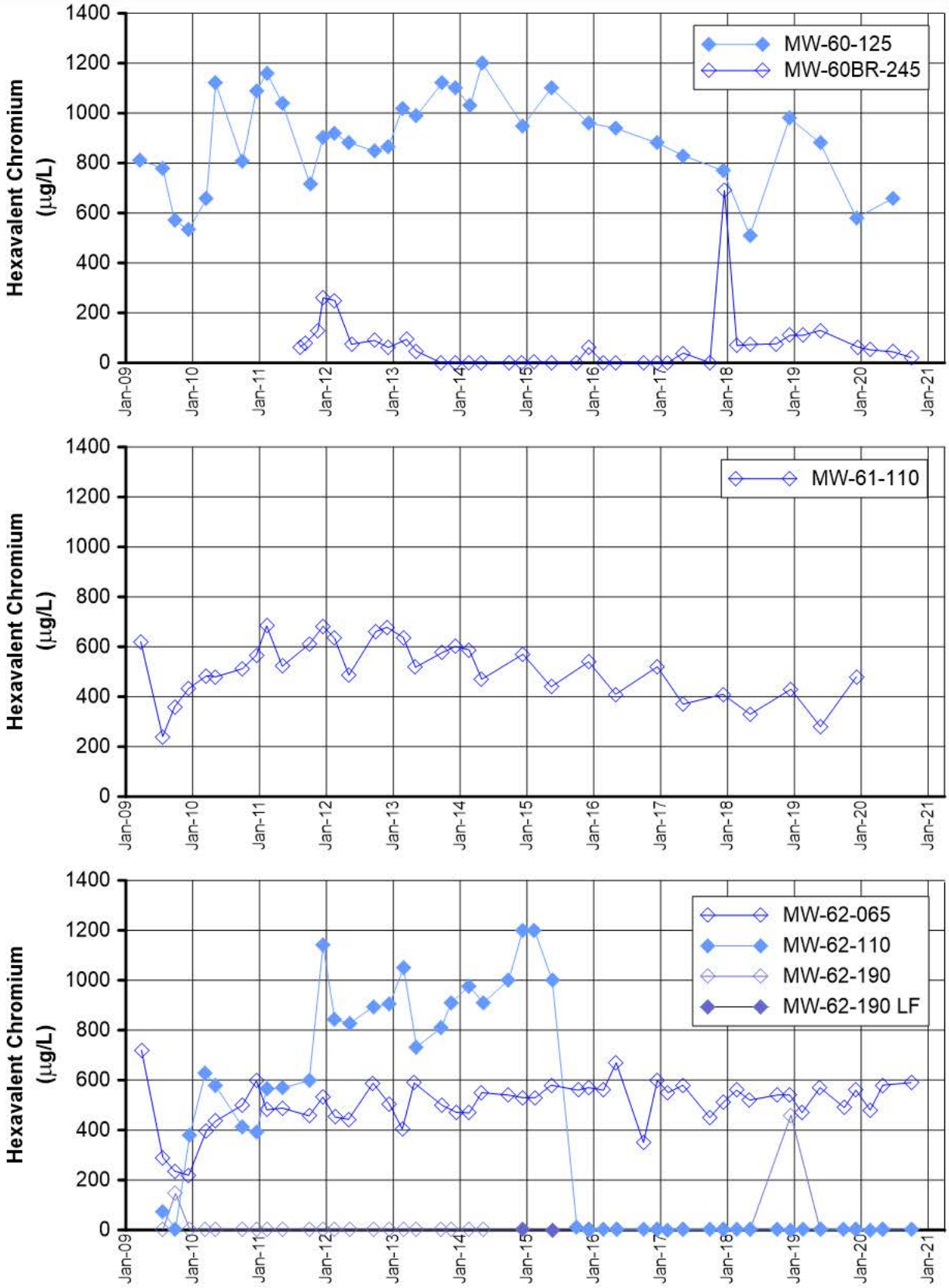
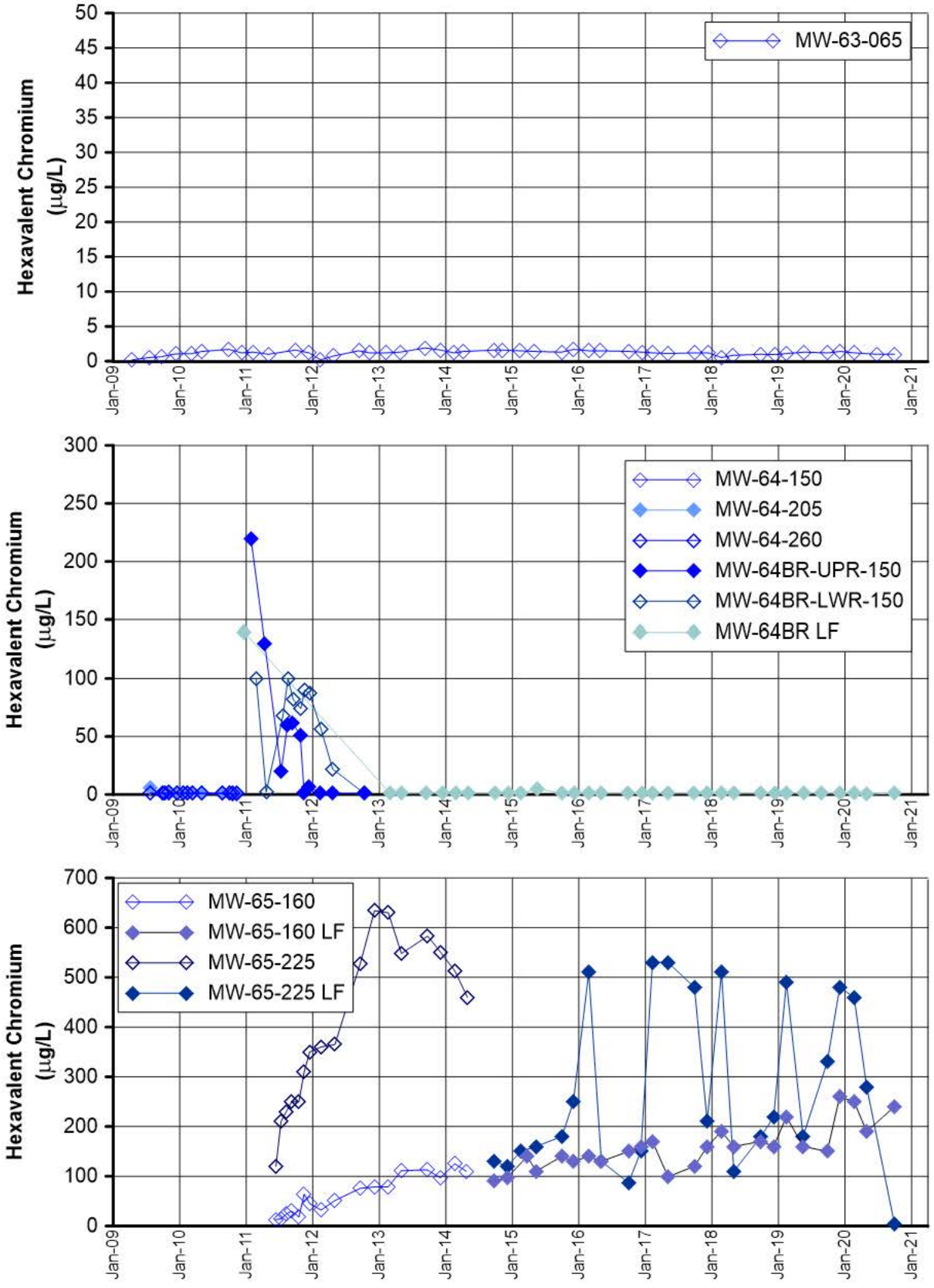



**Notes:**

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

**FIGURE D-14**
**HEXAVALENT CHROMIUM**
**IN MW-60 CLUSTER, MW-61-110 AND MW-62 CLUSTER**
THIRD QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

ARCADIS




**Notes:**

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

**FIGURE D-15**
**HEXAVALENT CHROMIUM**
**IN MW-63-065, MW-64 CLUSTER AND MW-65 CLUSTER**
THIRD QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

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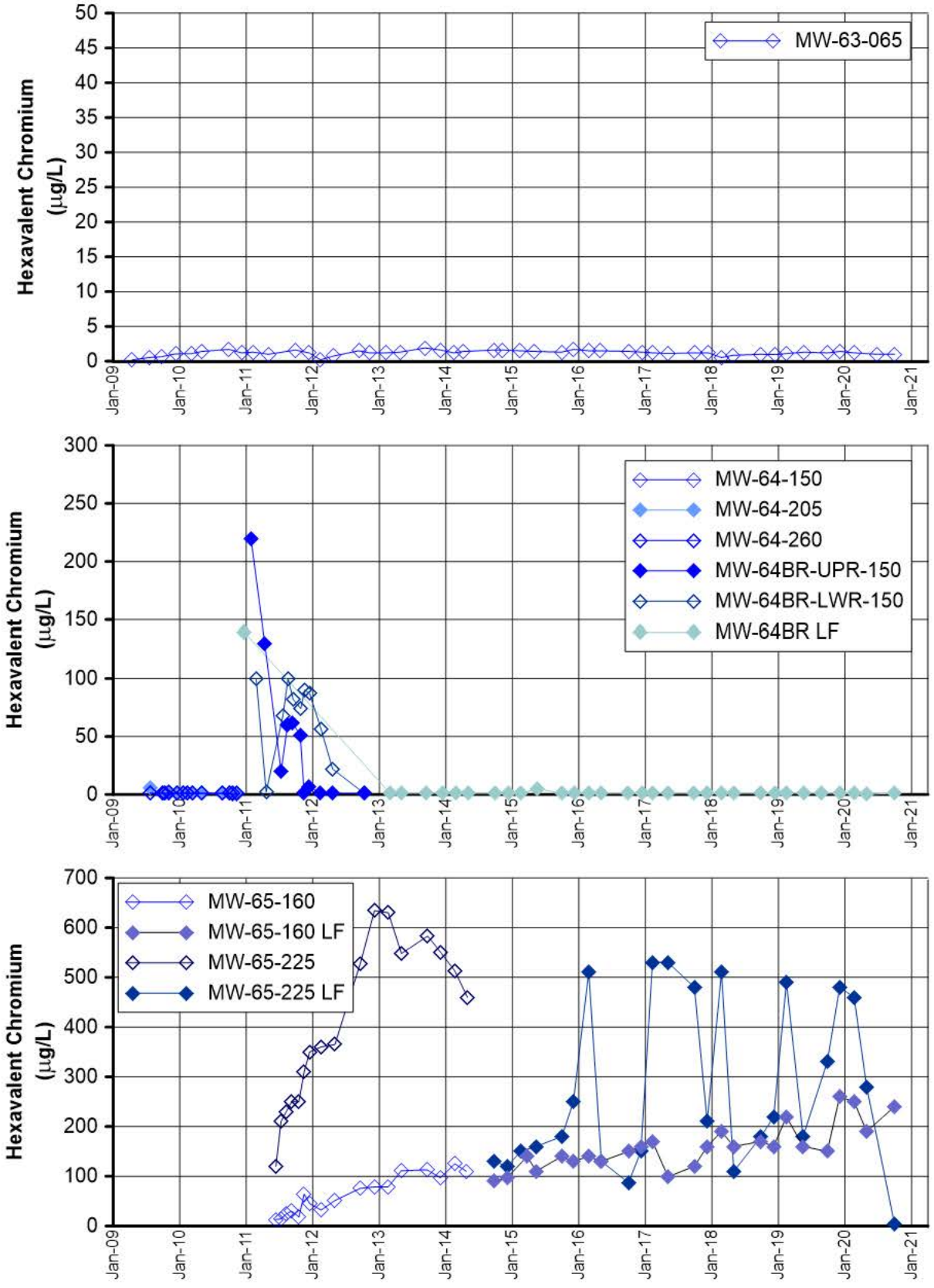


**Notes:**

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

**FIGURE D-15**
**HEXAVALENT CHROMIUM**
**IN MW-63-065, MW-64 CLUSTER AND MW-65 CLUSTER**
THIRD QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

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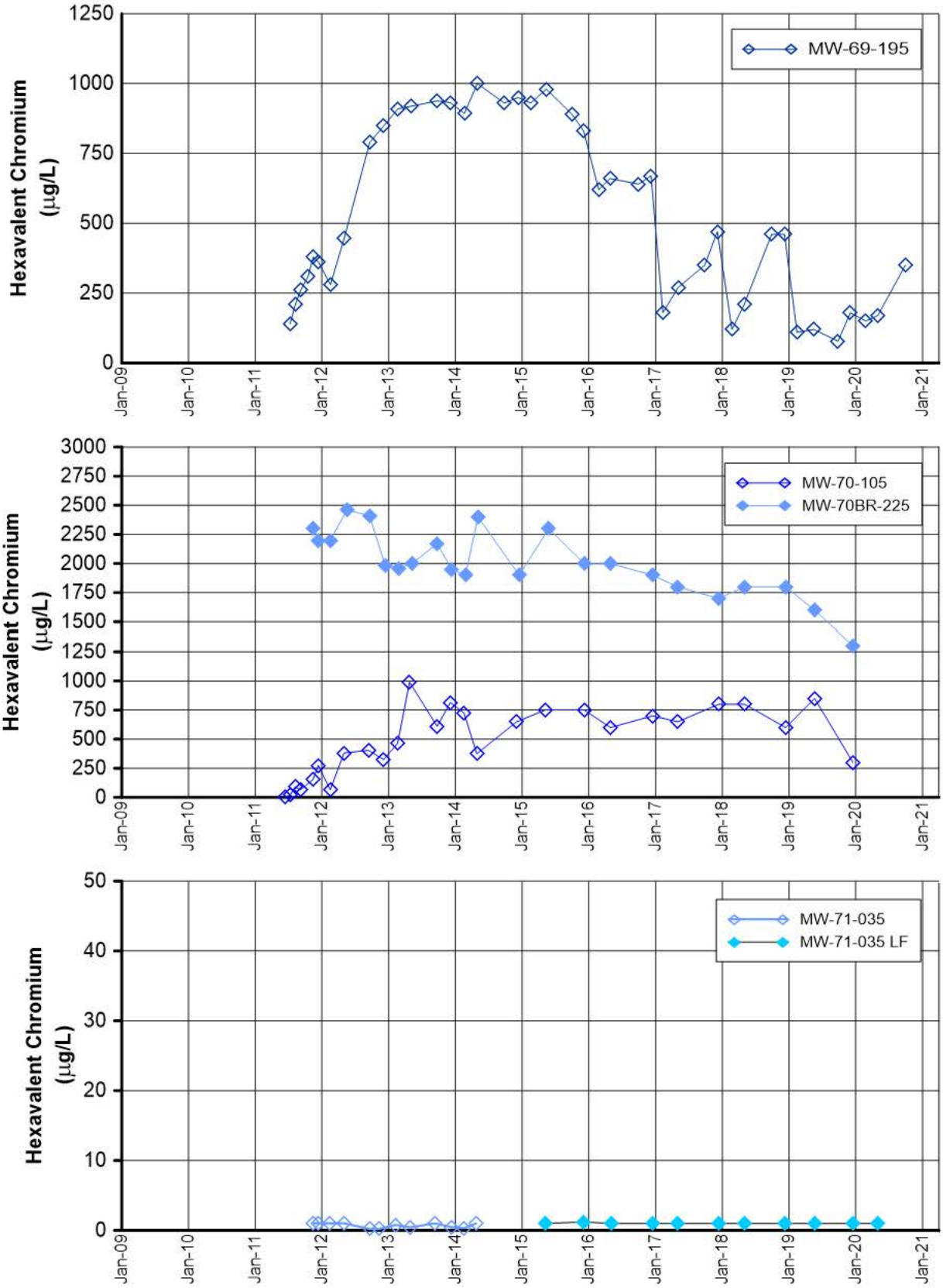


**Notes:**

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

**FIGURE D-17**
**HEXAVALENT CHROMIUM**
**IN MW-69-195, MW-70 CLUSTER, AND MW-71-035**
THIRD QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

ARCADIS

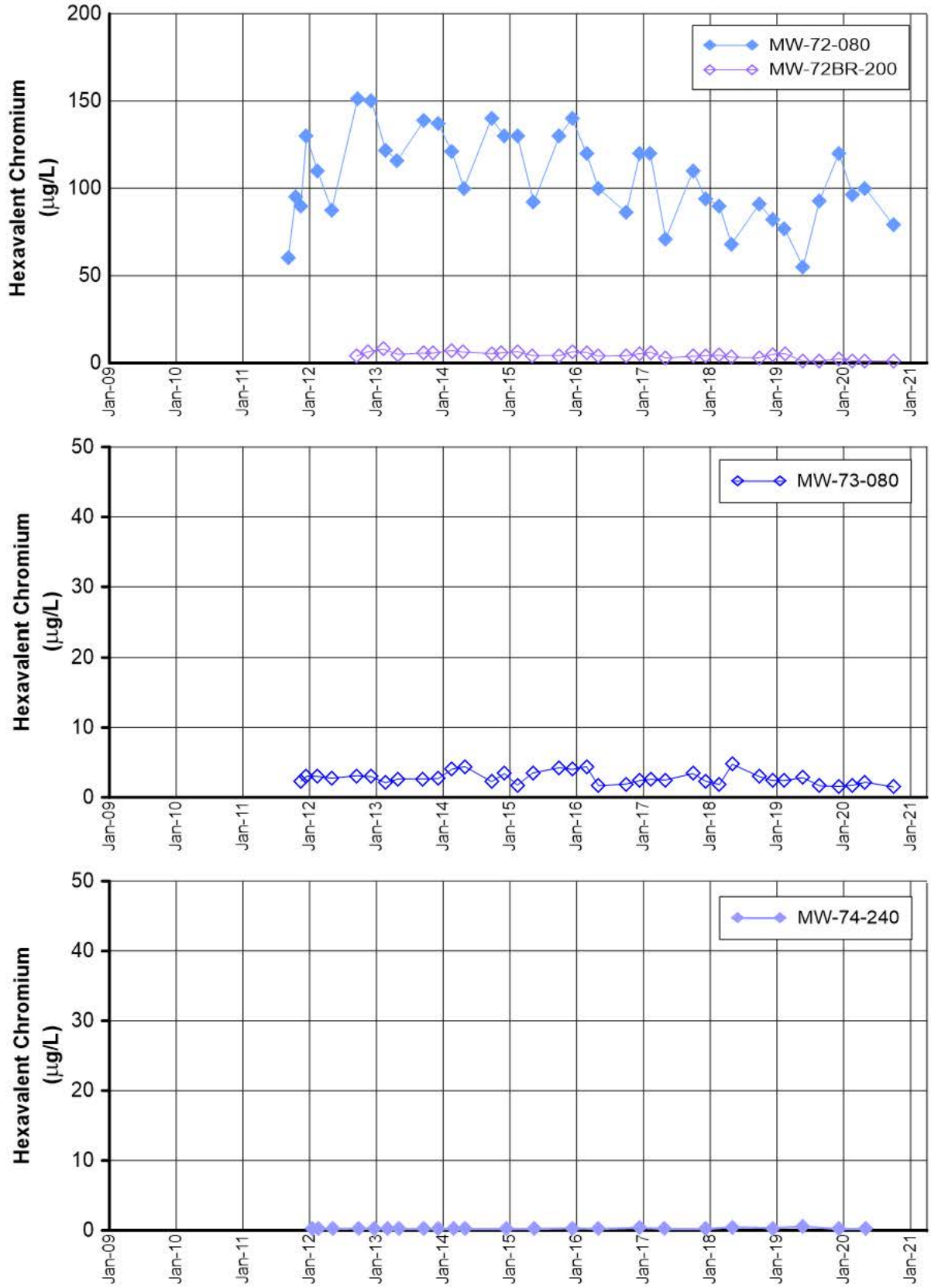


**FIGURE D-18**
**HEXAVALENT CHROMIUM**
**IN MW-72 CLUSTER, MW-73-080, AND MW-74-240**
THIRD QUARTER 2020 INTERIM MEASURES PERFORMANCE
MONITORING AND SITE-WIDE GROUNDWATER
AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

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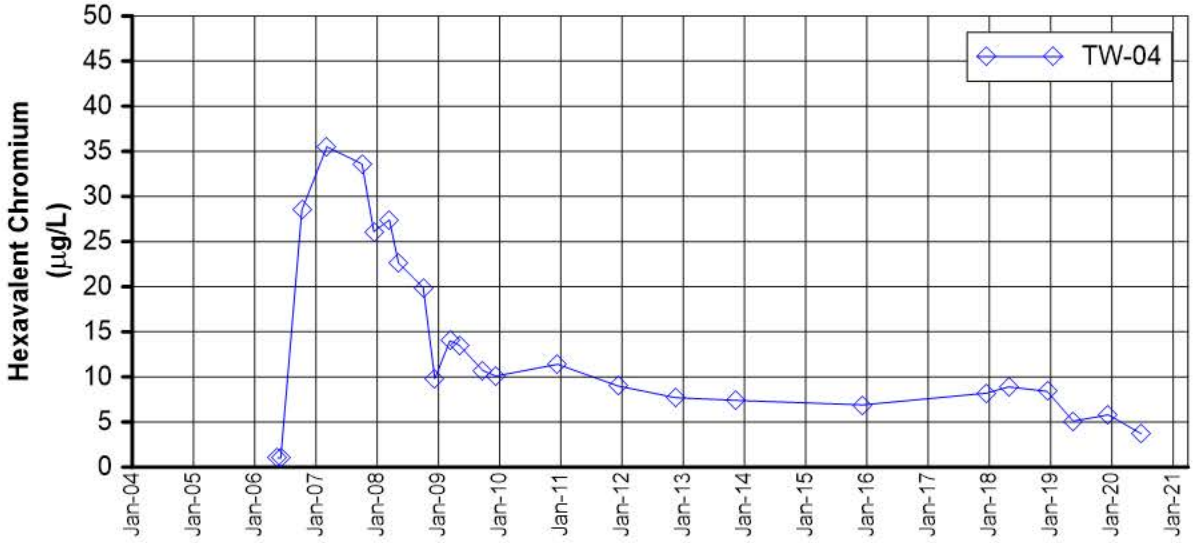


**FIGURE D-19**
**HEXAVALENT CHROMIUM IN TW-04**
THIRD QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

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# APPENDIX E

## Interim Measures Extraction System Operations Log, Third Quarter 2020

**APPENDIX E**

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

During Third Quarter 2020 (July through October), 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, TW-2D, and PE-01 were not operated during Third Quarter 2020; an attempt was made to extract water using well TW-2D during August 2020, but the well was found to be inoperable. A portion of the piping/conduit for PE-01 at the MW-20 Bench was disconnected from the IM-3 system on December 18, 2019 to allow for remedy construction activities without crossing under the PE-01 piping/conduit. The operational run time for the Interim Measure groundwater extraction system (combined or individual pumping) was approximately 91.4 percent during Third Quarter 2020.

The Interim Measure Number 3 (IM-3) facility treated approximately 21,547,124 gallons of extracted groundwater during Third Quarter 2020. The IM-3 facility also treated approximately 28,600 gallons of injection well backwashing/re-development water, 1,990 gallons of purge water from site sampling activities, and 127,947 gallons from remedy wastewater generated from remedy well construction activities. Six containers of solids (sludge) were transported offsite from the IM-3 facility during the reporting period.

Periods of planned and unplanned extraction system downtime (that together resulted in approximately 8.6 percent of downtime during Third Quarter 2020) are summarized below. The times shown are in Pacific Standard Time to be consistent with other data collected (for example, water level data) at the site.

## E.1 July 2020

- **July 1 - 6, 2020 (unplanned):** The extraction well system was offline from 12:02 a.m. to 12:36 a.m. on July 1, 2020; from 4:52 p.m. to 6:48 p.m. on July 1, 2020; from 12:32 p.m. to 1:50 p.m. on July 2, 2020; from 5:32 a.m. to 6:28 a.m. on July 3, 2020; from 10:06 p.m. to 11:26 p.m. on July 3, 2020; from 7:06 p.m. to 8:32 p.m. on July 4, 2020; from 2:04 p.m. to 3:22 p.m. on July 5, 2020; and from 2:22 a.m. to 3:16 p.m. on July 6, 2020 due to a high-water level in Raw Water Storage Tank (T-100). The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 9 hours 42 minutes.
- **July 6, 2020 (unplanned):** The extraction well system was offline from 6:22 a.m. to 10:10 a.m. to replace the flow meters at the Clarifier Feed Pump (P-400) and the Plant Effluent Flow (FIT700). Extraction system downtime was 3 hours 48 minutes.
- **July 6, 2020 (unplanned):** The extraction well system was offline from 7:34 p.m. to 8:50 p.m. due to replacing microfilter modules. Extraction system downtime was 1 hour 16 minutes.
- **July 7 - 9, 2020 (unplanned):** The extraction well system was offline from 10:24 a.m. to 11:20 a.m. on July 7, 2020 and from 7:12 p.m. to 8:18 p.m. on July 9, 2020 due to a high-water level in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 2 hours 2 minutes.
- **July 11, 2020 (unplanned):** The extraction well system was offline from 11:14 a.m. to 12:24 p.m. and from 12:26 p.m. to 1:04 p.m. due to replacing microfilter modules. Extraction system downtime was 1 hour 48 minutes.

- **July 12, 2020 (unplanned):** The extraction system was offline from 9:50 a.m. to 9:52 a.m. due to a programmable logic controller (PLC) and human machine interface (HMI) connectivity issue. Extraction system downtime was 2 minutes.
- **July 18, 2020 (unplanned):** The extraction well system was offline from 2:24 a.m. to 4:50 a.m. due to replacing microfilter modules. Extraction system downtime was 2 hours 26 minutes.
- **July 19, 2020 (unplanned):** The extraction well system was offline from 9:36 p.m. to 10:24 p.m. due to a high-water level in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 48 minutes.
- **July 20, 2020 (unplanned):** The extraction well system was offline from 12:12 p.m. to 2:16 p.m. due to replacing microfilter modules. Extraction system downtime was 2 hours 4 minutes.
- **July 22, 2020 (planned):** The extraction well system was offline from 7:38 a.m. to 8:22 a.m. due to testing of the pipeline critical alarms and leak detection system. Extraction system downtime was 44 minutes.
- **July 22, 2020 (unplanned):** The extraction well system was offline from 12:28 a.m. to 1:46 p.m. due to a high-water level in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 1 hour 18 minutes.
- **July 23, 2020 (planned):** The extraction well system was offline from 8:42 a.m. to 9:10 a.m. to process wastewater (8,000 gallons) generated from remedy well construction activities. Extraction system downtime was 28 minutes.
- **July 23 - 25, 2020 (unplanned):** The extraction well system was offline from 10:58 p.m. to 11:44 p.m. on July 23, 20202 and from 6:10 a.m. to 6:38 a.m. on July 25, 2020 due to a high-water level in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 1 hour 14 minutes.
- **July 25, 2020 (unplanned):** The extraction well system was offline from 4:52 p.m. to 7:48 p.m. due to replacing microfilter modules. Extraction system downtime was 2 hours 56 minutes.
- **July 26, 2020 (unplanned):** The extraction well system was offline from 1:58 a.m. to 4:12 a.m. because the Acid Pump (P-801B) which feeds the Treated Water Storage Tank (T-700) failed. The pump was repaired and extraction resumed. Extraction system downtime was 2 hours 14 minutes.
- **July 31, 2020 (unplanned):** The extraction well system was offline from 8:42 a.m. to 9:06 a.m. due to a high-water level in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 24 minutes.

## E.2 August 2020

- **August 1, 2020 (unplanned):** The extraction well system was offline from 5:34 p.m. to 8:26 p.m. due to replacing microfilter modules. Extraction system downtime was 2 hours 52 minutes.
- **August 6, 2020 (unplanned):** The extraction well system was offline from 6:26 a.m. to 6:42 a.m. to process wastewater (400 gallons) generated from remedy well construction activities. A leak was found in the brine return line at the MW-20 Bench; the leak was contained in secondary containment (a flange fitting was loose), and the process was stopped. Extraction system downtime was 16 minutes.
- **August 6, 2020 (unplanned):** The extraction system was offline from 7:28 a.m. to 7:30 a.m. due to a PLC and HMI connectivity issue. Extraction system downtime was 2 minutes.

- **August 6, 2020 (planned):** The extraction well system was offline from 7:44 a.m. to 7:58 a.m. to confirm that the brine return line was repaired and to process wastewater (3,050 gallons) generated from remedy well construction activities. Extraction system downtime was 14 minutes.
- **August 6, 2020 (unplanned):** The extraction well system was offline from 3:44 p.m. to 4:34 p.m. due to a high-water level in Raw Water Storage Tank (T-100). The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 50 minutes.
- **August 8, 2020 (planned):** The extraction well system was offline from 8:22 a.m. to 9:24 a.m.; and from 12:06 p.m. to 1:02 p.m. to process wastewater (6,000 gallons) generated from remedy well construction activities. Extraction system downtime was 1 hour 58 minutes.
- **August 8, 2020 (unplanned):** The extraction well system was offline from 7:32 p.m. to 8:28 p.m. due to a high-water level in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 56 minutes.
- **August 9-12, 2020 (planned):** The extraction well system was offline from 4:18 a.m. August 9, 2020 to 8:44 a.m. August 12, 2020 for the semiannual scheduled maintenance outage. Extraction system downtime was 3 days 4 hours 26 minutes.
- **August 12, 2020 (unplanned):** The extraction well system was offline from 9:20 a.m. to 2:12 p.m. because as the plant came back online from the semiannual maintenance outage there were low pH values throughout the plant and higher conductivity values. The plant was kept in recirculation until the pH and conductivity values returned to normal. Extraction system downtime was 4 hours 52 minutes.
- **August 14-16, 2020 (unplanned):** The extraction well system was offline from 2:16 a.m. to 3:14 a.m. and from 10:18 p.m. to 11:00 p.m. on August 14, 2020; from 6:36 a.m. to 11:38 a.m. on August 15, 2020; and from 2:26 p.m. to 3:22 p.m. on August 16, 2020 due to a high-water level in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 7 hours 38 minutes.
- **August 17, 2020 (planned):** The extraction well system was offline from 6:20 a.m. to 6:32 a.m. to process wastewater generated from remedy well construction activities. Extraction system downtime was 12 minutes.
- **August 17, 2020 (unplanned):** The extraction well system was offline from 2:10 p.m. to 3:24 p.m. due to a high-water level in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 1 hour 14 minutes.
- **August 18, 2020 (planned):** The extraction well system was offline from 6:06 a.m. to 6:12 a.m. to process wastewater generated from remedy well construction activities. Extraction system downtime was 6 minutes.
- **August 18, 2020 (unplanned):** The extraction well system was offline from 6:30 p.m. to 7:46 p.m. due to a City of Needles power outage. The outage tripped out the microfilter and the air compressors. Extraction system downtime was 1 hour 16 minutes.
- **August 19, 2020 (unplanned):** The extraction system was offline from 3:56 a.m. to 3:58 a.m. and from 7:04 a.m. to 7:06 a.m. due to a PLC and HMI connectivity issue. Extraction system downtime was 4 minutes.
- **August 19, 2020 (unplanned):** The extraction well system was offline from 12:10 p.m. to 1:42 p.m. due to a high-water level in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 1 hour 32 minutes.
- **August 20-21, 2020 (unplanned):** The extraction well system was offline from 11:52 p.m. on August 20, 2020 to 12:46 p.m. on August 21, 2020; and from 12:48 a.m. to 12:58 a.m., from 1:02 a.m. to 1:30 a.m., and from 1:32 a.m. to 3:54 a.m. on August 21, 2020 due to a City of Needles power outage caused by high

temperatures. The power outage tripped out the microfilter and the blowers resulting in a high-water level in T-100. Extraction system downtime was 3 hours 54 minutes.

- **August 22, 2020 (unplanned):** The extraction well system was offline from 2:56 a.m. to 3:54 a.m. due to a high-water level in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 58 minutes.
- **August 22, 2020 (unplanned):** The extraction well system was offline from 5:04 a.m. to 5:50 a.m. due to a tripped breaker for TW-3D. The operator reset the breaker and restarted the pump. Extraction system downtime was 46 minutes.
- **August 23, 2020 (unplanned):** The extraction well system was offline from 3:18 a.m. to 4:04 a.m. due to a high-water level in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 46 minutes.
- **August 23, 2020 (unplanned):** The extraction well system was offline from 4:32 a.m. to 4:44 a.m. due to a tripped breaker for TW-3D. The operator reset the breaker and restarted the pump. Extraction system downtime was 12 minutes.
- **August 24, 2020 (unplanned):** The extraction well system was offline from 7:46 a.m. to 9:08 a.m. due to a high-water level in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 1 hour 22 minutes.
- **August 24, 2020 (unplanned):** The extraction well system was offline from 9:28 a.m. to 9:34 a.m. due to a tripped breaker for TW-3D. The operator reset the breaker and restarted the pump. Extraction system downtime was 6 minutes.
- **August 24, 2020 (unplanned):** The extraction well system was offline from 9:40 a.m. to 9:44 a.m.; from 9:48 a.m. to 9:50 a.m.; from 9:54 a.m. to 9:56 a.m.; from 10:00 a.m. to 10:04 a.m.; from 10:08 a.m. to 10:10 a.m., and from 10:14 a.m. to 10:20 a.m. due to a tripped breaker for TW-3D. The TW-3D pump and motor wouldn't stay running. The heaters in the TW-3D panel/bucket kept tripping which stops the well from running. Technicians and electricians were scheduled to troubleshoot and inspect on August 25, 2020. Extraction system downtime was 20 minutes.
- **August 25, 2020 (unplanned):** The extraction well system was offline from 10:36 a.m. to 11:28 a.m. due to a high-water level in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 52 minutes.
- **August 25-26, 2020 (unplanned):** The extraction well system was offline from 11:40 a.m. to 11:44 a.m., from 11:48 a.m. to 11:52 a.m., from 11:56 a.m. to 12:02 p.m., from 12:06 p.m. to 12:10 p.m., from 12:22 p.m. to 12:32 p.m., from 12:46 p.m. to 1:38 p.m., and from 1:50 p.m. to 5:14 p.m. on August 25, 2020; from 5:20 p.m. on August 25, 2020 to 10:06 a.m. on August 26, 2020; and from 10:08 a.m. to 10:14 a.m. on August 26, 2020 due to a tripped breaker for TW-3D. The TW-3D pump and motor wouldn't stay running. Operator and IT technician tried troubleshooting, but no obvious issue was found. Extraction system downtime was 21 hours 36 minutes.
- **August 27-28, 2020 (unplanned):** The extraction well system was offline from 6:34 a.m. to 7:08 a.m. on August 27, 2020 and from 9:18 a.m. to 9:42 a.m. on August 28, 2020 due to a high-water level in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 58 minutes.
- **August 28, 2020 (unplanned):** The extraction well system was offline from 9:54 a.m. to 10:24 a.m.; from 10:28 a.m. to 10:34 a.m.; from 10:38 a.m. to 11:00 a.m.; and from 11:02 a.m. to 11:28 a.m. due to a tripped breaker for TW-3D. The TW-3D pump and motor wouldn't stay running. Cascade team and Groundwater Partners

team replaced the TW-3D pump and motor to eliminate that as a potential cause. Extraction system downtime was 1 hour 24 minutes.

- **August 29, 2020 (unplanned):** The extraction well system was offline from 12:44 a.m. to 1:40 a.m. due to a high-water level in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 56 minutes.
- **August 29, 2020 (unplanned):** The extraction well system was offline from 9:46 a.m. to 9:50 a.m., from 9:52 a.m. to 9:56 a.m., from 9:58 a.m. to 10:10 a.m., from 10:12 a.m. to 10:38 a.m., 10:40 a.m. to 10:44 a.m., from 10:46 a.m. to 10:50 a.m., from 10:52 to 12:00 p.m. (noon), from 12:02 p.m. 12:22 p.m., from 12:24 p.m. to 1:32 p.m., from 1:38 p.m. to 1:42 p.m., 1:52 p.m. to 2:02 p.m., and from 2:04 p.m. to 2:16 p.m. due to a tripped breaker for TW-3D. The TW-3D pump and motor wouldn't stay running. During this time, an attempt was made to extract groundwater from TW-2D, but it would not stay on. Parts have been since been ordered to replace the Motor Control Center (MCC) and disconnect for TW-2D. Extraction system downtime was 3 hours 56 minutes.
- **August 29, 2020 (unplanned):** The extraction well system was offline from 3:34 p.m. to 4:44 p.m. due to a high-water level in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 1 hour 10 minutes.
- **August 29, 2020 (unplanned):** The extraction system was offline from 5:16 p.m. to 5:20 p.m. and from 7:10 p.m. to 7:12 p.m. due to a PLC and HMI connectivity issue. Extraction system downtime was 6 minutes.
- **August 30, 2020 (unplanned):** The extraction well system was offline from 9:50 a.m. to 10:32 a.m. due to a high-water level in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 42 minutes.
- **August 30, 2020 (unplanned):** The extraction system was offline from 11:00 a.m. to 11:04 a.m. due to a PLC and HMI connectivity issue. Extraction system downtime was 4 minutes.

## E.3 September 2020

- **September 2, 2020 (unplanned):** The extraction well system was offline from 6:42 p.m. to 8:12 p.m. due to replacing microfilter modules. Extraction system downtime was 1 hour 30 minutes.
- **September 3, 2020 (unplanned):** The extraction well system was offline from 11:18 a.m. to 12:26 p.m. due to the air compressor failing. The air compressor belt broke; it was changed, and the compressor was restarted. Extraction system downtime was 1 hour 8 minutes.
- **September 4, 2020 (unplanned):** The extraction well system was offline from 6:44 p.m. to 7:36 p.m. due to a high-water level in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 52 minutes.
- **September 4, 2020 (unplanned):** The extraction well system was offline from 9:08 p.m. to 11:26 p.m. due to replacing microfilter modules. Extraction system downtime was 2 hours 18 minutes.
- **September 5-7, 2020 (unplanned):** The extraction well system was offline from 10:26 a.m. to 10:54 a.m. on September 5, 2020; from 7:04 p.m. to 7:52 p.m. on September 6, 2020; from 6:20 p.m. to 7:06 p.m. on September 7, 2020; and from 7:10 p.m. to 7:18 p.m. on September 7, 2020 due to a high-water level in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 2 hour 10 minutes.
- **September 7-8, 2020 (unplanned):** The extraction system was offline from 7:28 p.m. to 7:34 p.m., from 7:40 p.m. to 7:46 p.m., and from 7:50 p.m. to 8:02 p.m. on September 7, 2020; from 8:28 p.m. on September 7,

2020 to 2:06 p.m. on September 8, 2020; and from 2:14 p.m. to 3:50 p.m. and from 3:54 p.m. to 4:28 p.m. on September 8, 2020 due to TW-3D shutting off for an unknown cause. The cause was investigated, repairs were attempted, and the system was restarted; however, the issue was not resolved (see below). Extraction system downtime was 20 hours 12 minutes.

- **September 8-11, 2020 (unplanned):** The extraction well system was offline from 11:34 p.m. on September 8, 2020 to 12:26 a.m. on September 9, 2020; from 3:16 a.m. to 4:02 a.m. on September 10, 2020; and from 2:40 a.m. to 3:36 a.m. on September 11, 2020 due to a high-water level in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 2 hours 34 minutes.
- **September 11, 2020 (unplanned):** The extraction well system was offline from 6:14 a.m. to 6:16 a.m. and from 7:00 a.m. to 7:04 a.m. on September 11, 2020 due to TW-3D failing and working on the electrical components in the MCC enclosure (bucket) for TW-3D. Extraction system downtime was 6 minutes.
- **September 12-13, 2020 (unplanned):** The extraction well system was offline from 1:50 a.m. to 2:50 a.m. on September 12, 2020 and from 3:42 a.m. to 7:54 a.m. on September 13, 2020 due to a high-water level in T-100 and TW-3D not working. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. The TW-3D MCC enclosure was also replaced and the TW-3D starting issue was resolved. Extraction system downtime was 5 hours 12 minutes.
- **September 13, 2020 (unplanned):** The extraction system was offline from 7:56 a.m. to 7:58 a.m. due to a PLC and HMI connectivity issue. Extraction system downtime was 2 minutes.
- **September 14, 2020 (unplanned):** The extraction well system was offline from 3:08 a.m. to 3:56 a.m. due to a high-water level in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 48 minutes.
- **September 14, 2020 (unplanned):** The extraction well system was offline from 10:00 a.m. to 11:06 a.m. due to replacing microfilter modules. Extraction system downtime was 1 hour 6 minutes.
- **September 18-19, 2020 (unplanned):** The extraction well system was offline from 3:14 a.m. to 4:06 a.m. on September 18, 2020 and from 6:32 p.m. to 7:42 p.m. on September 19, 2020; due to a high-water level in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 2 hours 34 minutes.
- **September 20, 2020 (unplanned):** The extraction well system was offline from 3:28 p.m. to 4:00 p.m. and from 4:06 p.m. to 4:18 p.m. due to a City of Needles power outage. Extraction system downtime was 44 minutes.
- **September 21, 2020 (unplanned):** The extraction well system was offline from 1:58 a.m. to 2:56 a.m. due to a high-water level in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 58 minutes.
- **September 22, 2020 (unplanned):** The extraction well system was offline from 11:26 a.m. to 12:44 p.m. due to replacing microfilter modules. Extraction system downtime was 1 hour 18 minutes.
- **September 22, 2020 (unplanned):** The extraction system was offline from 3:26 p.m. to 15:40 a.m. due to a PLC and HMI connectivity issue. Extraction system downtime was 14 minutes.
- **September 22, 2020 (unplanned):** The extraction well system was offline from 3:44 p.m. to 8:14 p.m. due to a City of Needles power outage. Also, the backup generator would not start due to needing new batteries. Batteries were replaced. Extraction system downtime was 4 hours 30 minutes.

- **September 23, 2020 (unplanned):** The extraction system was offline from 4:46 p.m. to 4:52 p.m. due to a PLC and HMI connectivity issue. Extraction system downtime was 6 minutes.
- **September 23, 2020 (unplanned):** The extraction well system was offline from 4:56 p.m. to 6:40 p.m. due to a high-water level in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 1 hour 44 minutes.
- **September 26, 2020 (planned):** The extraction well system was offline from 10:48 a.m. to 11:26 a.m. due to testing of the pipeline critical alarms and leak detection system. Extraction system downtime was 38 minutes.
- **September 29, 2020 (unplanned):** The extraction well system was offline from 1:32 a.m. to 4:04 a.m. due to replacing microfilter modules and due to a high-water level in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 2 hours 32 minutes.
- **September 29, 2020 (planned):** The extraction well system was offline from 8:34 a.m. to 9:04 a.m. to process wastewater (8,000 gallons) generated from remedy well construction activities. Extraction system downtime was 30 minutes.
- **September 29, 2020 (unplanned):** The extraction system was offline from 2:20 p.m. to 2:30 p.m. due to an update of the onsite computers. Extraction system downtime was 10 minutes.
- **September 30, 2020 (planned):** The extraction well system was offline from 7:54 a.m. to 9:36 a.m. to process wastewater (8,000 gallons) generated from remedy well construction activities. Extraction system downtime was 1 hour 42 minutes.

## E.4 October 2020

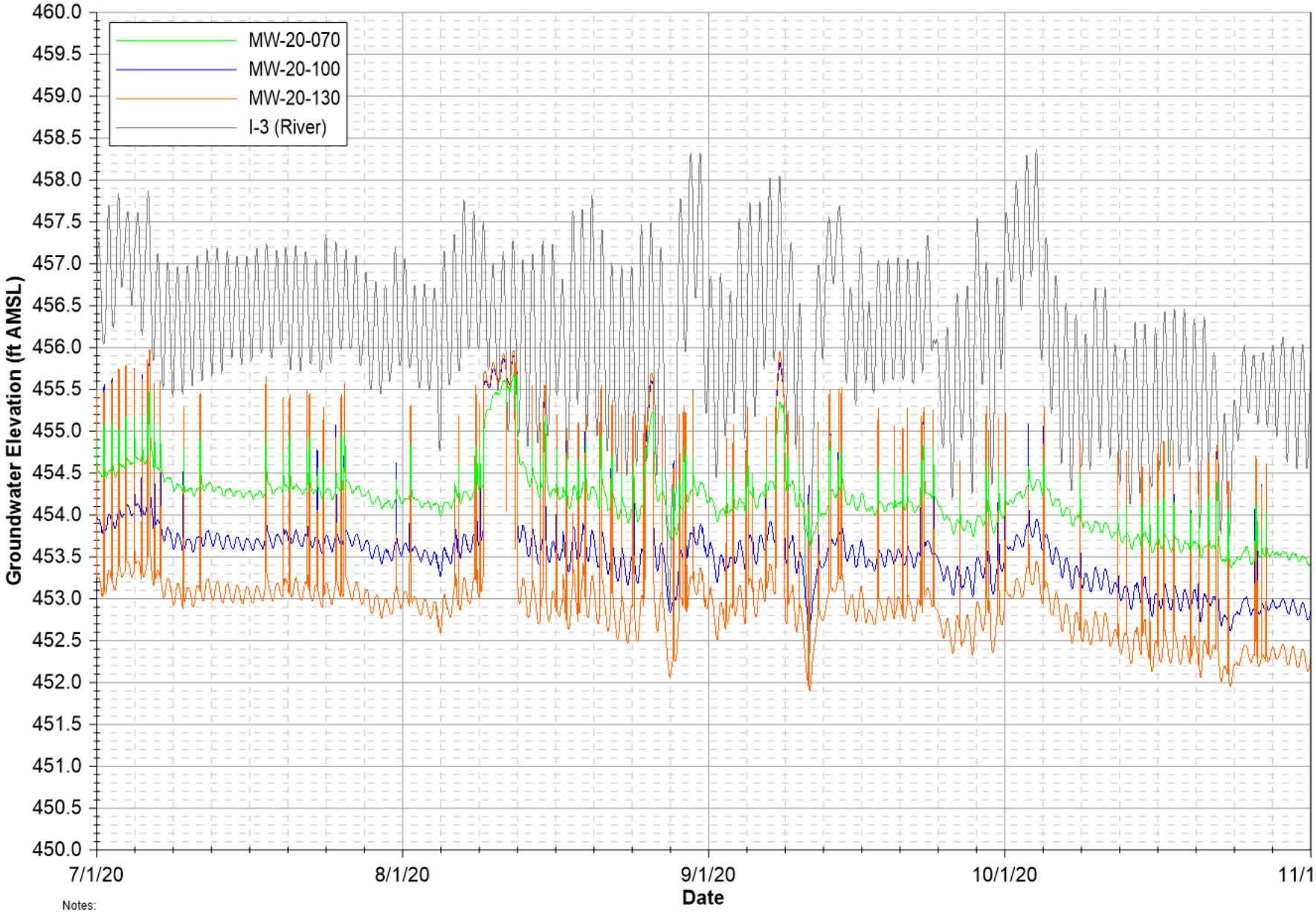
- **October 1-8, 2020 (unplanned):** The extraction well system was offline from 12:42 a.m. to 1:26 a.m. on October 1, 2020; from 10:00 a.m. to 10:26 a.m. on October 3, 2020; from 10:30 p.m. to 11:18 p.m. on October 4, 2020; and from 2:04 p.m. to 3:32 p.m. on October 8, 2020 due to a high-water level in the Raw Water Storage Tank (T-100). The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 3 hours 26 minutes.
- **October 12, 2020 (planned):** The extraction well system was offline from 10:36 a.m. to 11:04 a.m. to process wastewater (3,000 gallons) generated from remedy well construction activities. Extraction system downtime was 28 minutes.
- **October 13, 2020 (planned):** The extraction well system was offline from 7:12 a.m. to 7:50 a.m. to process wastewater (33,000 gallons) generated from remedy well construction activities. Transfers occurred over the entire day and into the next. Extraction system downtime was 38 minutes.
- **October 14-15, 2020 (unplanned):** The extraction well system was offline from 8:44 p.m. to 9:56 p.m. on October 14, 2020; from 3:18 p.m. to 4:30 p.m. on October 15, 2020 due to a high-water level in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 2 hours 24 minutes.
- **October 16, 2020 (unplanned):** The extraction well system was offline from 11:30 a.m. to 12:34 p.m. due to replacing microfilter modules. Extraction system downtime was 1 hour 4 minutes.
- **October 17-20, 2020 (unplanned):** The extraction well system was offline from 1:42 p.m. to 2:50 p.m. on October 17, 2020; from 1:28 p.m. to 2:42 p.m. on October 18, 2020; from 6:42 p.m. to 7:56 p.m. on October 19, 2020; and from 3:32 p.m. to 4:40 p.m. on October 20, 2020 due to a high-water level in T-100. The

operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 4 hours 44 minutes.

- **October 21, 2020 (unplanned):** The extraction well system was offline from 1:14 p.m. to 2:14 p.m.; and from 2:38 p.m. to 4:06 p.m. due to testing the sensor in Iron Oxidation Reactor 3 (T-301C). Extraction system downtime was 2 hours 28 minutes.
- **October 22, 2020 (unplanned):** The extraction well system was offline from 9:40 a.m. to 1:20 p.m. to remove a blockage (solids buildup) in the piping at the Chromium Reduction Reactor (T-300). Extraction system downtime was 3 hours 40 minutes.
- **October 23, 2020 (unplanned):** The extraction well system was offline from 1:48 p.m. to 3:54 p.m. due to a high-water level in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 2 hours 6 minutes.
- **October 26, 2020 (unplanned):** The extraction well system was offline from 8:32 a.m. to 8:54 a.m. due to a City of Needles power outage. Extraction system downtime was 22 minutes.
- **October 26, 2020 (unplanned):** The extraction well system was offline from 9:14 a.m. to 10:48 a.m. due to a high-water level in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 1 hour 34 minutes.
- **October 26, 2020 (unplanned):** The extraction well system was offline from 12:18 p.m. to 1:22 p.m. due to replacing microfilter modules. Extraction system downtime was 1 hour 4 minutes.
- **October 26-27, 2020 (unplanned):** The extraction well system was offline from 11:56 p.m. on October 26, 2020 to 12:30 a.m. on October 27, 2020 due to a high-water level in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 34 minutes.
- **October 27, 2020 (unplanned):** The extraction well system was offline from 11:22 a.m. to 12:12 p.m. due to an alarm for low ferrous injection shutting down the facility. The problem was investigated and corrected. Extraction system downtime was 50 minutes.

# APPENDIX F

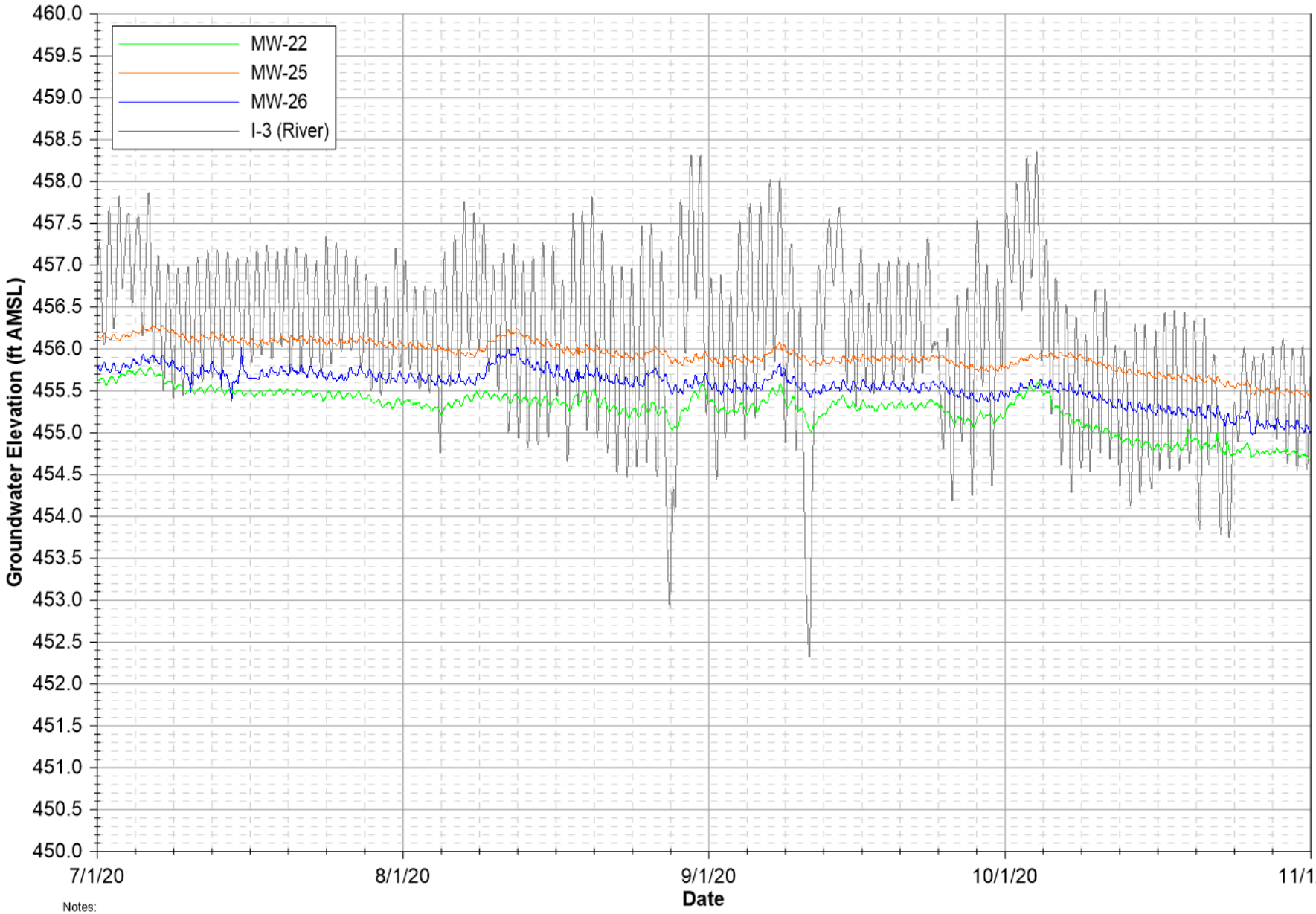
## Hydrographs, Third Quarter 2020




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

**FIGURE F-1A**
**MW-20 CLUSTER HYDROGRAPHS**
THIRD QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS



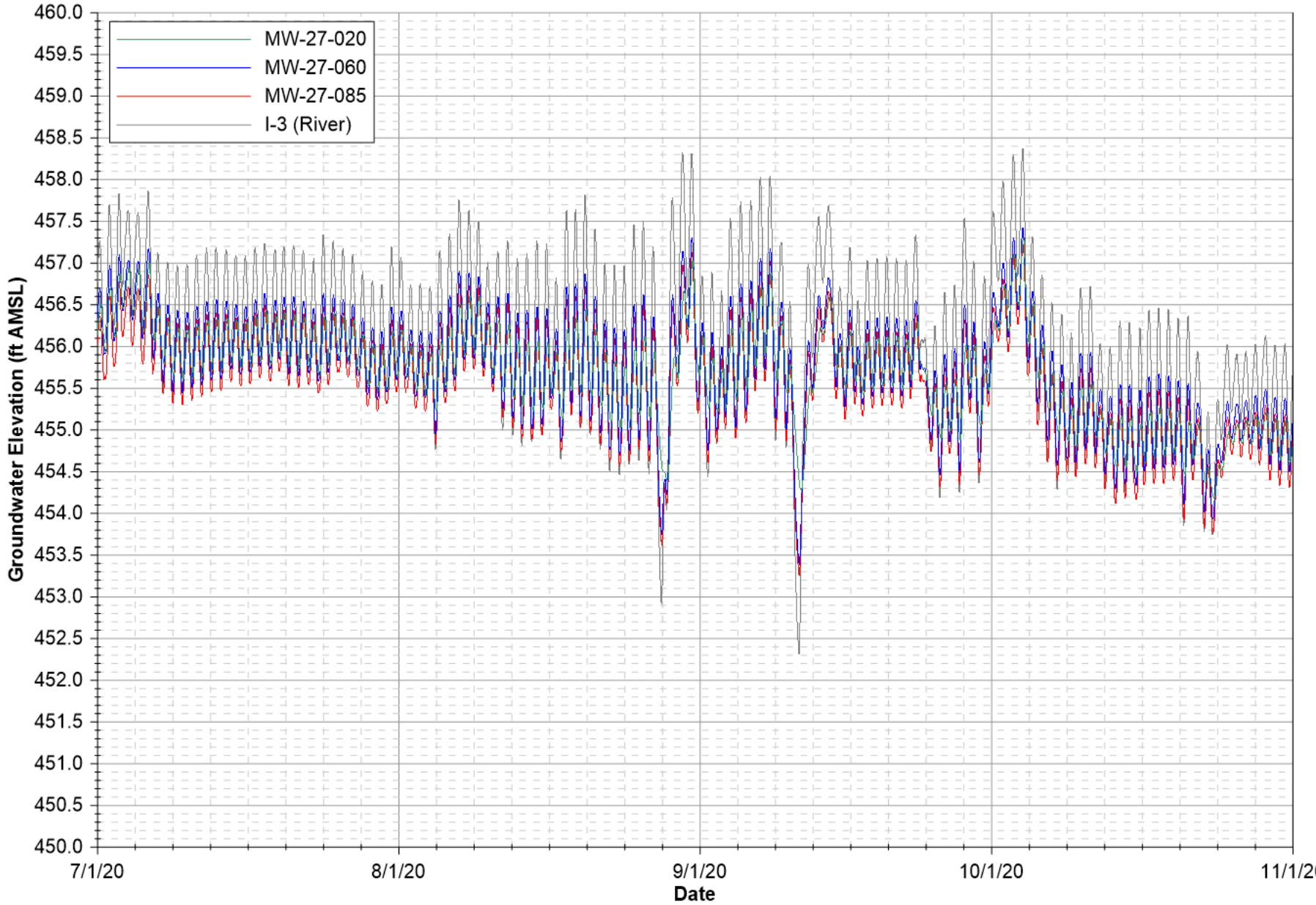

Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

**FIGURE F-1B**

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

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

ARCADIS



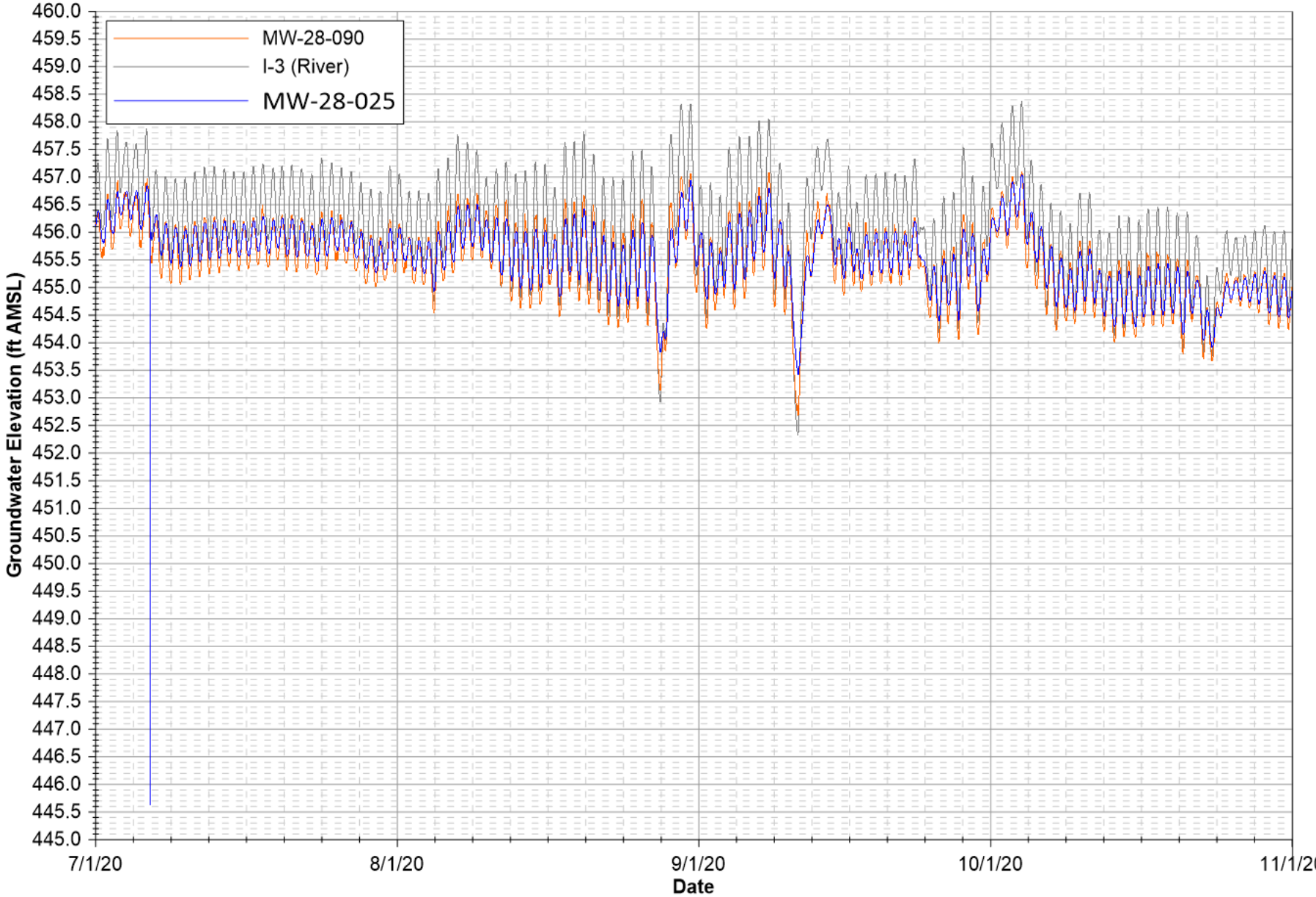

Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level

**FIGURE F-1C**

**MW-27 CLUSTER HYDROGRAPHS**

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

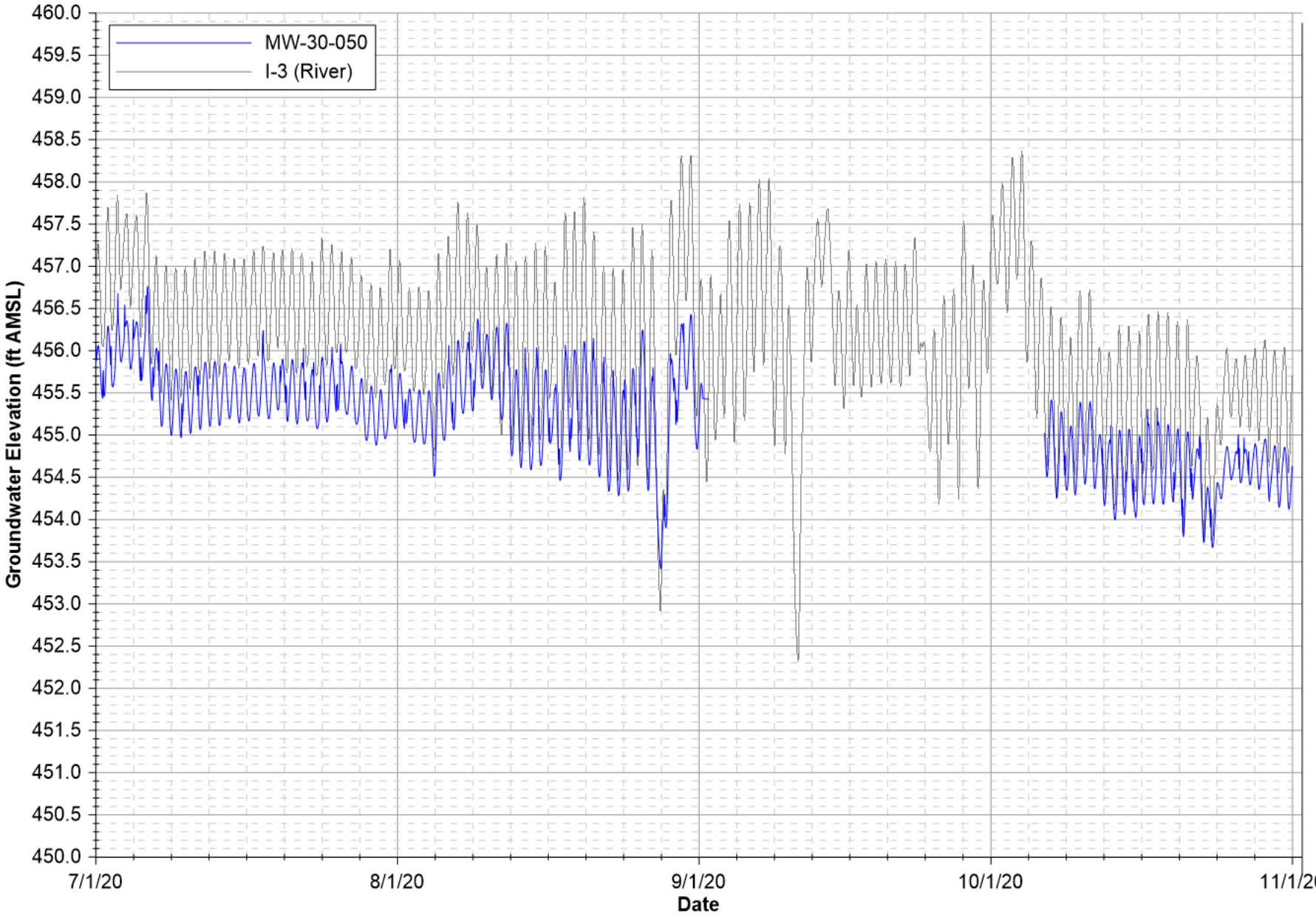
ARCADIS




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

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

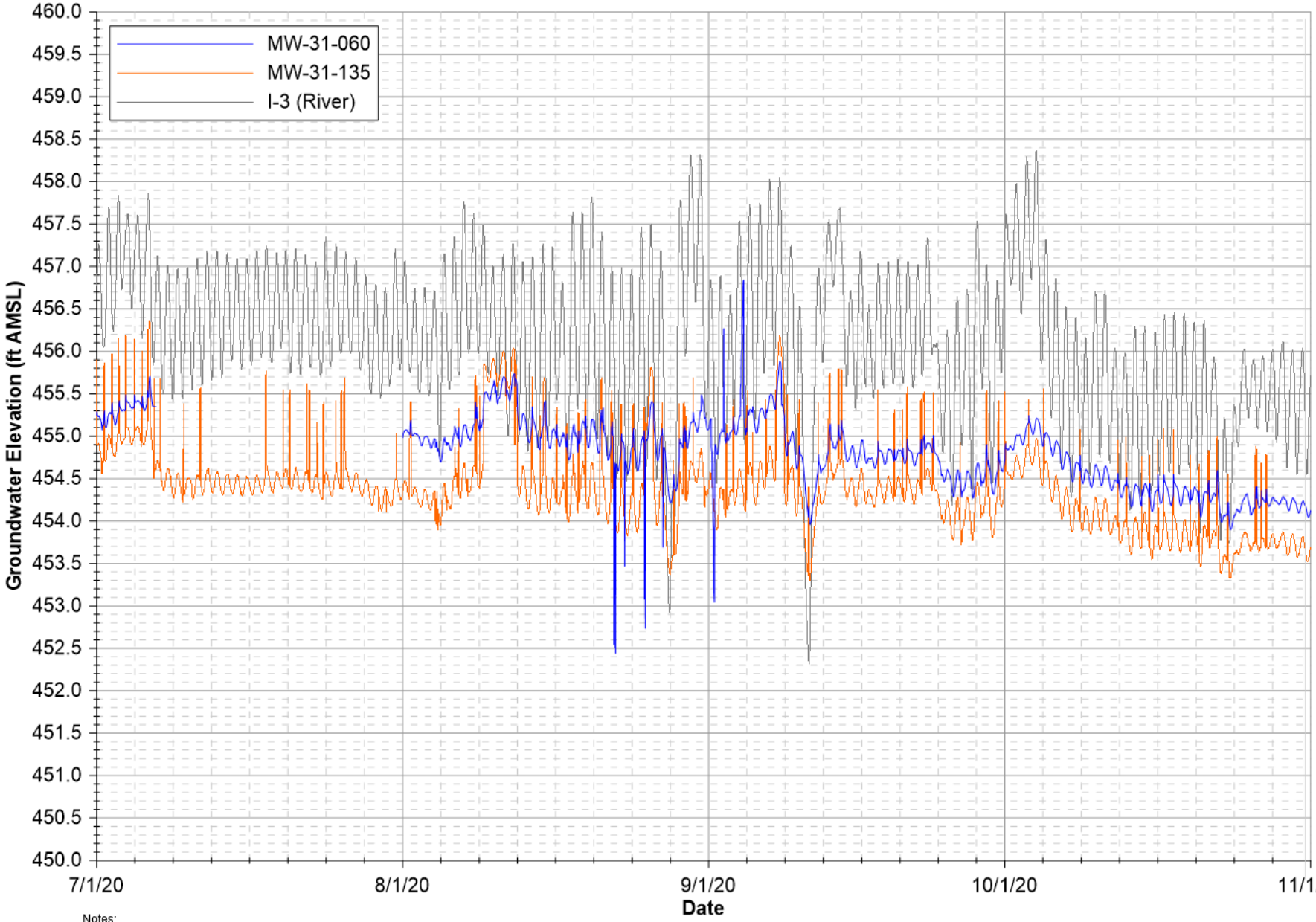
ARCADIS




Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.
3. MW-30-050 data unavailable from September 1, 2020 through October 6, 2020 due to transducer malfunction.

**FIGURE F-1E**
**MW-30-050 HYDROGRAPH**
THIRD QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS



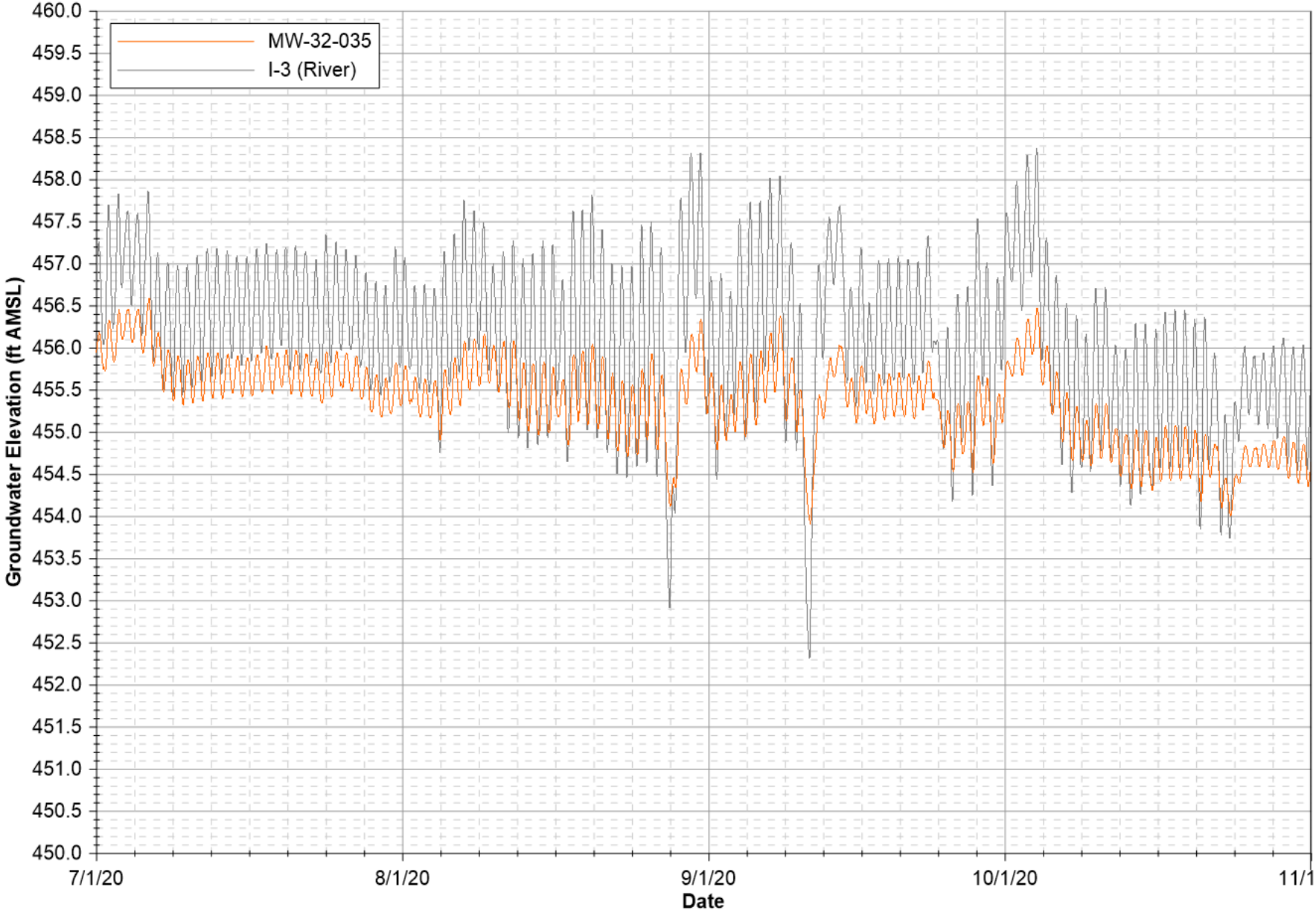

Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.
3. MW-31-060 data unavailale from 7/7/20 through 8/1/2020 due to transducer malfunction.

**FIGURE F-1F**

**MW-31 CLUSTER HYDROGRAPHS**

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

ARCADIS

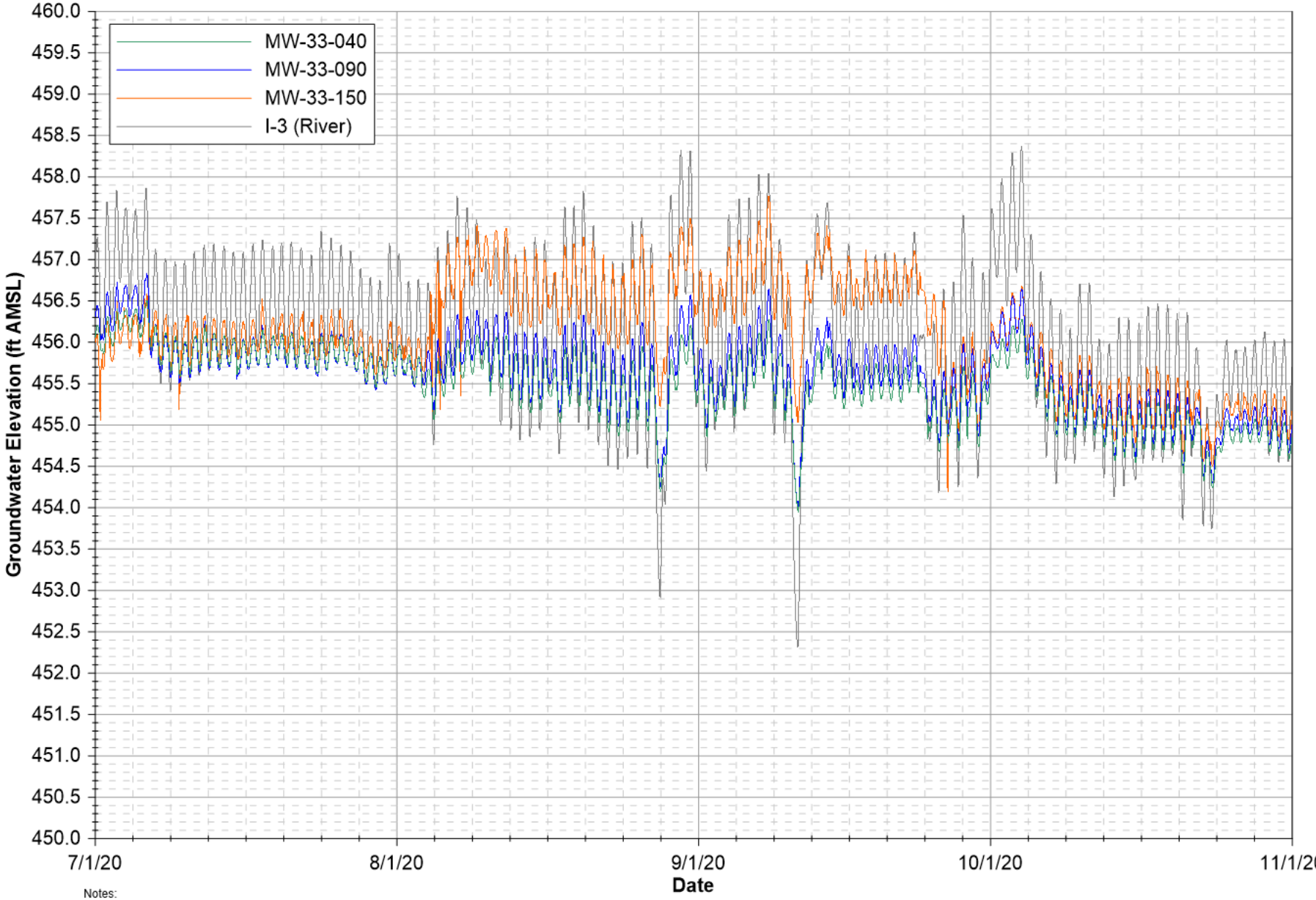



Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

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



ARCADIS



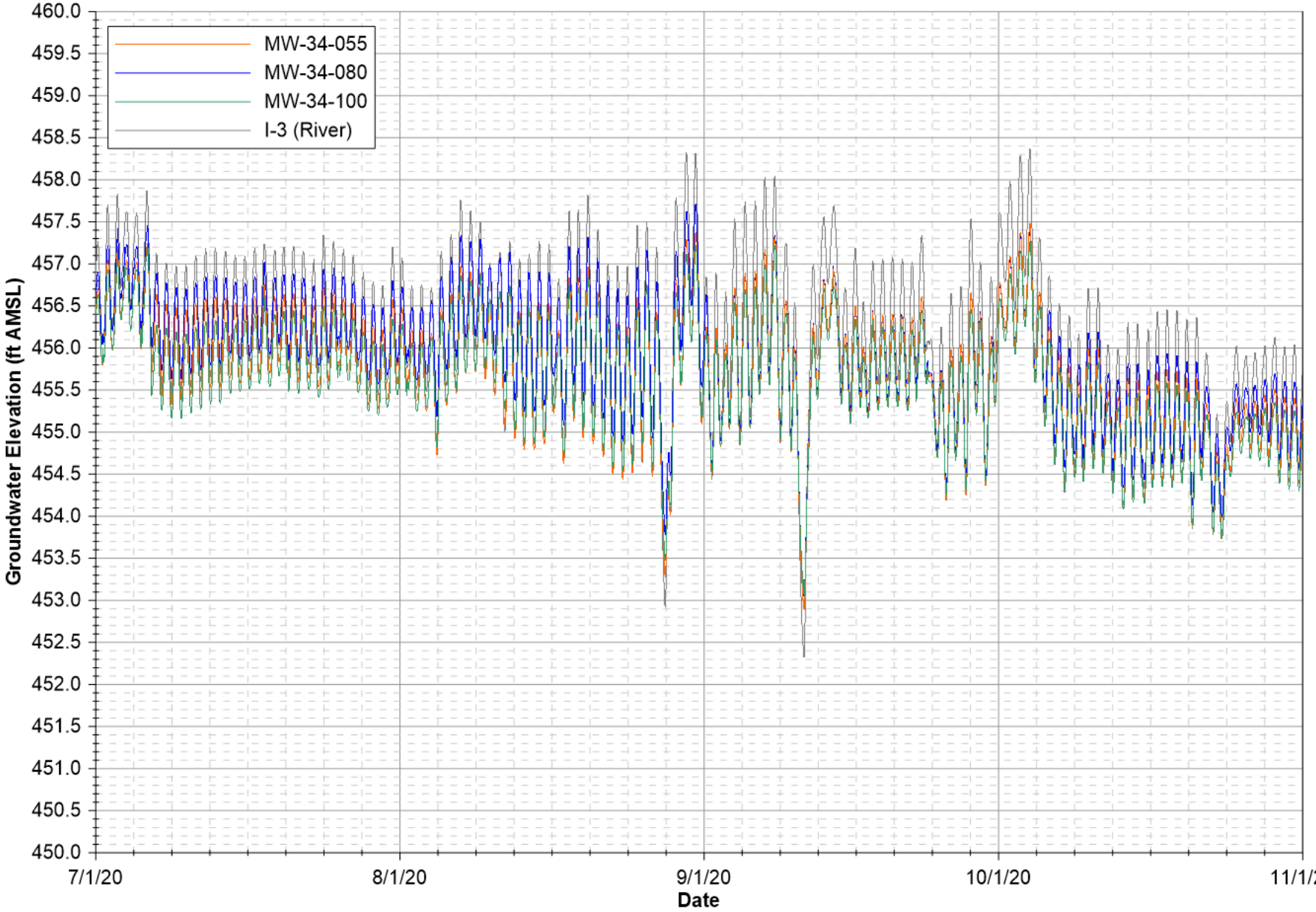

Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

**FIGURE F-1H**

**MW-33 CLUSTER HYDROGRAPHS**

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

ARCADIS



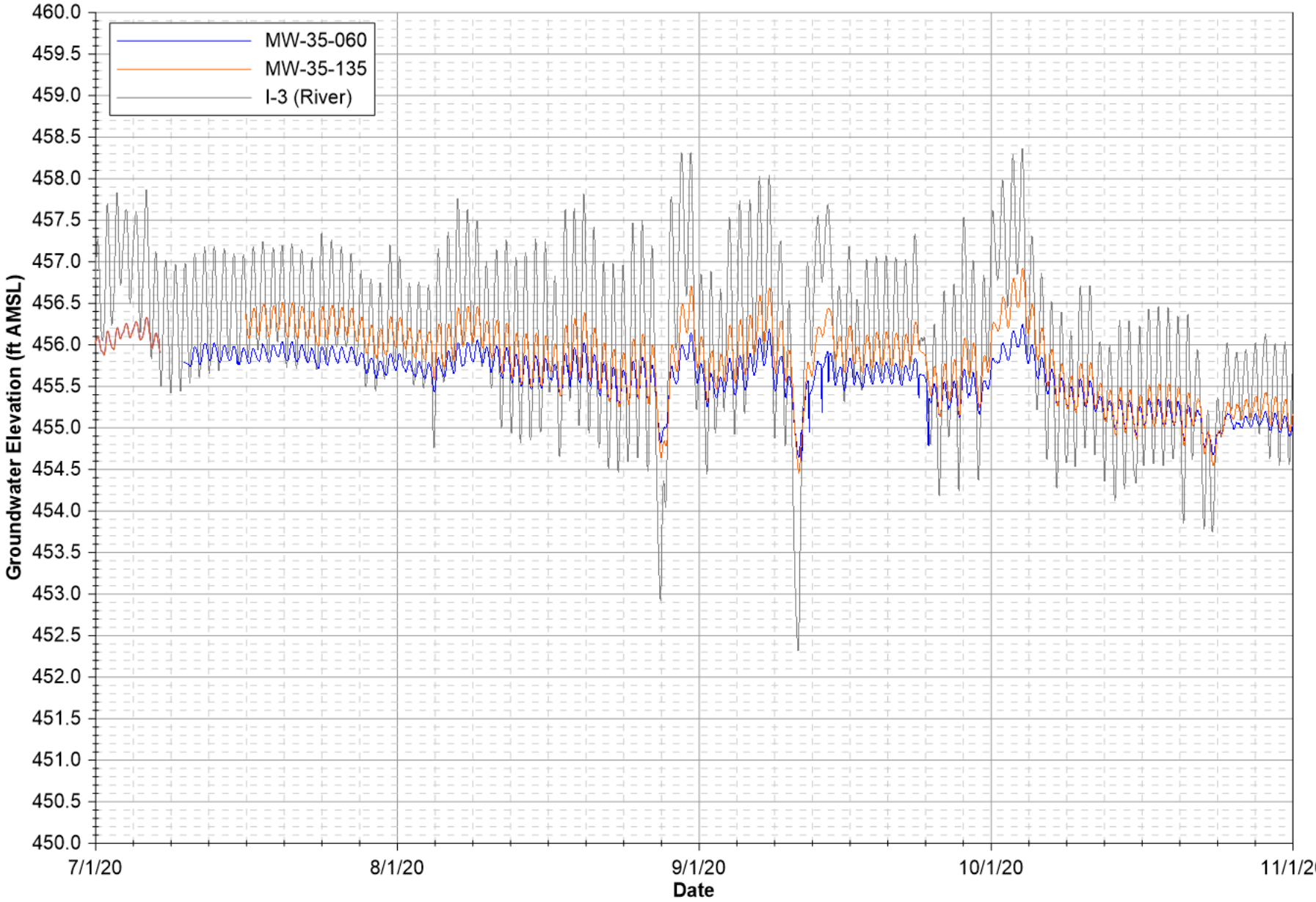

Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

**FIGURE F-1I**

**MW-34 CLUSTER HYDROGRAPHS**

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

ARCADIS

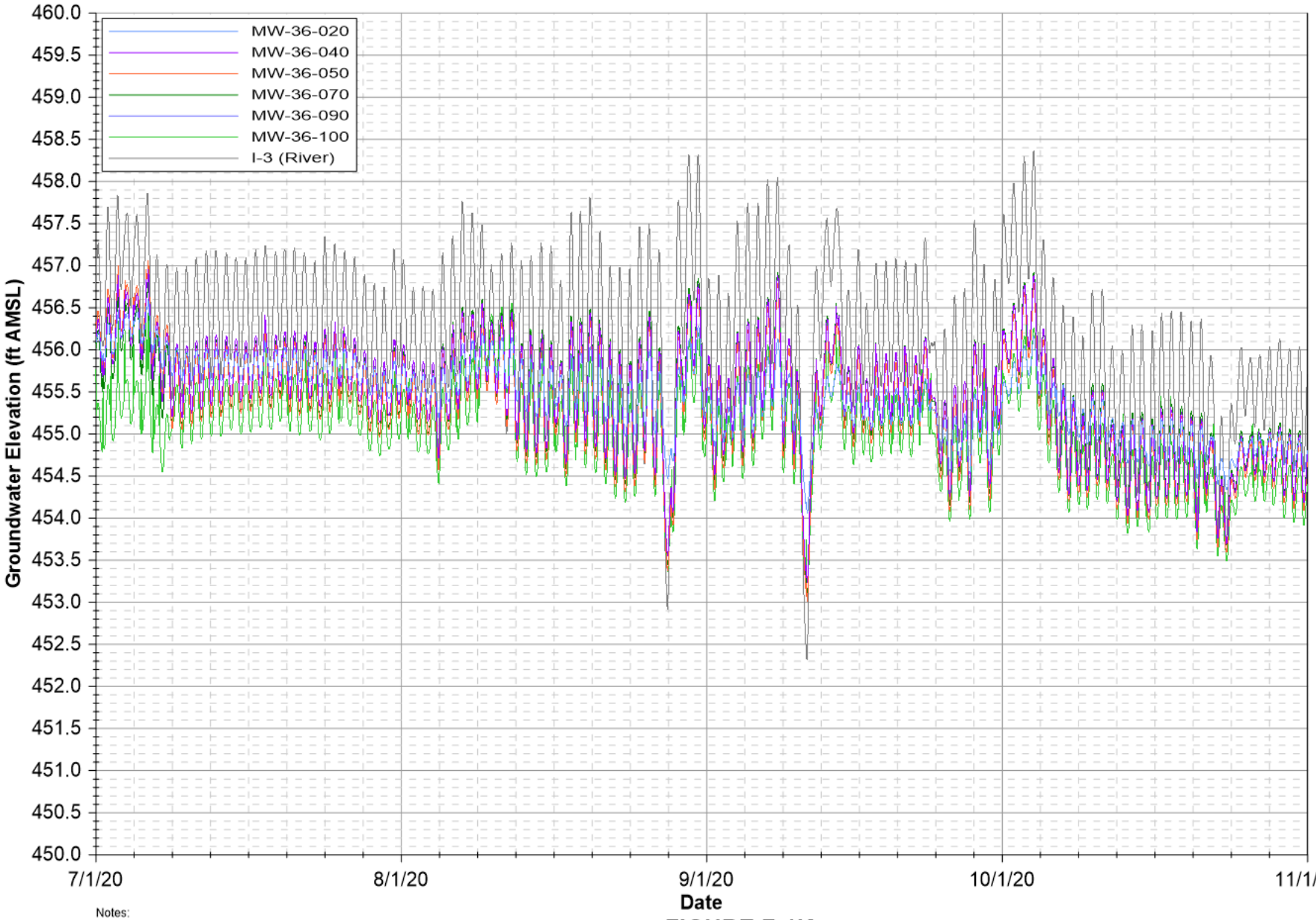



Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.
3. MW-35-060 data unavailable from July 8, 2020 through July 10, 2020 due to transducer malfunction.
4. MW-35-135 data unavailable from July 7, 2020 through July 16, 2020 due to transducer malfunction.

**FIGURE F-1J**
**MW-35 CLUSTER HYDROGRAPHS**
THIRD QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA



ARCADIS



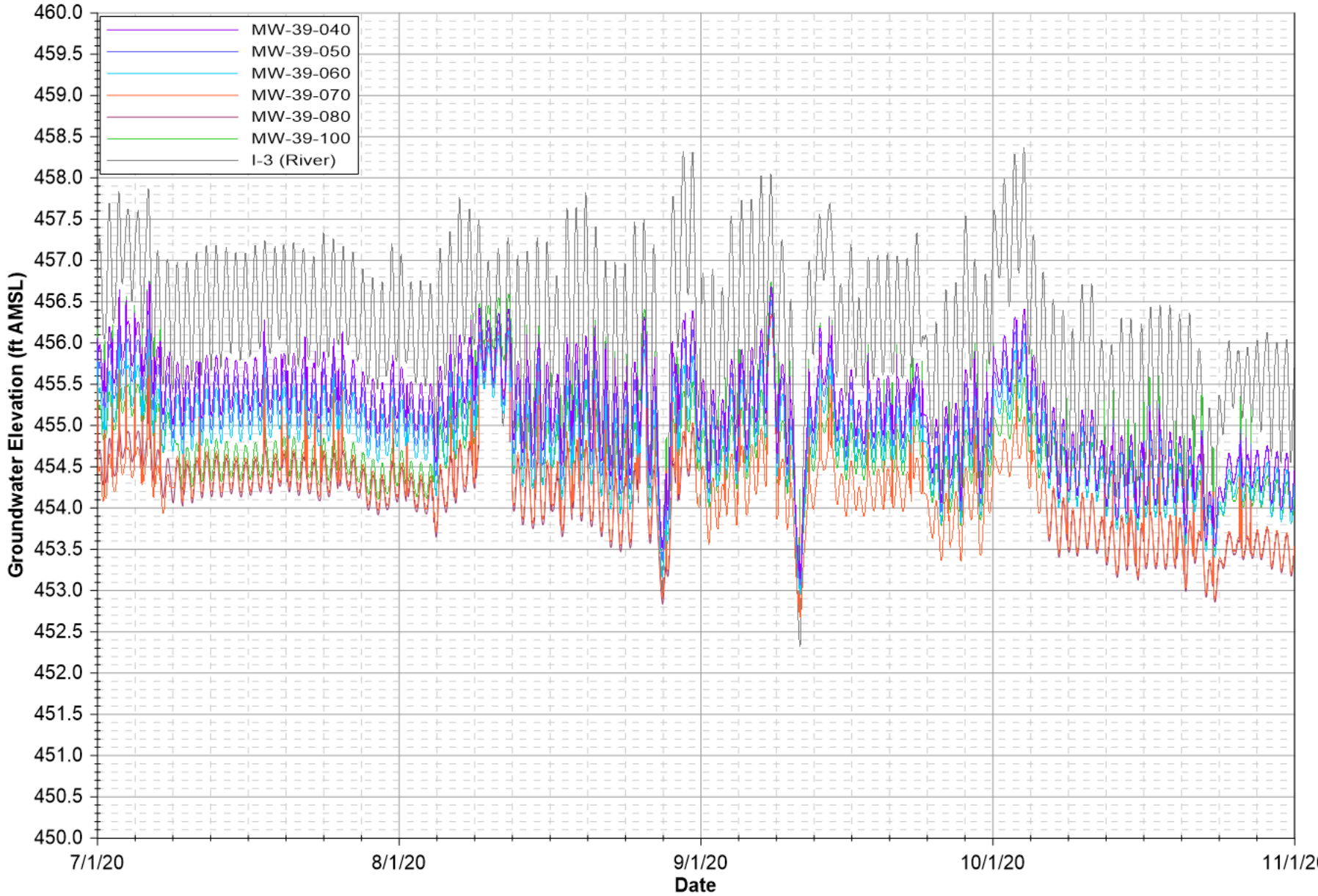

Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

**FIGURE F-1K**

**MW-36 CLUSTER HYDROGRAPHS**

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

ARCADIS

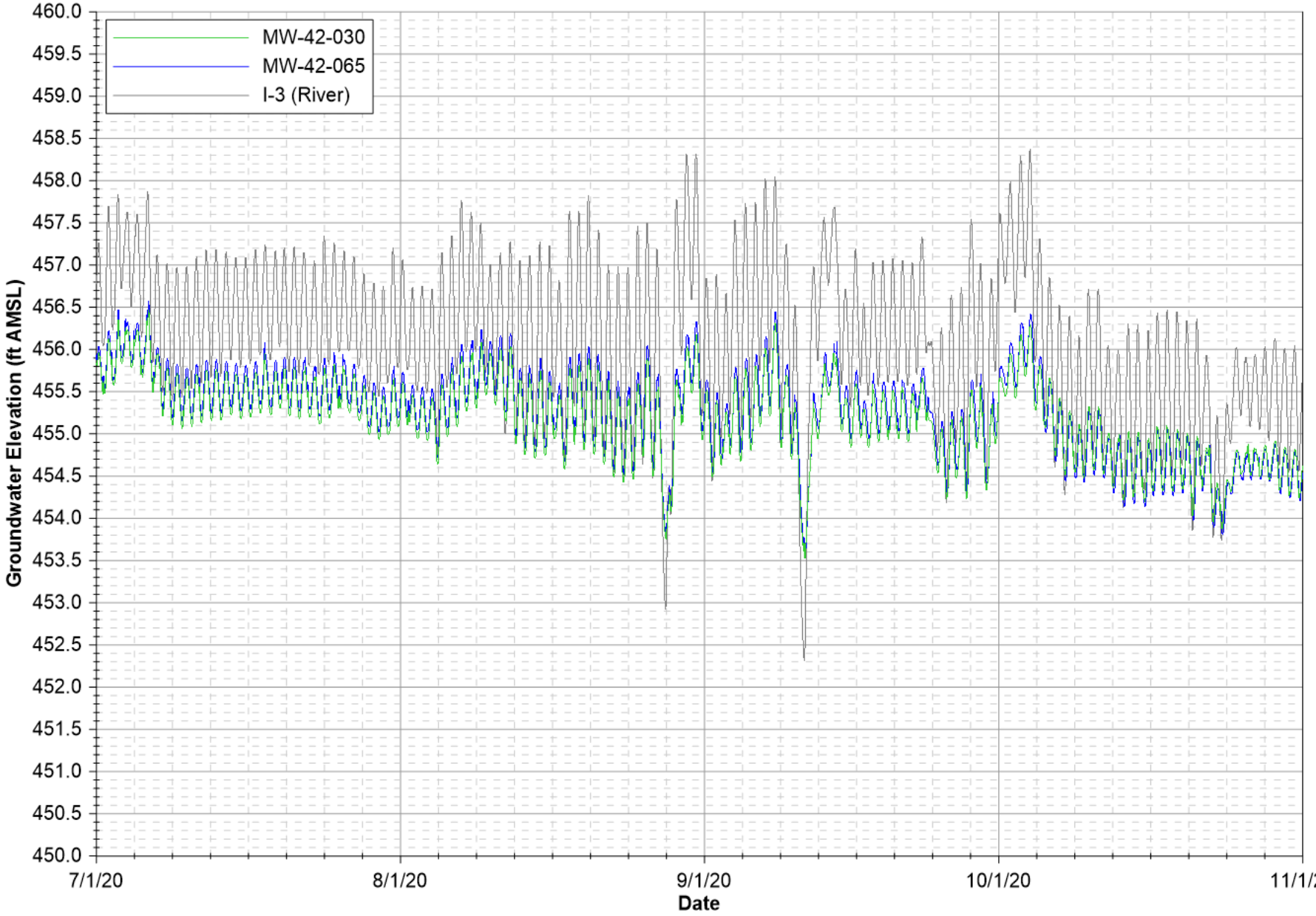



Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.
3. MW-39-080 data unavailable from August 31, 2020 through October 6, 2020 due to transducer malfunction.

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



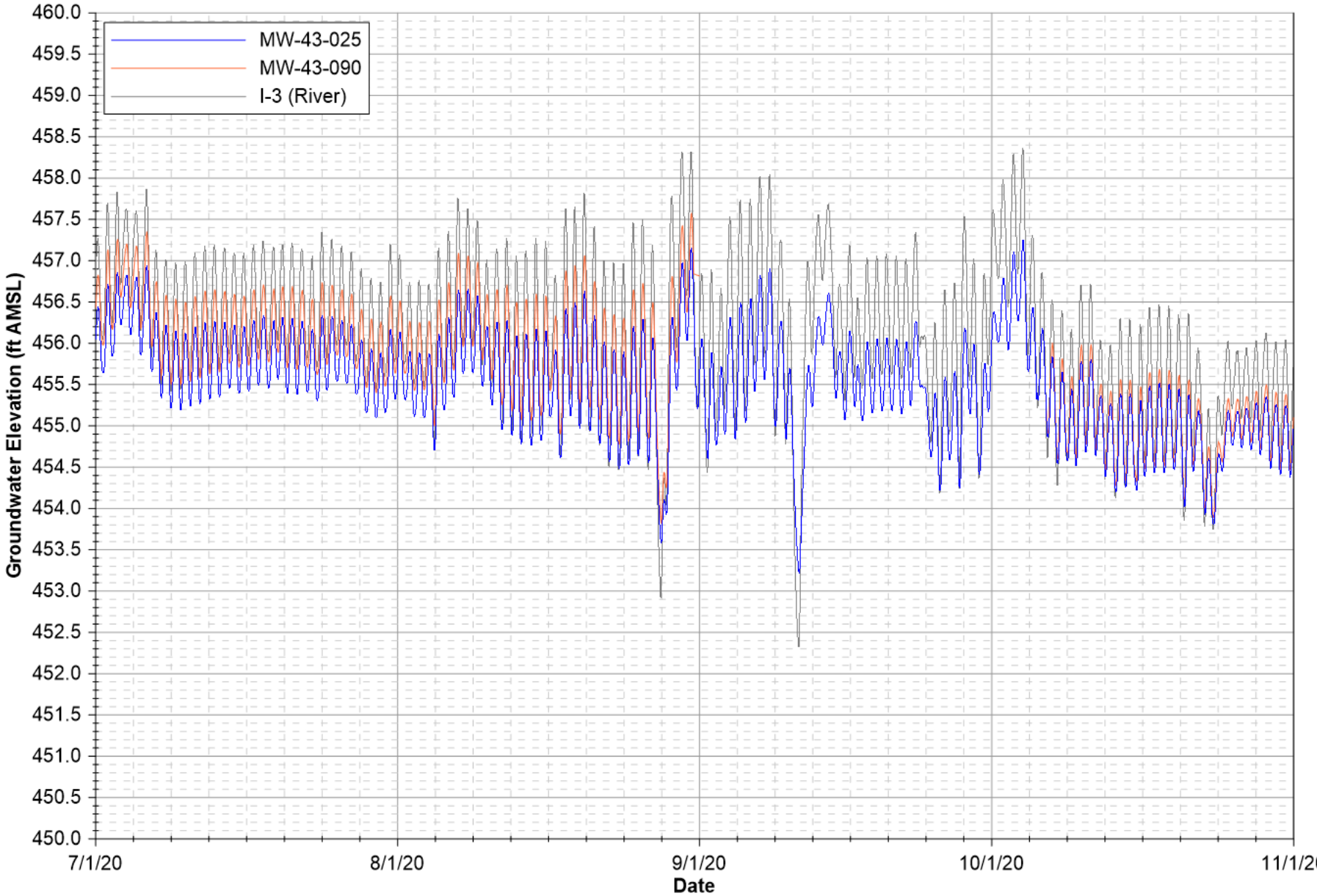
ARCADIS




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

**FIGURE F-1M**
**MW-42 CLUSTER HYDROGRAPHS**
THIRD QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS




Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.
3. MW-43-090 data unavailable from Augustl 31, 2020 through October 6, 2020 due to transducer malfunction.

**FIGURE F-1N**
**MW-43 CLUSTER HYDROGRAPHS**
THIRD QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS


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

**FIGURE F-1O**

**MW-44 CLUSTER HYDROGRAPHS**

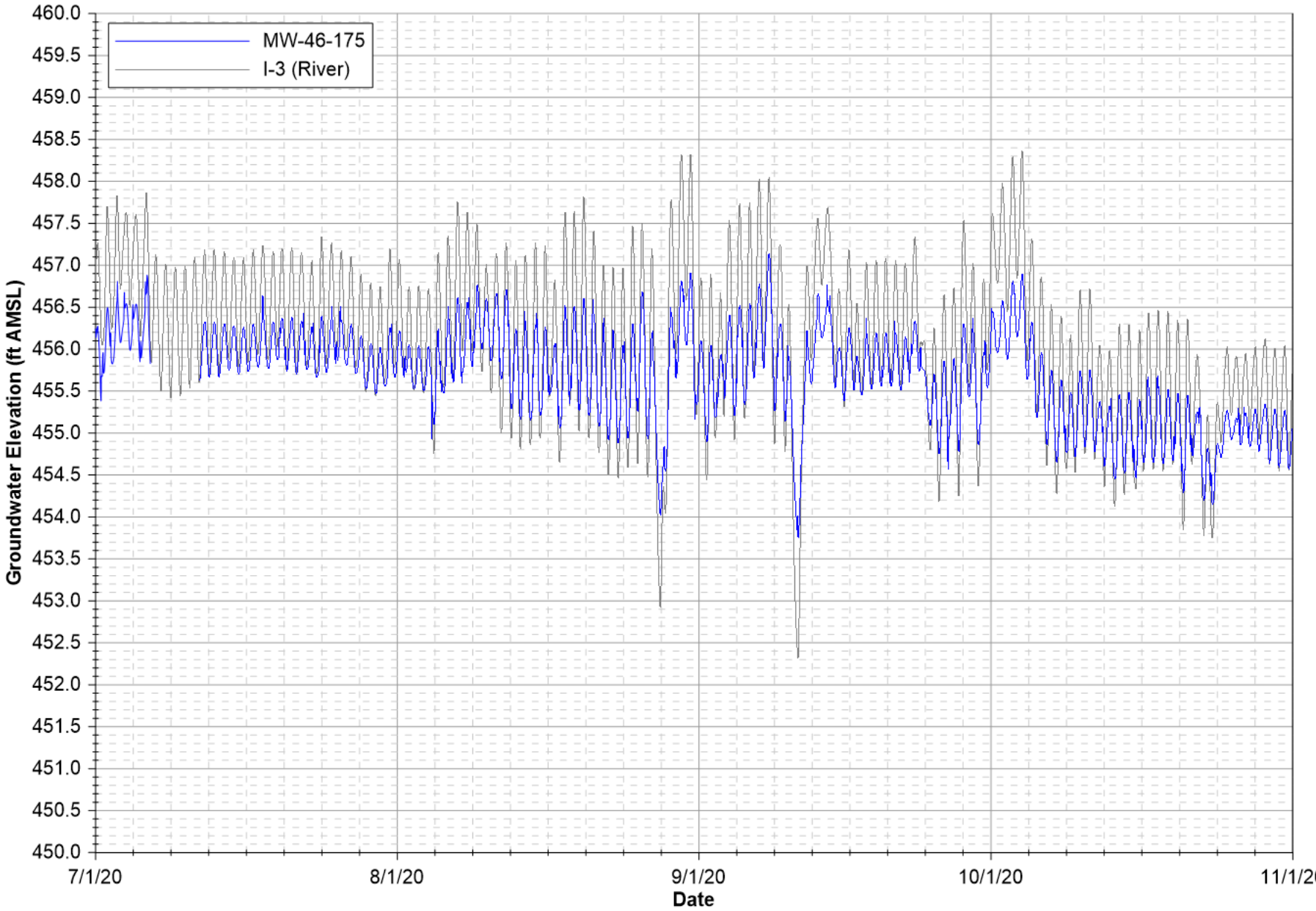
THIRD QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS


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

**FIGURE F-1P**
**MW-45-095a HYDROGRAPH**
THIRD QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

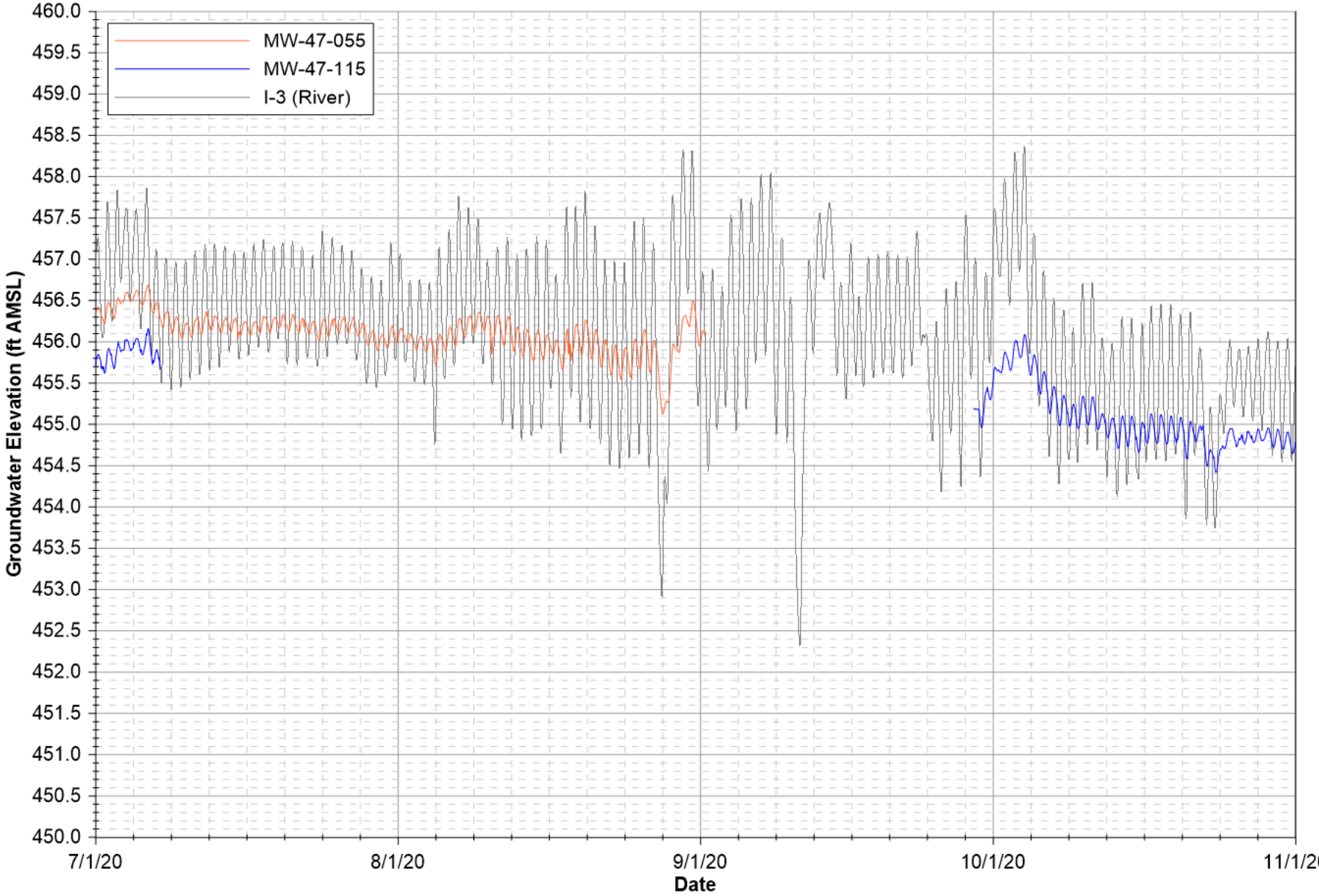
ARCADIS




Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.
3. MW-46-175 data unavailable from July 6, 2020 through July 11, 2020 due to transducer malfunction.

**FIGURE F-1Q**
**MW-46 HYDROGRAPH**
THIRD QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

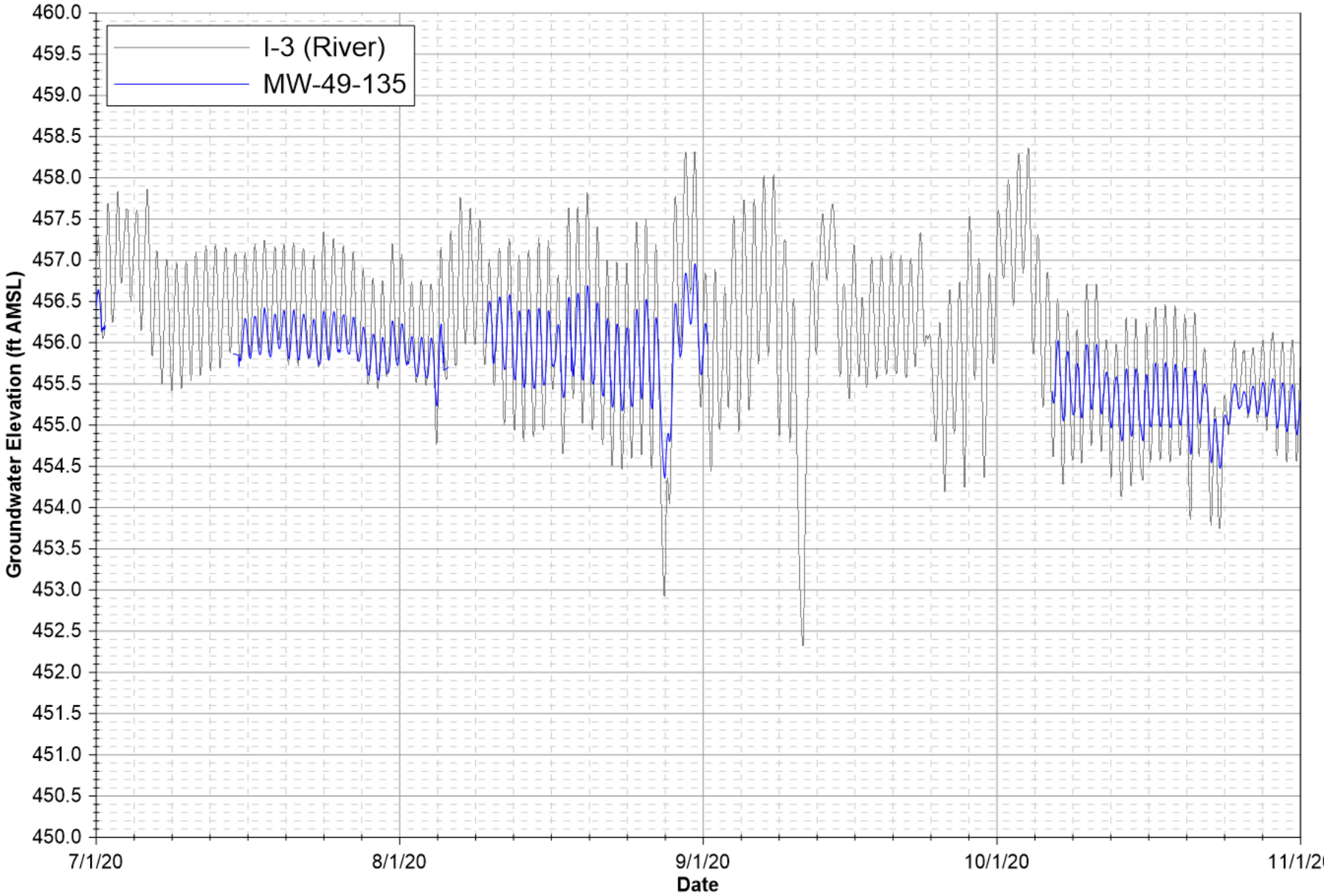
ARCADIS




Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.
3. MW-47-55 data unavailable from September 1, 2020 through October 31, 2020 due to transducer malfunction.
3. MW-47-115 data unavailable from July 7, 2020 through September 29, 2020 due to transducer malfunction.

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

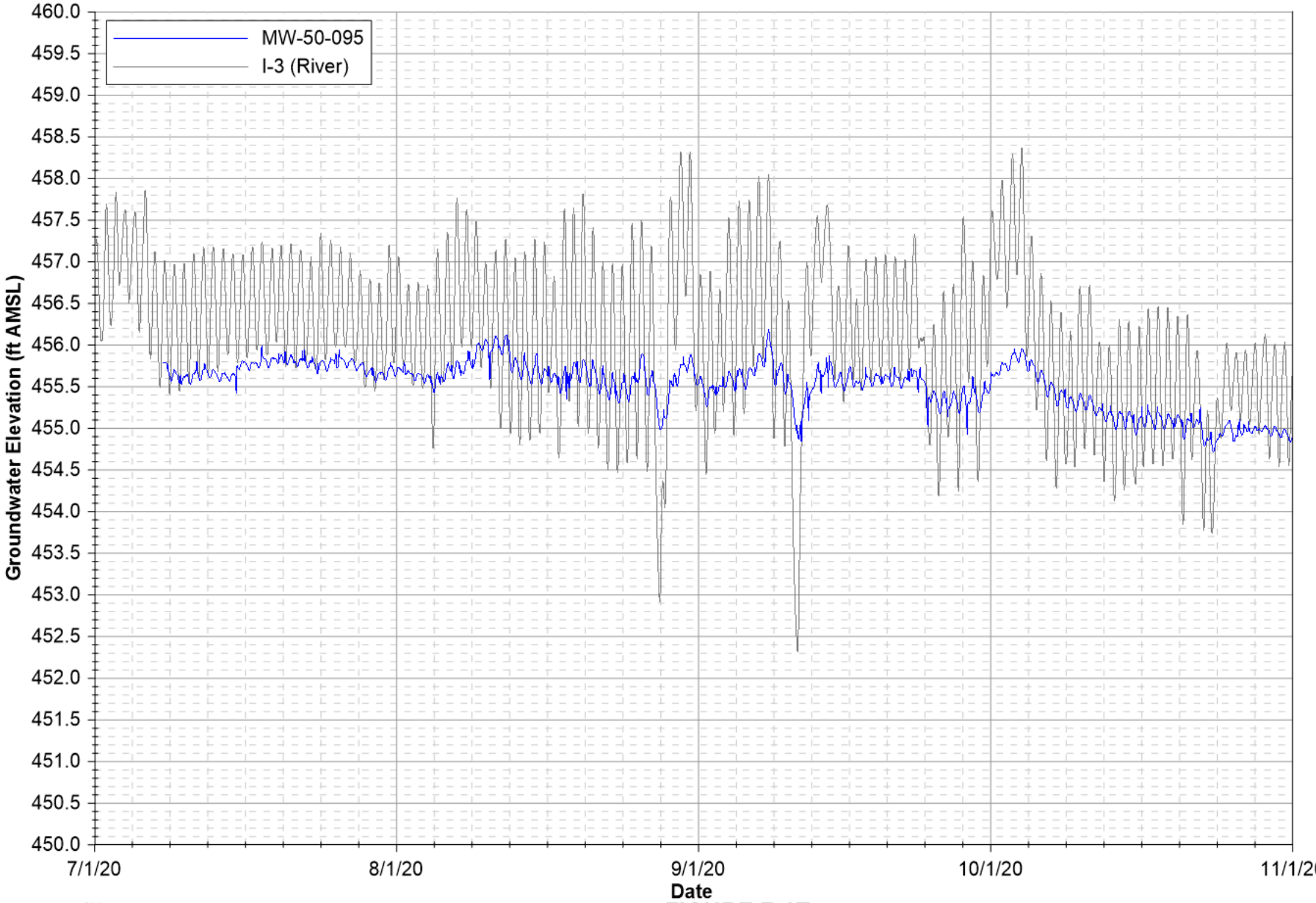
ARCADIS




Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.
3. MW-49-135 data unavailable from July 1, 2020 through July 15, 2020; August 5, 2020 through August 9, 2020 and September 1, 2020 through October 6, 2020 due to transducer malfunction.

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

ARCADIS



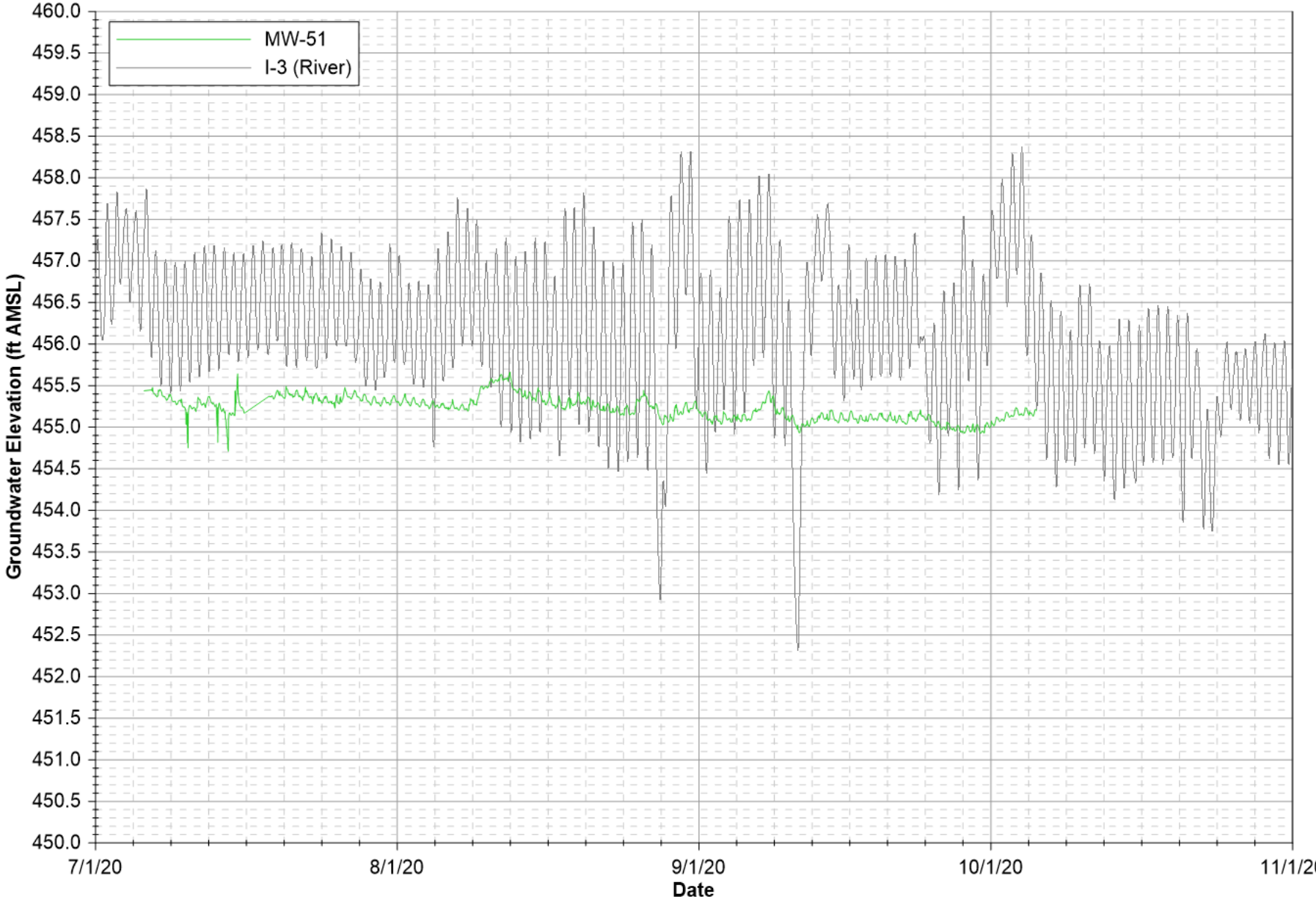

Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.
3. MW-50-095 data unavailable from June 15, 2020 through July 8, 2020 due to transducer malfunction.

**FIGURE F-1T**

**MW-50 HYDROGRAPH**

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

ARCADIS




Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.
3. MW-51 data unavailable from April 27, 2020 through July 6, 2020 and October 5, 2020 due to transducer malfunction.

**FIGURE F-1U**

**MW-51 HYDROGRAPHS**

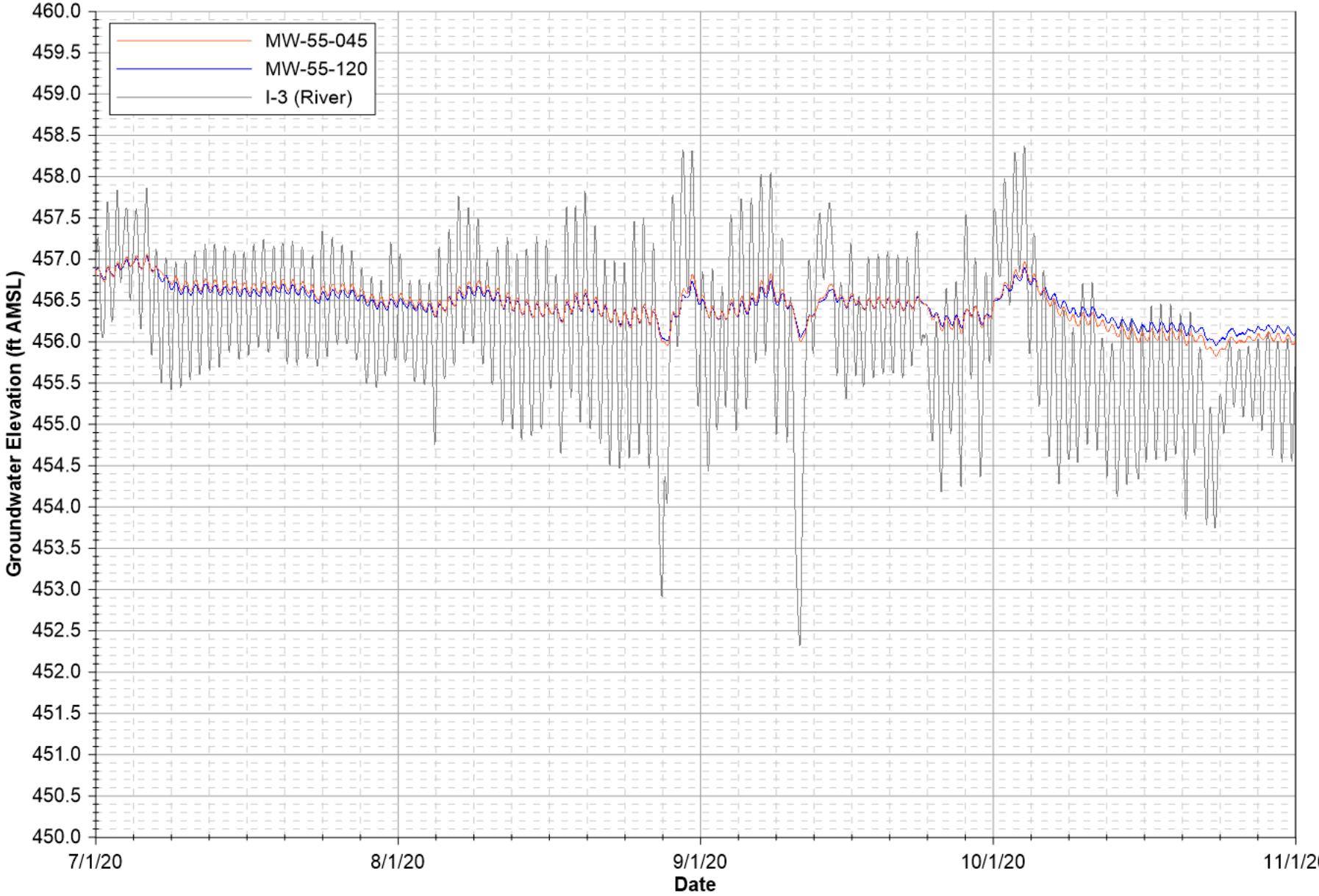
THIRD QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS


Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.
3. MW-54-195 data unavailable from August 5, 2020 through September 2, 2020 due to transducer malfunction.

**FIGURE F-1V**
**MW-54 CLUSTER HYDROGRAPHS**
THIRD QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS




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

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

ARCADIS


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

**FIGURE F-1X**
**INSITU PILOT STUDY WELL HYDROGRAPHS**
THIRD QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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