Topock Project Executive Abstract

Document Title: Quarterly Performance Monitoring Report and Evaluation, February through April 2009

Submitting Agency: DTSC

Final Document? ☒ Yes ☐ No

Date of Document: 5/29/2009

Who Created this Document?: (i.e. PG&E, DTSC, DOI, Other)

PG&E

Priority Status: ☐ **HIGH** ☒ **MED** ☐ **LOW**
Is this time critical? ☐ Yes ☒ No

Type of Document:
☐ Draft ☒ Report ☐ Letter ☐ Memo

☐ Other / Explain:

Action Required:
☒ Information Only ☐ Review & Comment
Return to: _____ _____

By Date:_____
☐ Other / Explain:

What does this information pertain to?
☐ Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA)/Preliminary Assessment (PA)
☐ RCRA Facility Investigation (RFI)/Remedial Investigation (RI) (including Risk Assessment)
☐ Corrective Measures Study (CMS)/Feasibility Study (FS)
☐ Corrective Measures Implementation (CMI)/Remedial Action
☐ California Environmental Quality Act (CEQA)/Environmental Impact Report (EIR)
☒ Interim Measures
☐ Other / Explain:

Is this a Regulatory Requirement?
☒ Yes
☐ No
If no, why is the document needed?

What is the consequence of NOT doing this item? What is the consequence of DOING this item?
Report is required to be in compliance with 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. Hydraulic and chemical monitoring data were collected and used to evaluate system performance based on a set of standards approved by DTSC. Key items included in this report are: (1) Measured groundwater elevation and hydraulic gradient data at compliance well pairs, monitoring the direction of groundwater flow away from the Colorado River, and towards the pumping centers on site; (2) Chromium (VI) data for monitoring wells on the floodplain, and (3) Pumping rates and volumes from the IM extraction system.

Based on the data and evaluation presented in this report, the IM performance standard has been met for the first quarter. The average groundwater gradients in the compliance well pairs exceeded the minimum landward gradient target (0.001 ft/ft) for each of the three months in the quarter (February, March, and April 2009). Hexavalent Chromium (Cr(VI)) concentrations observed in the floodplain monitoring wells are either stable or decreasing. The average pumping rate for the IM extraction system was 121.2 gallons per minute and an estimated 71.8 kilograms (or 158.3 pounds) of chromium were removed during this quarter.

Written by: PG&E

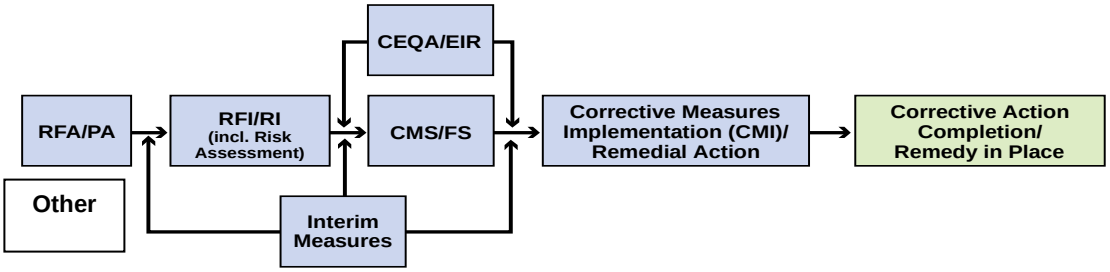
Recommendations:
Performance monitoring and evaluation of the IM hydraulic containment system will continue in accordance with the Performance Monitoring Plan and as directed by the DTSC. This report is for information only.

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?

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). **The link to the Documents Library is currently UNDER CONSTRUCTION.**



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

Version 9

Pacific Gas and Electric Company

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May 29, 2009

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

Subject: First Quarter 2009 Performance Monitoring Report
Interim Measures Performance Monitoring Program
PG&E Topock Compressor Station, Needles, California

Dear Mr. Yue:

Enclosed is the Quarterly Performance Monitoring Report and Evaluation, February through April 2009 for PG&E's Interim Measures (IM) performance monitoring program for the Topock project. This report presents the First Quarter (February through April 2009) performance monitoring results for the IM hydraulic containment system and summarizes the operations and performance evaluation for the reporting period. The quarterly performance monitoring report is submitted in conformance with the reporting requirements in DTSC's Interim Measure directive dated February 14, 2005, and includes updates and modifications approved by DTSC in letters dated October 12, 2007, July 14, 2008, and July 17, 2008.

This report also presents water level monitoring data collected from the Arizona monitoring wells MW-54 and MW-55.

Please contact me at (805) 546-5243 if you have any questions on the performance monitoring report.

Sincerely,

Yvonne Meeks

Enclosure
Interim Measure Performance Monitoring Report

Quarterly Performance Monitoring Report and Evaluation, February through April 2009

Interim Measures Performance Monitoring Program
PG&E Topock Compressor Station
Needles, California

Prepared for

California Department of Toxic Substances Control

on behalf of

Pacific Gas and Electric Company

May 29, 2009

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155 Grand Ave. Ste. 1000
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Quarterly Performance Monitoring Report and Evaluation, February through April 2009

Interim Measures Performance Monitoring Program
PG&E Topock Compressor Station
Needles, California

Prepared for

California Department of Toxic Substances Control

On behalf of

Pacific Gas and Electric Company

May 29, 2009

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

Serena Lee
Professional Geologist, PG No. 8259

Jay Piper
CH2M HILL Project Manager

Contents

Appendixes

Acronyms and Abbreviations

µg/L	micrograms per liter (essentially the same as parts per billion [ppb])
AMSL	Above mean sea level
cfs	cubic feet per second
Cr(VI)	hexavalent chromium
DTSC	California Department of Toxic Substances Control
gpm	gallons per minute
IM	Interim Measure
IM No. 3	Interim Measure Number 3
PG&E	Pacific Gas and Electric Company
PMP	Performance Monitoring Program
TDS	total dissolved solids
USBR	United States Bureau of Reclamation

SECTION 1

1.0 Introduction

Pacific Gas and Electric Company (PG&E) is implementing an Interim Measure (IM) to address chromium concentrations in groundwater at the Topock Compressor Station near Needles, California. The IM consists of groundwater extraction for hydraulic control of the plume boundaries in the Colorado River floodplain and management of extracted groundwater. The groundwater extraction, treatment, and injection systems are collectively referred to as Interim Measure Number 3 (IM No. 3). Currently, the IM No. 3 facilities include a groundwater extraction system (four extraction wells: TW-2D, TW-3D, TW-2S, and PE-1), conveyance piping, a groundwater treatment plant, and an injection well field for the discharge of the treated groundwater. Figure 1-1 shows the location of the IM No. 3 extraction, conveyance, treatment, and injection facilities. (All figures are located at the end of this report.)

In a letter dated February 14, 2005, the California Department of Toxic Substances Control (DTSC) established the criteria for evaluating the performance of the IM (DTSC, 2005). As defined by DTSC, the performance standard for this IM is to "establish and maintain a net landward hydraulic gradient, both horizontally and vertically, that ensures that hexavalent chromium [Cr(VI)] concentrations at or greater than 20 micrograms per liter [µg/L] in the floodplain are contained for removal and treatment" (DTSC, 2005). A draft *Performance Monitoring Plan for Interim Measures in the Floodplain Area* (CH2M HILL, 2005a) was submitted to DTSC on April 15, 2005 (herein referred to as the Performance Monitoring Plan). The site monitoring, data evaluation, reporting, and response actions required under the February 2005 DTSC directive are collectively referred to as the IM Performance Monitoring Program (PMP) for the floodplain area.

The February 2005 DTSC directive also defined the monitoring and reporting requirements for the IM. The reporting requirements for the PMP were modified by DTSC, via e-mail approval, in August 2007 to discontinue submittals of the monthly performance monitoring reports (the quarterly and annual reporting requirements were unchanged). Additional updates and modifications to the PMP were approved by DTSC in letters dated October 12, 2007, and July 14 and July 17, 2008 (DTSC, 2007a, 2008c, 2008d).

This quarterly report has been prepared in compliance with DTSC's requirements and documents the monitoring activities and performance evaluation of the IM hydraulic containment system. The first quarter reporting period covers monitoring activities from February 1 through April 30, 2009.

After DTSC approval, the IM No. 3 extraction system was shut down between April 20 and April 27, 2009 for planned annual maintenance of the treatment plant. This report fulfills the DTSC requirement for reporting "if the IM3 extraction system is offline for an extended period of time" (DTSC, 2007b). Incorporating the April 2009 IM No. 3 downtime reporting requirement in this quarterly performance monitoring report was approved by DTSC in an e-mail dated April 24, 2009 (DTSC, 2009).

1.1 Report Organization

This first quarter 2009 monitoring report presents the following:

- A description of the wells included in the performance monitoring network (Section 2).
- An evaluation of performance data, including the extraction system, chromium trends in the floodplain monitoring wells, hydraulic gradients, and river levels during the quarterly period, February through April 2009 (Section 3).
- Conclusions (Section 4).

SECTION 2

2.0 Performance Monitoring Network

Figure 2-1 shows the locations of wells used for IM extraction, performance monitoring, and hydraulic gradient measurements. With approval from DTSC, the list of wells included in the PMP was modified beginning August 1, 2008. The performance monitoring wells that were in service/active as of April 2009 are defined as follows:

- **Floodplain Wells** (monitoring wells on the Colorado River floodplain): MW-22, MW-27 cluster (three wells), MW-28 cluster (two wells), MW-30-50, MW-32-35, MW-33 cluster (three wells), MW-34 cluster (three wells), MW-36 cluster (six wells), MW-39 cluster (six wells), MW-42 cluster (two wells), MW-43 cluster (two wells), MW-44 cluster (three wells), MW-45-95, MW-46-175, and MW-49-135. Additionally, three pilot test wells installed in the floodplain (PT-2D, PT-5D, and PT-6D) are used to supplement hydraulic monitoring but are not formally part of the PMP.
- **Intermediate Wells** (monitoring wells located immediately north, west, and southwest of the floodplain): MW-20 cluster (three wells), MW-26, MW-31 cluster (two wells), MW-35 cluster (two wells), MW-47 cluster (two wells), MW-50-95, and MW-51.
- **Interior Wells** (monitoring wells located upgradient of IM pumping): MW-25.

Three extraction wells (TW-2D, TW-3D, and TW-2S) are located on the MW-20 bench, as shown in Figure 1-1. In addition, extraction well PE-1 is located in the floodplain approximately 450 feet east of extraction well TW-3D, as shown in Figure 1-1. Currently, both extraction wells TW-3D and PE-1 are in full-time operation.

Additional groundwater monitoring wells were installed on the Arizona side of the Colorado River in March through April 2008. These wells are not formally part of the PMP, but some of the new wells have been used to collect groundwater elevation data for evaluating the hydraulic gradient on the Arizona side of the river (CH2M HILL, 2008c).

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

SECTION 3

3.0 Quarterly Performance Evaluation for February through April 2009

3.1 Extraction System Operations

Pumping data for the IM No. 3 groundwater extraction system for the period of February 1 through April 30, 2009, are presented in Table 3-1. (All tables are presented at the end of this report.) From February 1 through April 30, 2009 (considered first quarter 2009), 15,502,632 gallons of groundwater were extracted and treated by the IM No. 3 system. This resulted in removal of an estimated 71.8 kilograms (or 158.3 pounds) of chromium from the aquifer during the first quarter reporting period. The average extraction rate for the IM system during the reporting period, including system downtime, was 121.2 gallons per minute (gpm). The average monthly pumping rates were 133.5 gpm (February 2009), 127.8 gpm (March 2009), and 102.3 gpm (April 2009) during the reporting period.

During first quarter 2009, extraction wells TW-3D and PE-1 operated at a combined target pumping rate of 135 gpm, excluding periods of planned and unplanned downtime. Extraction well TW-2D ran for a short period on February 11, 2009, during a sampling event; otherwise, this extraction well was not operated during the first quarter 2009. Extraction well TW-2S was not operated during first quarter 2009. The operational run time percentage for the IM extraction system was 89.6 percent during this reporting period. The IM extraction system was shut down for a 7-day period from April 20 through April 27, 2009, for annual maintenance. An operations log for the extraction system during the first quarter of 2009, including planned and unplanned downtime, is included in Appendix A.

The concentrate (i.e., saline water) from the reverse osmosis system was shipped offsite with shipping papers as a Resource Conservation and Recovery Act non-hazardous waste and transported to Liquid Environmental Solutions in Phoenix, Arizona, for treatment and disposal. Five containers of solids from the IM No. 3 facility were disposed of at the Kettleman Hills Chemical Waste Management facility during first quarter 2009. Daily inspections included general facility inspections, flow measurements, and site security monitoring. Daily logs with documentation of inspections are maintained onsite.

Table 3-2 summarizes the chromium and total dissolved solids (TDS) analytical results in groundwater samples collected from the IM extraction well system during the first quarter 2009 reporting period and prior months. Chromium concentrations have been gradually decreasing at well PE-1 since February 2008. TDS concentrations increased slightly at well TW-3D compared to November and December 2008. Future monitoring of the extraction well(s) water quality will be completed at the frequency required by the Waste Discharge Requirements issued for the IM No. 3 treatment facility.

3.2 Cr(VI) Distribution and Trends in the Floodplain Area

During first quarter 2009, groundwater monitoring wells in the floodplain area were sampled for Cr(VI), total chromium, and field water quality parameters under semiannual, quarterly, and monthly schedules, in accordance with the approved groundwater monitoring plan and DTSC directives. Refer to PG&E's Topock *Groundwater and Surface Water Monitoring Report, Fourth Quarter 2008 and Annual Report, PG&E Topock Compressor Station, Needles, California* (CH2M HILL, 2009) for a description of the 2008 groundwater monitoring activities and sampling frequencies for wells in the performance monitoring area.

The distribution of Cr(VI) in the upper, middle, and lower depth intervals of the Alluvial Aquifer in the performance monitoring area for March 2009 is shown in plan view and cross section on Figure 3-1. The Cr(VI) concentration contours shown for the Alluvial Aquifer are based on the March 2009 groundwater sampling data and incorporate Cr(VI) distribution results from prior October–December 2008 sampling.

Overall, the Cr(VI) concentration contours for March 2009 are consistent with or slightly decreased compared to the Cr(VI) distribution maps issued in the prior IM performance monitoring reports (CH2M HILL, 2008a-2008c, 2009). The exception to this is in the area of newly completed monitoring well MW-59, where the extent and concentrations of the chromium plume in the shallow zone of the alluvial aquifer have been extended somewhat from previous interpretations. Figure 3-2 presents the March 2009 Cr(VI) results on a cross section parallel to the Colorado River (locations of cross sections shown on Figure 2-1). Cr(VI) contours shown on Figure 3-2 are based on March 2009 sampling results. Tables B-1 and B-2 in Appendix B present the chromium and field parameter sampling results from April 2008 through April 2009 for the wells in the PMP area.

Figure 3-3 presents Cr(VI) concentration trend graphs for selected deep monitoring wells in the floodplain area through the April 2009 sampling. Sampling results are plotted for wells MW-34-100, MW-36-90, MW-36-100, MW-44-115, MW-44-125, and MW-46-175. The locations of the deep wells selected for performance evaluation are shown in Figure 2-1.

The effects of IM No. 3 pumping are evident in the sampling data from wells MW 36-90 and MW-36-100, as shown in Figure 3-3. Since the initiation of IM pumping, the Cr(VI) concentrations at MW-36-90 have decreased. When PE-1 was placed in service, concentrations decreased further; concentrations have remained consistently less than 10 µg/L since August 2006. Concentrations in the deeper well MW-36-100 (well screen at the same level as the PE-1 well screen) decreased under IM No. 3 pumping, initially increased upon initiation of pumping at PE-1, and have generally decreased since January 2007.

The concentration trend for MW-34-100, as shown in Figure 3-3, has shown both short-term declines and increases since PE-1 pumping commenced. However, since October 2008, concentrations at this well have shown a general downward trend. The Cr(VI) result from April 6, 2009, sampling of MW-34-100 (74.7 µg/L) is the lowest concentration measured at this well since regular sampling began in April 2005. Concentrations have generally shown slight increases during low river periods (November through January), as shown in Figure 3-3. Landward gradients have been present at this location since IM pumping began;

therefore, the periodic increases in concentration observed at MW-34-100 do not indicate any movement of the plume toward the river.

Monitoring well clusters MW-44 and MW-46 are located within the Cr(VI) plume (approximately 190 feet and 400 feet north of PE-1). The concentration trend for well MW-44-115 has been generally downward since July 2006. Sampling data from well MW-44-125 show generally stable concentrations since October 2006. Concentrations in well MW-46-175 generally decreased from March 2006 until May 2007, but have been generally stable since May 2007. The MW-44 and MW-46 well clusters are within the hydraulic capture of IM pumping (see Section 3.3). Stable or decreasing concentrations were observed in the other wells in the floodplain area where Cr(VI) has been detected in prior monitoring (Table B-1).

In addition to the wells presented in Figure 3-3, declining Cr(VI) concentrations have been observed in MW-39-80, as shown in Figure 3-1 and Appendix B, Table B-1; these declines reflect the pumping influence from TW-3D. The chromium concentrations observed in the MW-33 cluster wells remained consistent with previous results during the quarterly reporting period.

3.3 Hydraulic Gradients and River Levels during Quarterly Period

During first quarter 2009, water levels were recorded at intervals of 30 minutes with pressure transducers in 54 wells and two river monitoring stations (I-3 and RRB). The data are typically continuous, with only short interruptions for sampling or maintenance. The locations of the wells monitored are shown in Figure 2-1 and are listed in Section 2.0.

Daily average groundwater and river elevations have been calculated from the pressure transducer data for the first quarter 2009 reporting period and are summarized in Appendix C. Because of the variation in groundwater salinity at the site, the water level measurements need to be adjusted (density-corrected) to equivalent freshwater hydraulic heads prior to calculating groundwater elevations and gradients. The methods and procedures used for adjusting the performance monitoring water level data for salinity and temperature differences are described in the PMP. Groundwater elevation hydrographs (for first quarter 2009) for all wells with transducers are included in Appendix C. The Colorado River elevation (I-3 gage station) during first quarter 2009 is also shown on the hydrographs in Appendix C.

Average first quarter 2009 groundwater elevations for wells in the upper and middle depth intervals are presented and contoured in plan view in Figure 3-4 and Figure 3-5. West of the TW-3D and PE-1 pumping area, the hydraulic gradient in the upper depth interval is easterly and consistent with the regional gradient outside of the floodplain area.

Average first quarter 2009 groundwater elevations for the deep wells are presented and contoured in plan view in Figure 3-6. The average quarterly groundwater elevations are also presented and contoured in floodplain cross section A, as shown in Figure 3-7. The floodplain cross section also shows the locations and depths where the current IM pumping in the deep interval of the Alluvial Aquifer is occurring at TW-3D and PE-1. The landward hydraulic gradients for the deep monitoring wells presented in Figure 3-6 and Figure 3-7 are

consistent with the strong landward gradients measured and presented in the 2007 and 2008 monitoring reports (CH2M HILL, 2008a-2008c).

In April 2008, pressure transducers were installed in five of the new wells located on the Arizona side of the Colorado River. The new Arizona wells include MW-55-45, MW-55-120, MW-54-85, MW-54-140, and MW-54-195. For the first quarter 2009 reporting period, a full set of transducer data was recorded in these wells. The quarterly average groundwater elevations for wells MW-55-120, MW-54-85, MW-54-140, and MW-54-195 are posted on Figures 3-5 and 3-6, and are used for contouring where appropriate.

With the exception of well MW-55-45, the wells in the MW-54 and MW-55 clusters are screened in the deep interval of the Alluvial Aquifer. The screened intervals of wells MW-54-140 and MW-55-120 are of the most similar elevation ranges and, therefore, best lend themselves to water level contouring. Well MW-55-45 is screened over the boundary between the shallow and middle depth intervals; because this is the only data point in this depth interval on the Arizona side of the river, this area was not included in contouring of the shallow and middle depth intervals.

Deep zone water levels shown in Figure 3-6 indicate that potentiometric levels in monitoring wells in Arizona are higher than those in wells across the river on the California floodplain. This means that the hydraulic gradient on the Arizona side of the river is directed to the west and, as a result, groundwater flow is also toward the west in that area. This is consistent with the site conceptual model and with the current numerical groundwater flow model.

Hydraulic gradients were measured during the first quarter 2009 reporting period for well pairs selected for performance monitoring with two pumping centers (TW-3D and PE-1). The following well pairs were approved by DTSC on October 12, 2007 (DTSC, 2007a), to define the gradients induced while pumping from two locations:

- MW-31-135 and MW-33-150 (northern gradient pair)
- MW-45-95 and MW-34-100 (central gradient pair)
- MW-45-95 and MW-27-85 (southern gradient pair)

Table 3-3 presents the average monthly hydraulic gradients that were measured between the gradient well pairs in February, March, and April 2009. For the northern (MW-31-135/MW-33-150) well pair, gradients were landward at magnitudes from 1.9 to 2.4 times the target gradient of 0.001 feet per foot. The southern well pair (MW-45-95/ MW-27-85) gradients averaged from 1.8 to 3.8 times the target gradient during the reporting period. For the central well pair (MW-45-95/MW-34-100), the average landward gradient ranged from 4.8 to 10.1 times the target gradient during the reporting period.

Figure 3-8 presents the measured hydraulic gradients, river levels, and pumping rates during the first quarter 2009 reporting period. From February through April 2009, the average daily river levels rose consistently. The monthly average pumping rates for the IM No. 3 system was 133.5 gpm in February 2009, 127.8 gpm in March 2009, and 102.3 gpm in April 2009. For the first quarter 2009 reporting period, average monthly landward gradients above the target gradient were maintained in the gradient control well pairs.

A review of the groundwater elevation contour maps indicates very strong landward hydraulic gradients within the IM capture zone throughout the floodplain. That is, the inferred groundwater flow lines from the floodplain monitoring wells where Cr(VI) concentrations are greater than 20 μg/L are oriented toward the TW-3D and PE-1 extraction wells within the IM capture zone.

3.4 Other Water Quality Data for Floodplain Wells

Common water quality parameters (temperature, pH, oxidation-reduction potential, dissolved oxygen, and specific conductance) were measured in the field during well purging and groundwater sampling as described in the *Sampling, Analysis, and Field Procedures Manual, Revision 1, PG&E Topock Program* (CH2M HILL, 2005b). The field water quality data measured from April 2008 through April 2009 are presented in Tables B-1 and B-2 of Appendix B.

Table D-1 in Appendix D presents the results of the general chemistry and stable isotope analyses for 15 PMP monitoring wells and two river stations during sampling events from March 2005 through April 2009. Figure 2-1 shows the locations of the monitoring wells sampled for the performance monitoring parameters. In July 2008, DTSC approved modifications to the PMP IM chemical performance monitoring program (DTSC, 2008d). With those modifications, 10 monitoring wells and one river station are now sampled for IM chemical performance monitoring. Water samples from the selected performance monitoring locations were analyzed for TDS, chloride, sulfate, nitrate, bromide, calcium, potassium, magnesium, sodium, boron, alkalinity, deuterium, and oxygen-18 to monitor the effects of IM pumping on groundwater chemistry. Oxygen-18 and deuterium have an extended laboratory turnaround time. The available stable isotope data are presented in Appendix D-1, and these data will be reported in full with subsequent PMR submittals.

3.5 Projected River Levels during the Next Quarter

Colorado River stage near the Topock Compressor Station is measured at the I-3 location. The river stage is directly influenced by releases from Davis Dam and, to a lesser degree, from Lake Havasu elevations, both of which are controlled by the United States Bureau of Reclamation (USBR). Total releases from Davis Dam follow a predictable annual cycle, with the largest monthly releases typically occurring in spring and early summer and the smallest monthly releases in late fall and 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.

The river stage at the I-3 station fluctuates in a similar pattern. The monthly average stage at I-3 typically peaks in the early summer and reaches its low point in the winter. After Davis Dam releases, the river stage also fluctuates on a diurnal cycle, though greatly attenuated. The magnitude of the daily river stage fluctuations at I-3 is less than the magnitude of the monthly average river stage fluctuations over a typical year.

Table 3-4 is a summary of the estimated and actual Davis Dam releases and river elevations since January 2006. The actual Davis Dam February 2009 release (11,319 cubic feet per

second [cfs]) was almost the same as the USBR-projected release for that month (10,800 cfs). The projected Colorado River elevation at I-3 (monthly average) is calculated using a multiple regression method that considers both the Davis Dam release and the Lake Havasu level. Current USBR projections show that the average Davis Dam release for May 2009 (15,800 cfs) will be less than April 2009 (18,432 cfs). Based on the regression method results, using May 13, 2009, USBR projections for both the Davis Dam release and Lake Havasu level it is anticipated that the Colorado River level at the I-3 gage location in May 2009 will be slightly lower than the April 2009 river stage.

Figure 3-9 shows the Colorado River stage measured at I-3 superimposed on the projected I-3 river levels based on actual Davis Dam discharge and Lake Havasu levels. This graph shows that the formula used to calculate I-3 levels provides a good estimate of the actual levels at I-3 over a wide range of river levels. The future projections shown on this graph are based on USBR long-range projections of Davis Dam releases and Lake Havasu levels. The river stage data and USBR projections indicate that the highest river levels of the year typically occur in April, May, and June. Current USBR projections show that the lowest water levels will occur in November through December 2009 and January 2010. Because water demand is based on climatic factors, there is more uncertainty in these projections farther into the future.

3.6 Status of Operation and Monitoring

Reporting of the IM extraction and monitoring activities will continue as described in the Performance Monitoring Plan (CH2M HILL, 2005a) and direction from DTSC. On October 12, 2007, DTSC approved PG&E's request to discontinue monthly performance monitoring reports. As a result, the next performance monitoring report will be the Second Quarter 2009 Performance Evaluation Report. The second quarter 2009 report will present operations and performance monitoring data from May 1 through July 31, 2009.

At DTSC's direction, PG&E will continue to operate wells TW-3D and PE-1 at a target combined pumping rate of 135 gpm during second quarter 2009, except for periods when planned and unplanned downtime occurs. Extracted groundwater treated at the IM No. 3 facility will be discharged into the IM No. 3 injection wells in accordance with Waste Discharge Requirements Order No. R7-2006-0060. Saline water and solids generated as byproducts of the treatment process will continue to be transported offsite.

PG&E will balance the pumping rates between wells TW-3D and PE-1 to maintain the target pumping rate and to maintain the DTSC-specified hydraulic gradients across the Alluvial Aquifer. Well TW-2D will serve as a backup to extraction wells TW-3D and PE-1.

SECTION 4

4.0 Conclusions

The groundwater elevation and hydraulic gradient data from February, March, and April 2009 performance monitoring indicate that the minimum landward gradient target (0.001 feet/foot) was exceeded throughout the first quarter 2009 reporting period. As illustrated in Figure 3-8, the landward gradients measured during February, March, and April 2009 exceeded the required minimum gradient in all compliance well pairs. The IM pumping rate was sufficient to meet the minimum target gradient during each month of the first quarter 2009. The monthly average landward gradients in the IM capture zone were maintained in April 2009, including during the 7-day shutdown of the IM No. 3 extraction system during scheduled annual treatment system maintenance. The DTSC requirement for reporting when "the IM3 extraction system is offline for an extended period of time" has been fulfilled in this report (DTSC, 2007b, 2009).

A total of 15,502,632 gallons of groundwater was extracted and treated by the IM No. 3 system during the first quarter 2009. An estimated 71.8 kilograms (or 158.3 pounds) of chromium were removed and treated by the IM No. 3 system during this quarter. The average pumping rate for the IM No. 3 extraction system during the first quarter 2009, including system downtime, was 121.2 gpm.

Overall, the Cr(VI) concentrations observed in the floodplain monitoring wells are either stable or decreasing. During the first quarter 2009, the groundwater Cr(VI) concentrations at wells MW-36-100, MW-39-80, MW-44-125, MW-44-175, and MW-46-175 declined from those observed during the previous quarter. Concentrations at wells MW-33-090, MW-33-159, and MW-44-115 remained stable during the first quarter 2009 reporting period. All of these wells are within the IM extraction system capture zone, as shown in Figure 3-6.

The concentration trend for well MW-34-100 has shown both short-term declines and increases in concentrations since PE-1 pumping commenced in January 2006. Since June 2006, Cr(VI) concentrations at this well have shown a general downward trend, with an increase in the fourth quarter 2008 sample concentrations. Landward gradients have been present at this location since IM pumping began; therefore, the periodic increases in concentration observed at MW-34-100 do not indicate any movement of the plume toward the river. Results from the first quarter 2009 sampling at MW-34-100 show declining concentrations at this monitoring location.

The hydraulic and chemical performance monitoring data and evaluation presented in this report indicate that the IM performance standard has been met for the first quarter (February through April) 2009 reporting period. Performance monitoring and evaluation of the IM hydraulic containment system will continue in accordance with the PMP and as directed by DTSC.

SECTION 5

References

California Department of Toxic Substances Control (DTSC). 2005. Letter. "Criteria for Evaluating Interim Measures Performance Requirements to Hydraulically Contain Chromium Plume in Floodplain Area, Pacific Gas & Electric Company, Topock Compressor Station." May 14.

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_____. 2008c. *Quarterly Performance Monitoring Report and Evaluation, August through October 2008, PG&E Topock Compressor Station, Needles, California.* December 1.

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Tables

TABLE 3-1
Pumping Rate and Extracted Volume for IM System February 2008 through April 2009
Interim Measures Performance Monitoring
PG&E Topock Compressor Station

Extraction Well ID	February 2009		March 2009		April 2009		First Quarter 2009		Project to Date [a]
	Average Pumping Rate [b] (gpm)	Volume Pumped (gal)	Average Pumping Rate [b] (gpm)	Volume Pumped (gal)	Average Pumping Rate [b] (gpm)	Volume Pumped (gal)	Average Pumping Rate [b] (gpm)	Volume Pumped (gal)	Cumulative Volume Pumped (gal)
TW-02S	0.00	0	0.00	0	0.00	0	0.00	0	1,000,780
TW-02D	0.02	829	0.00	0	0.00	0	0.01	829	53,091,512
TW-03D	107.26	4,324,820	102.53	4,576,794	81.94	3,539,665	97.24	12,441,279	173,339,515
PE-01	26.17	1,055,287	25.25	1,127,062	20.33	878,175	23.92	3,060,524	52,772,839
TOTAL	**133.5**	**5,380,936**	**127.8**	**5,703,856**	**102.3**	**4,417,840**	**121.2**	**15,502,632**	280,204,645
							Volume Pumped from the MW-20 Well Cluster		1,527,724
							Total Volume Pumped (gal)		281,732,369
							Total Volume Pumped (ac-ft)		864.6

NOTES:

gpm gallons per minute
gal gallons
ac-ft acre-feet

[a] Interim measure groundwater extraction at the Topock site was initiated in March 2004.

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

TABLE 3-2
Analytical Results for Extraction Wells, February 2008 through April 2009
Interim Measures Performance Monitoring
PG&E Topock Compressor Station

Well ID	Sample Date	Dissolved Chromium (total) (µg/L)	Hexavalent Chromium (µg/L)	Total Dissolved Solids (mg/L)
TW-3D	06-Feb-08	1,600	1,760	5,690
	05-Mar-08	1,740	1,810	4,730
	02-Apr-08	2,010	1,550	4,450
	08-May-08	1,740	1,540	5,320
	04-Jun-08	1,700	1,460	5,220
	02-Jul-08	1,780	1,460	5,660
	06-Aug-08	1,450	1,440	5,270
	04-Sep-08	1,380	1,490	5,250
	01-Oct-08	1,300	1,460	5,640
	06-Nov-08	1,810	1,650	5,350
	04-Dec-08	1,360	1,570	5,430
	09-Jan-09	1,300	1,570	5,770
	04-Feb-09	1,620	1,330	5,970
	04-Mar-09	1,280	1,280	5,630
	01-Apr-09	1,320	1,270	5,700
PE-1	06-Feb-08	44.1	42.8	4,360
	05-Mar-08	40.8	39.5	4,080
	02-Apr-08	37.1	29.0	4,180
	08-May-08	29.3	26.4	4,100
	04-Jun-08	33.4	16.0	3,560
	02-Jul-08	28.7	25.7	4,060
	06-Aug-08	27.4	28.2	4,090
	04-Sep-08	28.0	29.7	3,810
	01-Oct-08	27.5	27.6	3,600
	06-Nov-08	27.7	29.8	3,520
	04-Dec-08	32.3	28.8	3,700
	09-Jan-09	27.6	33.4	3,740
	04-Feb-09	25.5	26.3	3,500
	04-Mar-09	22.4	23.5	3,490
	01-Apr-09	20.8	21.4	3,690

NOTES:

µg/L = concentration in micrograms per liter
mg/L = concentration in milligrams per liter

Analytical results from inactive extraction wells are presented in Table B-2.

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

Dissolved chromium (total) was analyzed by Method SW6010B or SW6020, hexavalent chromium analyzed by Method SM3500-CrB and total dissolved solids were analyzed by Method SM2540C.

TABLE 3-3

Average Hydraulic Gradients Measured at Well Pairs, February through April 2009

Interim Measures Performance Monitoring

PG&E Topock Compressor Station

Well Pair [a]	Reporting Period	Mean Landward Hydraulic Gradient [b] (feet/foot)	Measurement Dates
Northern Gradient Pair	February	0.0023	February 1 through February 28
MW-31-135 / MW-33-150	March	0.0024	March 1 through March 31
	April	0.0019	April 1 through April 30
Central Gradient Pair	February	0.0101	February 1 through February 28
MW-45-95 / MW-34-100	March	0.0095	March 1 through March 31
	April	0.0048	April 1 through April 30
Southern Gradient Pair	February	0.0038	February 1 through February 28
MW-45-95 / MW-27-85	March	0.0037	March 1 through March 31
	April	0.0018	April 1 through April 30

Notes:

a Refer to Figure 2-1 for location of well pairs

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

TABLE 3-4

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

Interim Measures Performance Monitoring

PG&E Topock Compressor Station

	Davis Dam Release			Colorado River Elevation at I-3		
Month	**Projected (cfs)**	**Actual (cfs)**	**Difference (cfs)**	**Predicted (ft AMSL)**	**Actual (ft AMSL)**	**Difference (feet)**
January 2006	8,400	9,166	766	453.2	453.6	0.4
February 2006	11,100	10,790	-310	454.1	454.1	0.1
March 2006	13,000	12,429	-571	454.7	454.8	0.2
April 2006	16,600	18,300	1700	456.0	456.1	0.0
May 2006	15,500	16,818	1318	456.0	456.3	0.3
June 2006	16,100	17,547	1447	456.2	456.4	0.2
July 2006	14,700	15,171	-471	455.7	455.8	0.1
August 2006	12,900	12,871	29	454.9	455.1	0.1
September 2006	12,100	12,409	-309	454.7	454.7	0.0
October 2006	11,400	11,150	250	454.1	454.4	0.3
November 2006	8,300	8,222	78	452.9	453.3	0.4
December 2006	8,100	8,823	-723	453.0	453.4	0.4
January 2007	8,600	8,796	-196	453.2	453.6	0.4
February 2007	9,800	11,680	-1,880	453.6	454.3	0.7
March 2007	14,300	14,554	-254	455.1	455.6	0.5
April 2007	17,300	16,818	482	456.4	456.4	0.0
May 2007	16,800	16,199	601	456.5	456.4	-0.1
June 2007	16,000	16,212	-212	456.4	456.4	0.0
July 2007	14,900	14,897	3	455.8	456.0	0.2
August 2007	12,100	12,776	-676	454.7	455.4	0.7
September 2007	12,700	13,050	-350	454.8	455.4	0.5
October 2007	10,600	10,324	276	454.0	454.3	0.3
November 2007	9,100	8,387	713	453.6	453.6	0.0
December 2007	5,700	6,445	-745	452.3	452.7	0.4
January 2008	9,300	8,900	400	453.5	453.6	0.1
February 2008	10,100	12,463	-2,363	454.5	454.7	0.1
March 2008	15,200	15,837	-637	455.6	455.9	0.3
April 2008	17,600	18,554	-954	456.6	457.0	0.4
May 2008	17,200	16,155	1,045	456.6	456.4	-0.3
June 2008	15,400	15,655	-255	456.2	456.5	0.3
July 2008	14,500	14,574	-74	455.8	456.0	0.2
August 2008	13,100	12,976	124	455.2	455.2	0.0
September 2008	12,300	11,731	569	454.9	455.0	0.1
October 2008	10,500	10,272	228	454.1	454.2	0.1
November 2008	10,400	10,130	270	454.1	454.03	-0.1
December 2008	5,800	5,506	294	452.3	452.45	0.2
January 2009	9,300	10,644	-1,344	452.6	454.02	1.4
February 2009	10,800	11,319	-519	454.2	454.34	0.2
March 2009	16,200	16,826	-626	456.1	456.37	0.3
April 2009	18,800	18,432	368	457.2	457.13	-0.1
May 2009	15,800			457.0		

NOTES:

cfs = cubic feet per second; ft AMSL = feet above mean sea level

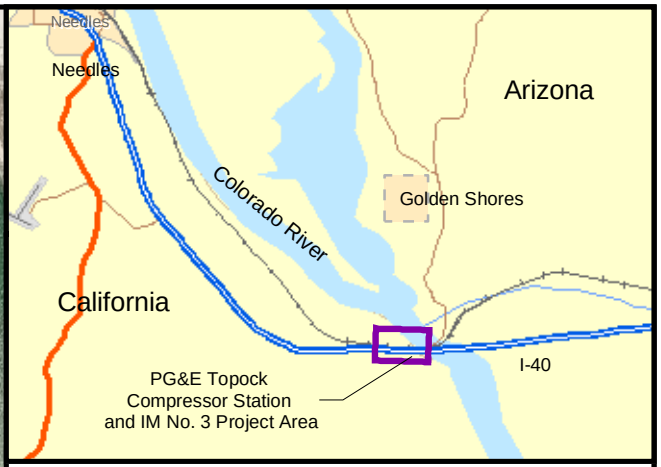
Predicted Colorado River elevations (river levels) at I-3 are based upon USBR projections for Davis Dam releases and Lake Havasu elevations from the preceding month, using a multiple regression between historical dam releases and measured river levels at I-3 (updated monthly). Data are reported monthly by the US Department of Interior at http://www.usbr.gov/lc/region/g4000/24mo.pdf

The difference in I-3 elevation is the difference between the I-3 elevation predicted, and the actual elevation measured at I-3. The main source of this difference is variation between USBR projections and actual dam releases or Lake Havasu levels, rather than the multiple regression error.

NA = I-3 transducer data unavailable for month of September 2005 due to damage by debris.

I-3 elevation for the month of October 2006 limited to average of data from October 4, 2006 through October 31, 2006.

Figures



N

0 550 1,100 Feet

1 inch = 550 feet

LEGEND

- PG&E Property Line
- Existing IM Extraction Well
- Existing IM Injection Well
- Treatment Facility Pipeline

Notes: Location map shows IM No. 3 facilities as of of January 2006. Aerial photograph taken May 2005.

FIGURE 1-1
LOCATIONS OF IM No. 3 GROUNDWATER EXTRACTION, CONVEYANCE, AND TREATMENT FACILITIES

INTERIM MEASURES PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

BAO \\ZINFANDEL\PROJ\PACIFICGASELECTRICCO\TOPOCKPROGRAM\GIS\MAPFILES\2009\ANNUALPERFORMANCE\IMPM_MARCH06_LOCS_IM3_FACILITIES_SHIFTED.MXD PJOYCE1 5/27/2009 16:40:30

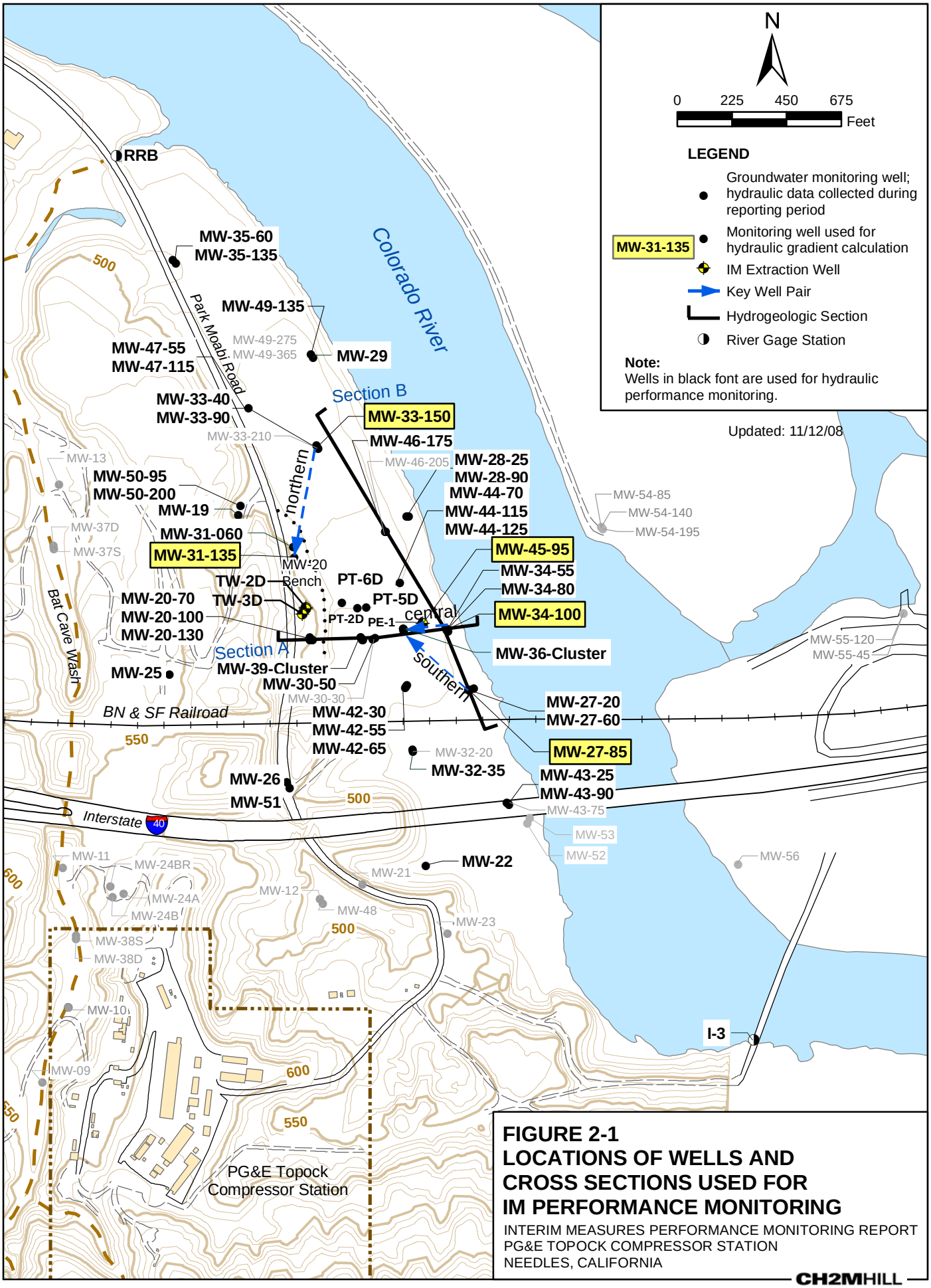
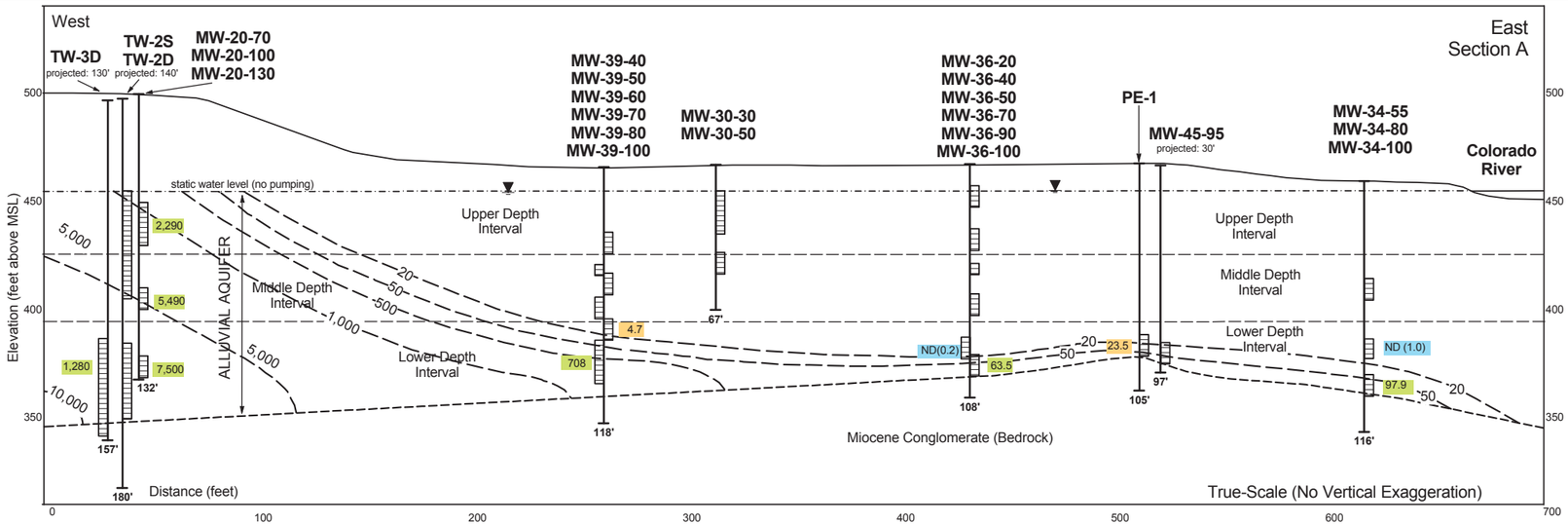


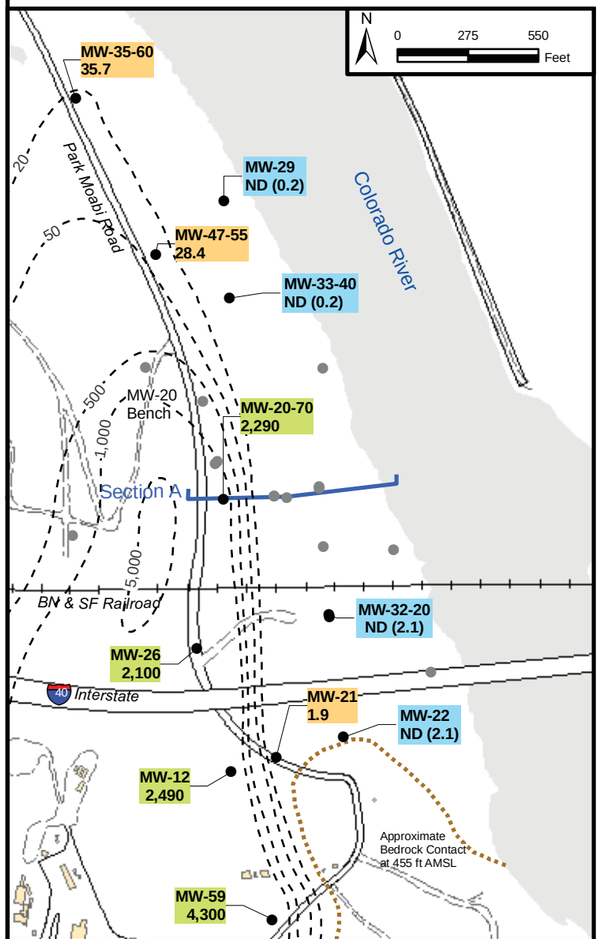
FIGURE 2-1
LOCATIONS OF WELLS AND CROSS SECTIONS USED FOR IM PERFORMANCE MONITORING

INTERIM MEASURES PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

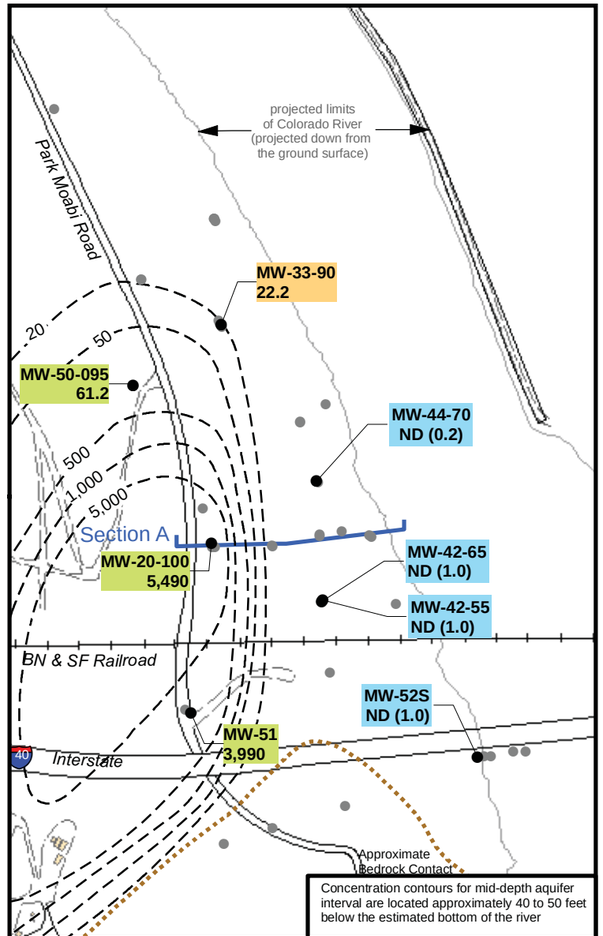
CH2MHILL

BAO \\ZINFANDEL\PROJ\PACIFICGASELECTRICCO\TOPOCKPROGRAM\GIS\MAPFILES\2008\PMP\PMP_WELLS_SECTIONS_8X11_NOV08.MXD PJOYCE1 5/27/2009 16:45:18

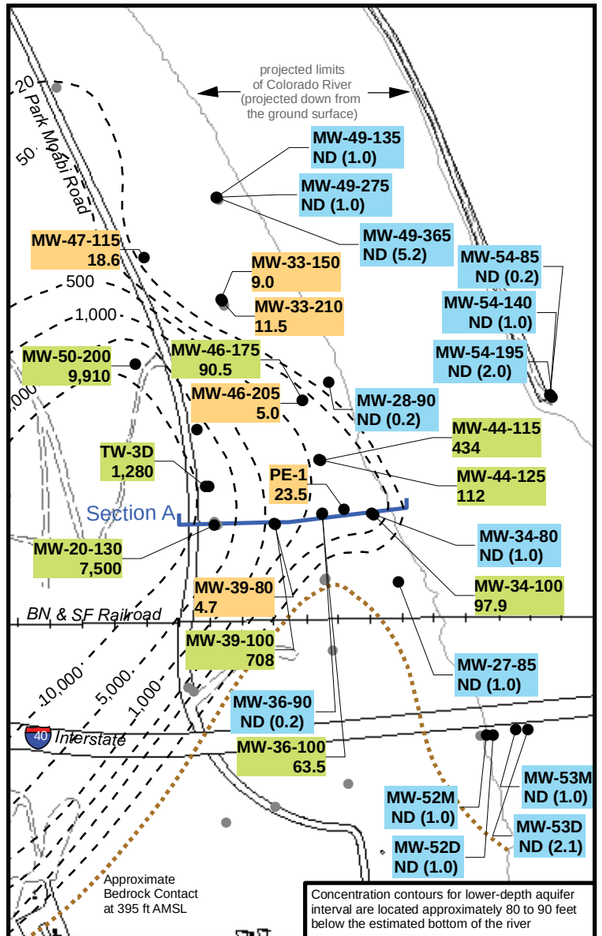




Shallow Wells (Upper Depth Interval)



Intermediate Wells (Middle Depth Interval)



Deep Wells (Lower Depth Interval)

LEGEND

Results posted are maximum Cr(VI) concentrations in wells sampled during March 2009. Concentrations in micrograms per liter (µg/L) approximately equivalent to parts per billion (ppb).

ND (1)	Not detected at listed reporting limit (ppb)
41	Less than 50 ppb
3,810	Greater than 50 ppb
– – 50 – –	Inferred Cr(VI) concentration contour within aquifer depth interval based on March 2009 sampling results

The contours depicted for March 2009 reflect the maximum concentration for wells within each depth interval. (Tables B-1 and B-2 in Appendix B).

Hydrogeologic Section A showing aquifer depth intervals and Cr(VI) sampling results

NOTES ON CONTOUR MAPS

1. The Cr(VI) concentration contours of 20 and 50 µg/L are shown in accordance with DTSC's 2005 performance monitoring directive.

2. The locations of the Cr(VI) contours shown for depths 80 to 90 feet below the Colorado River (east of well cluster MW-34) are estimated based on hydrogeologic and geochemical conditions documented in site investigations. The actual locations of contours beyond well control points in this area are not certain, but have been inferred using available site data. There are no data confirming the existence of Cr(VI) under the Colorado River.

3. Extraction wells PE-1, TW-3D, and TW-2D are not included in contouring.These wells draw water from a larger area and do not represent Cr(VI) concentrations at their specific locations.

Figure 3-1
MAXIMUM Cr(VI) CONCENTRATIONS IN ALLUVIAL AQUIFER, MARCH 2009

INTERIM MEASURES PERFORMACE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

North

South
Section B

Cross Section Parallel to the Colorado River

BN & SF
Railroad

MW-33-40
MW-33-90
MW-33-150
MW-33-210

MW-46-175
MW-46-205

MW-28-25
MW-28-90
projected: 110'

MW-44-70
MW-44-115
MW-44-125

MW-34-55
MW-34-80
MW-34-100

MW-27-20
MW-27-60
MW-27-85

Elevation (feet above MSL)

700
600
500
400
300
200
100
0

water table (average 454' MSL)

ALLUVIAL AQUIFER

Oldest Alluvium

Fluvial Deposits

Upper Depth Interval

Middle Depth Interval

Lower Depth Interval

Approximate geologic contact between alluvial fan and fluvial deposits

ND (1.0)
22.2
9.0
11.5
237'

ND (0.2)
90.5
5.0
216'

ND (0.2)
434
112
134'

ND (1.0)
97.9
116'

ND (1.0)
107'

20
50

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:

Results posted are maximum Cr(VI) concentrations from the groundwater sampling event in March 2009.

See Table B-1 for additional sampling data and prior results for wells on this cross section that were not sampled in March 2009.

water level

well screen

3,810

boring depth (feet) 103'

50
Inferred Cr(VI) concentration contour

Hexavalent chromium [Cr(VI)] concentration in micrograms per liter (ug/L), equivalent to parts per billion (ppb).

ND (1)	Not detected at listed reporting limit (ppb)
42	Less than 50 ppb
3,810	Greater than 50 ppb

FIGURE 3-2
Cr(VI) CONCENTRATIONS
FLOODPLAIN CROSS SECTION B,
MARCH 2009

INTERIM MEASURES PERFORMANCE
MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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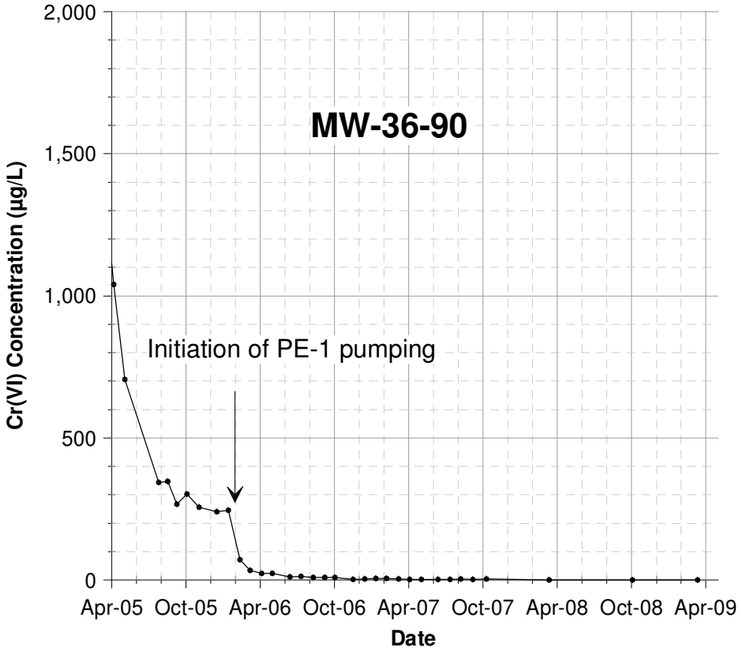
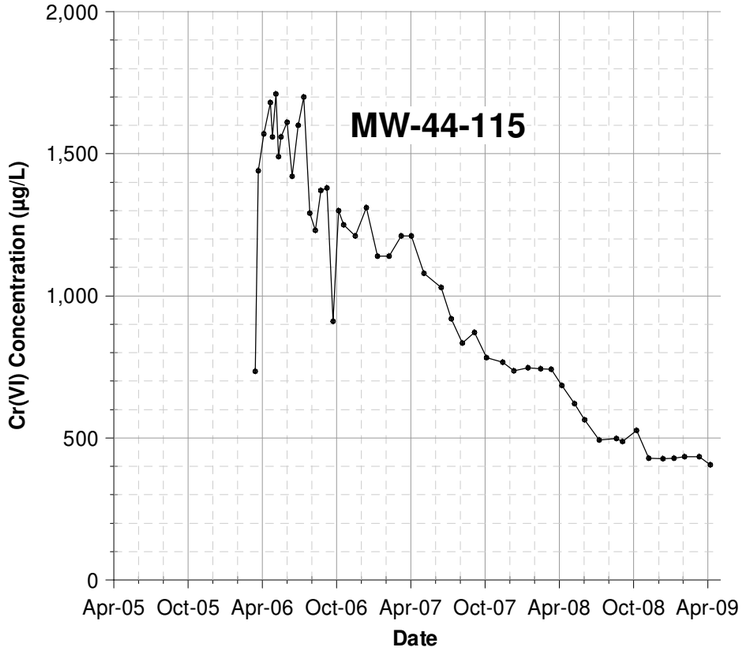
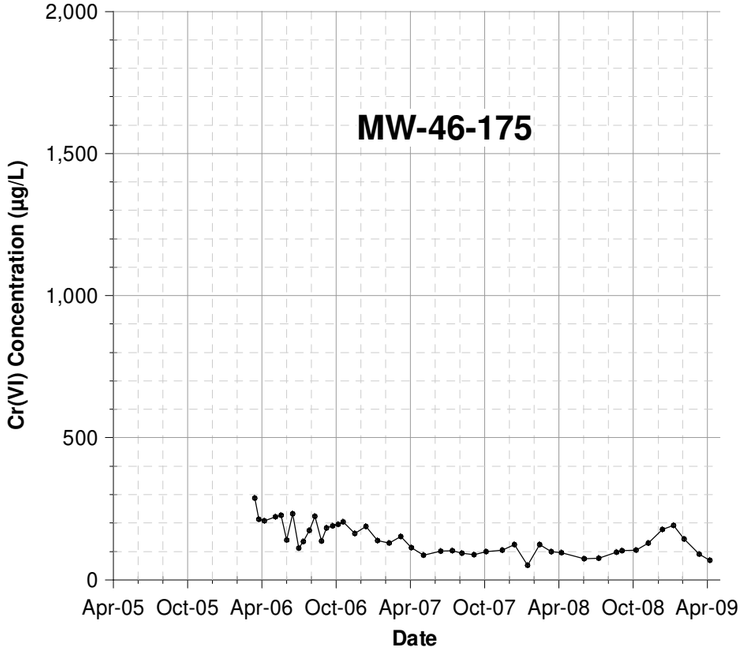
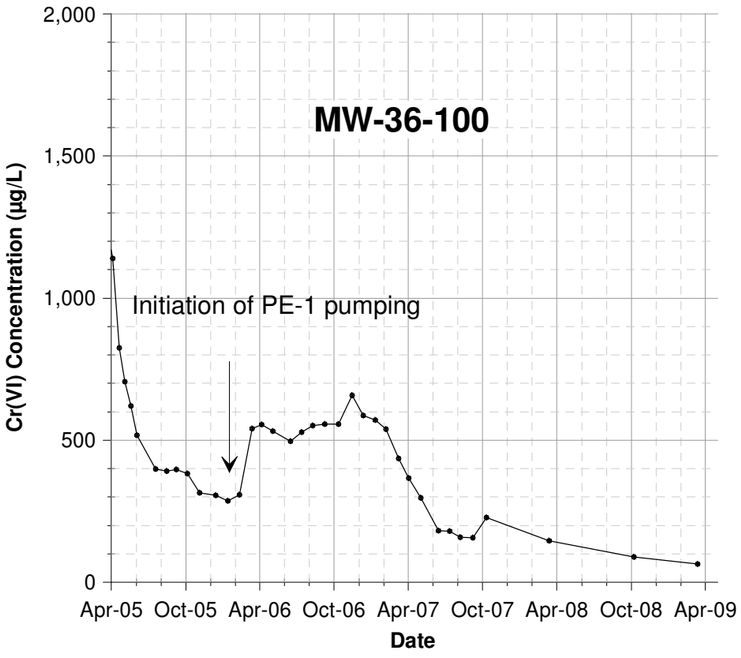
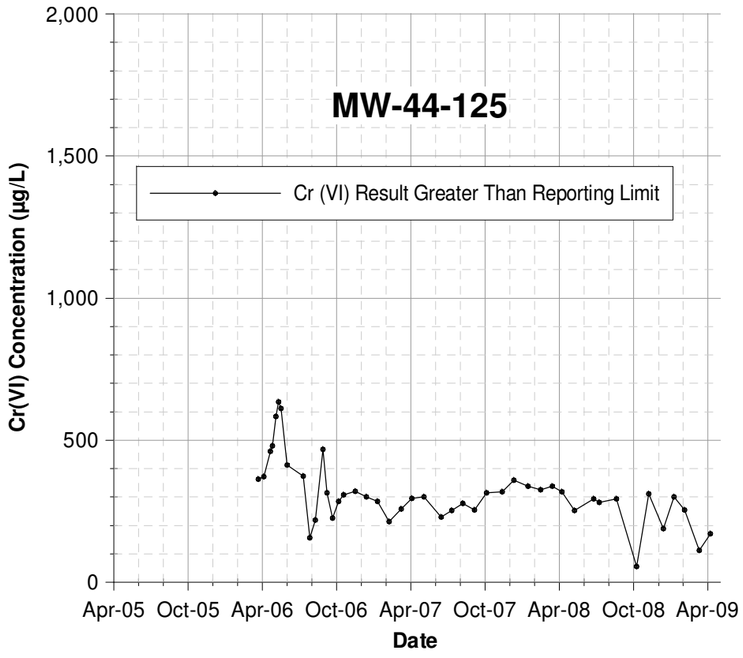
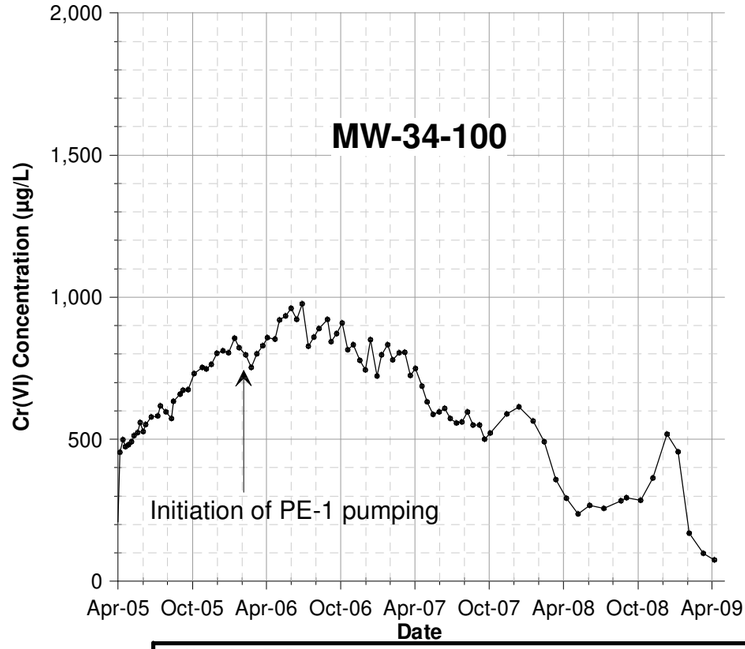












Notes
1. Hexavalent chromium [Cr(VI)] results in micrograms per liter (µg/L), equivalent to parts per billion (ppb).
2. Results plotted are maximum concentrations from primary and duplicate samples; see Table B-1 for complete results.
3. MW-36 wells selected to monitor effects of PE-1 pumping on plume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

FIGURE 3-3
Cr(VI) CONCENTRATION TRENDS IN SELECTED PERFORMANCE MONITORING WELLS, APRIL 2005 THROUGH APRIL 2009
INTERIM MEASURES PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

\\zinfandel\proj\PacificGasElectricCo\TopockProgram\Project_GMP\GMP_Reports\Chemplots\PMR_Figure_3-1

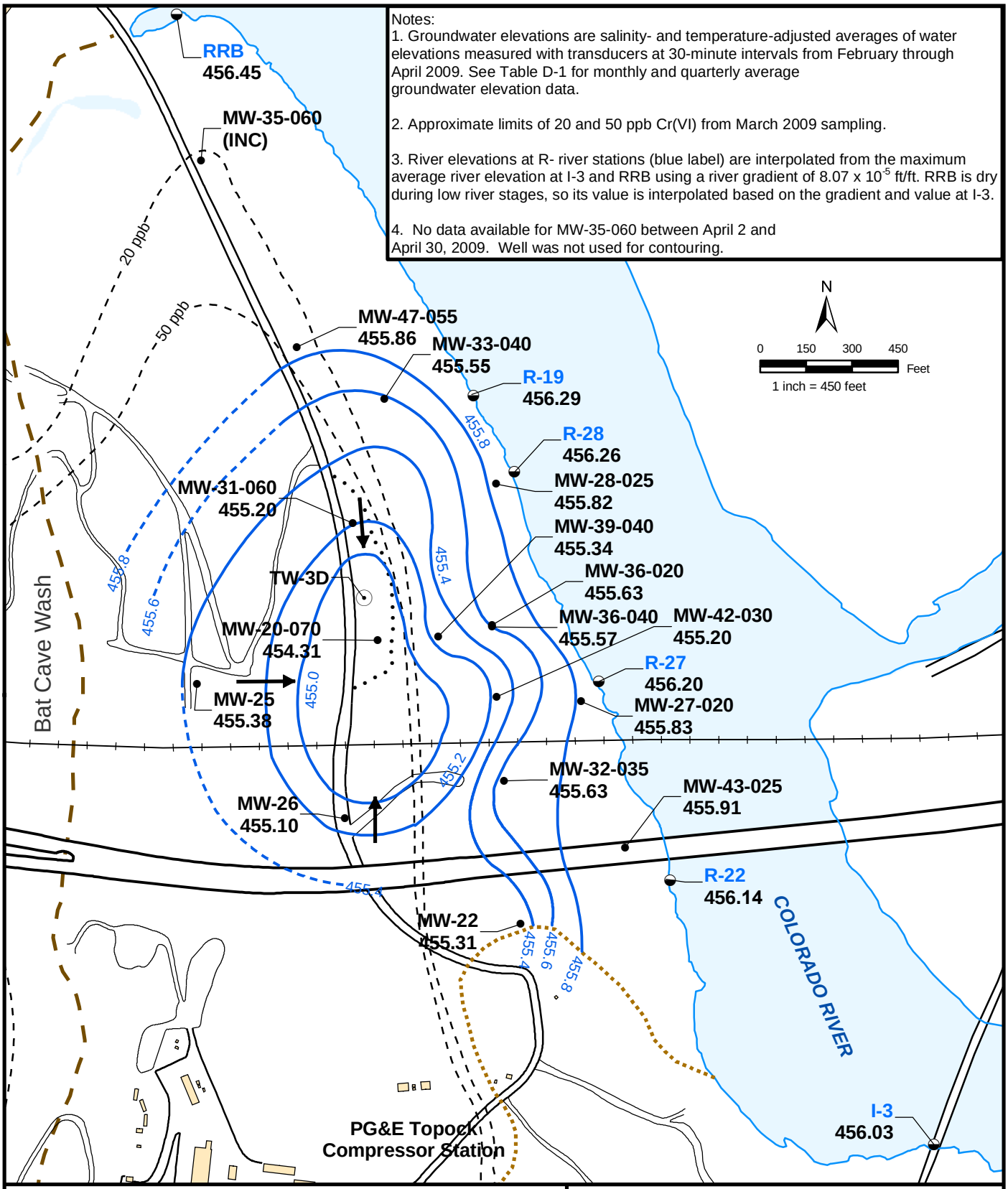


FIGURE 3-4
AVERAGE GROUNDWATER ELEVATIONS FOR SHALLOW WELLS, FEBRUARY THROUGH APRIL 2009

INTERIM MEASURES PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

BAO \\ZINFANDEL\PROJ\PACIFICGASELECTRICCO\TOPOCKPROGRAM\GIS\MAPFILES\2009\PMR\PMR_AVERAGE_GROUNDWATER_UA_1Q09.MXD PJOYCE1 5/27/2009 16:57:08

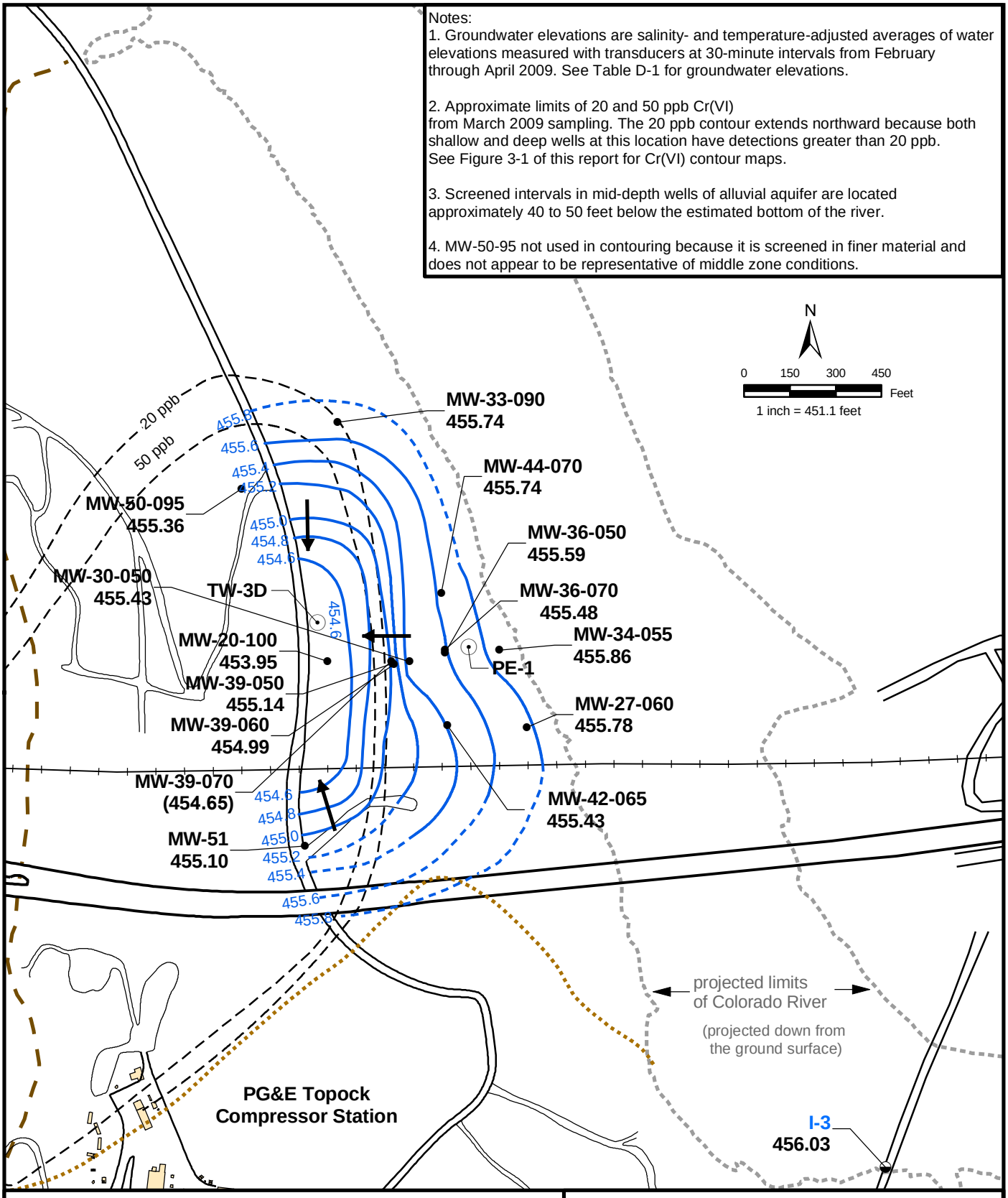


FIGURE 3-5
AVERAGE GROUNDWATER ELEVATIONS FOR MID-DEPTH WELLS, FEBRUARY THROUGH APRIL 2009

INTERIM MEASURES PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

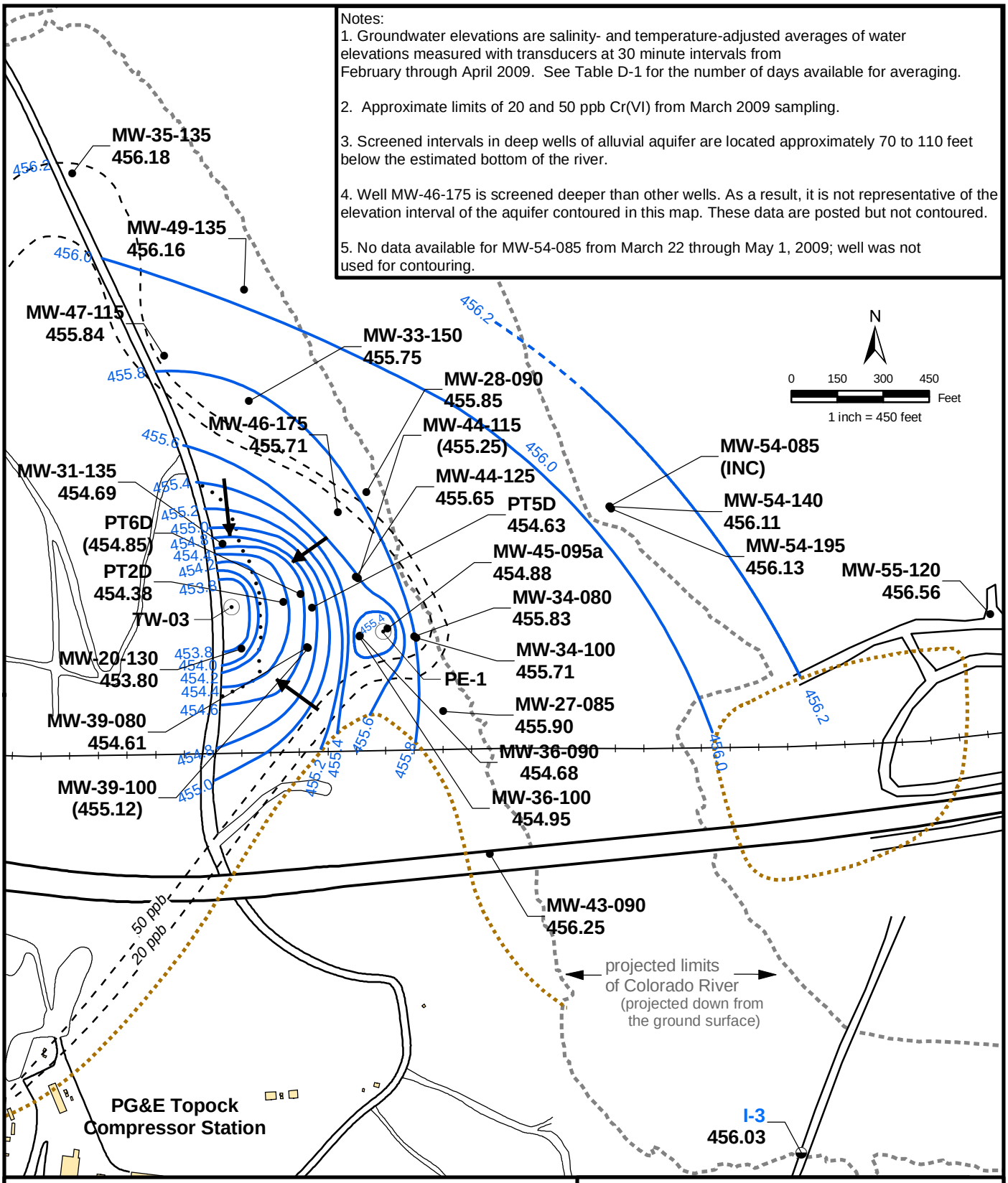
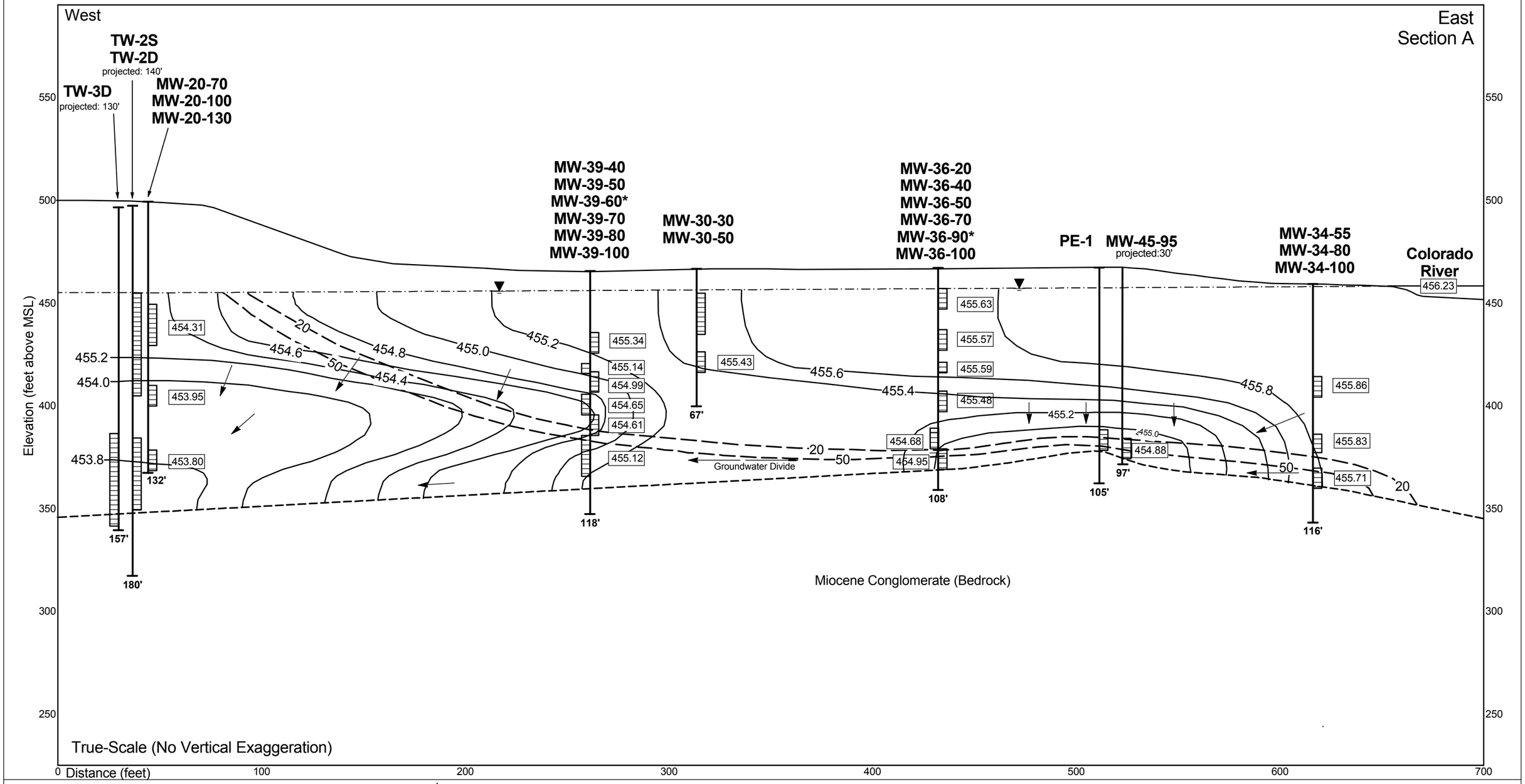


FIGURE 3-6
AVERAGE GROUNDWATER ELEVATIONS FOR DEEP WELLS, FEBRUARY THROUGH APRIL 2009

INTERIM MEASURES PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL



Notes:
Results show average groundwater elevations for February 1, 2009, through April 30, 2009, measured with transducers at 30-minute intervals.

Groundwater elevations adjusted for salinity and temperature.
*Well MW-36-90 and MW-39-60 are excluded from contouring.

River elevation (R-20) is the calculated average river level based upon the river gradient between RRB and I-3.

Legend:

MW-30-50 — well screen

Inferred water table

103 — boring depth (feet)

455.23 — Monthly average groundwater head (ft AMSL)

20 — Inferred hexavalent chromium contour (ppb)

453.5 — Groundwater head contour

453.5 — Inferred groundwater head contour

Interpreted groundwater flow direction

FIGURE 3-7
AVERAGE GROUNDWATER ELEVATIONS FOR WELLS IN FLOODPLAIN CROSS SECTION A, FEBRUARY THROUGH APRIL 2009

INTERIM MEASURES PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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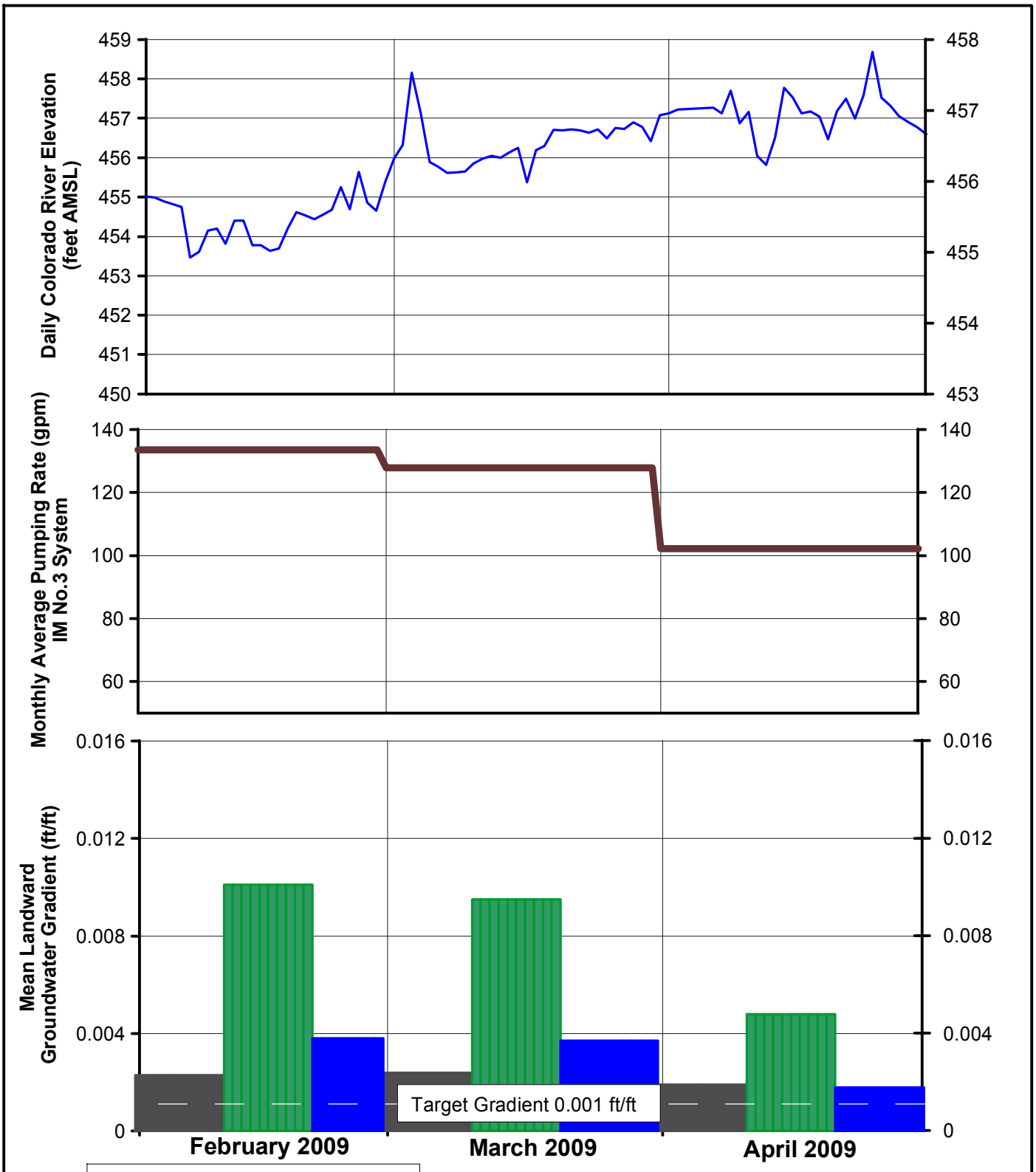
C:\DOCUMENTS AND SETTINGS\CHALL6\MY DOCUMENTS\TOPOC\PMR\1Q-2009\GINT\FIGURE_2-6_XSECA_GW.GDW;



Notes:

1) For IM pumping, the target landward gradient for well pairs is 0.001 feet/foot.
2) Refer to Table 3-1 and Section 3.1 for discussion of pumping data.
3) Pumping rate plotted is the combined rate of extraction wells TW-3D and PE-1 in operation each month.
4) Refer to Table 3-3 and Section 3.3 for discussion of gradient data.

FIGURE 3-8
MEASURED HYDRAULIC GRADIENTS, RIVER ELEVATION, AND PUMPING RATE, FEBRUARY THROUGH APRIL 2009
INTERIM MEASURES PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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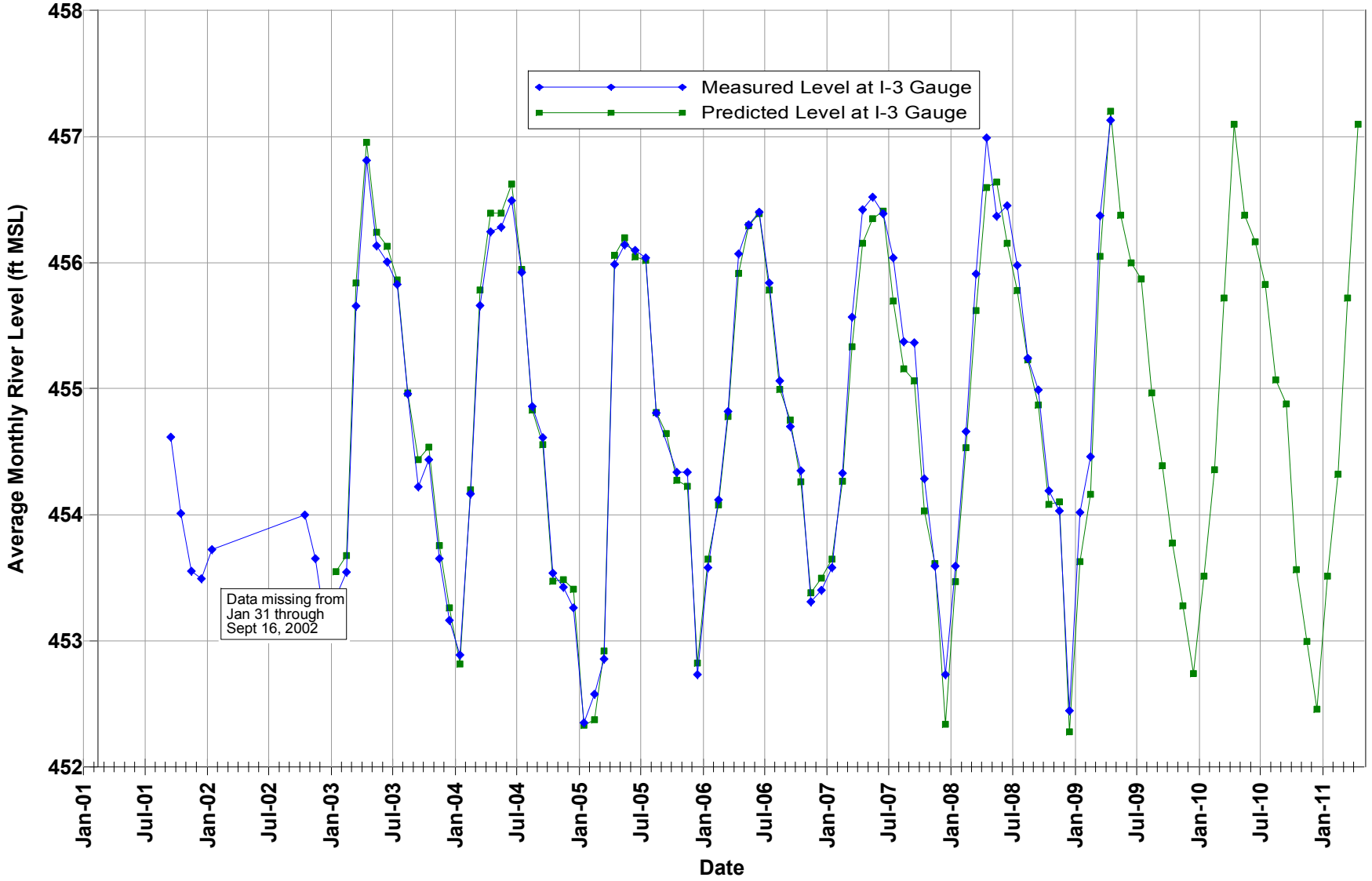

Note:
Projected river level is calculated based on monthly averages of Davis Dam release and stage in Lake Havasu as of May 13, 2009.
Measured data through April 30, 2009.
I-3 data unavailable from September 18 through October 4, 2006
River projections at I-3 are based upon May 2009 USBR projections.

FIGURE 3-9
PAST AND PREDICTED FUTURE RIVER LEVELS AT TOPOCK COMPRESSOR STATION

INTERIM MEASURES PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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Appendix A
Extraction System Operations Log for February through April 2009

Appendix A
Extraction System Operations Log for February through April 2009
PG&E Topock Interim Measures Performance Monitoring Program

During the first quarter 2009 (February through April), extraction wells TW-3D and PE-1 operated at a target pump rate of at 135 gallons per minute (gpm), excluding periods of planned and unplanned downtime. Extraction well TW-2D ran for a short period on February 11, 2009, during a sampling event; otherwise it was not operated during first quarter 2009. Extraction well TW-2S was not operated during first quarter 2009. The operational run time for the Interim Measure (IM) groundwater extraction system (combined or individual pumping) was approximately 89.6 percent during first quarter 2009. The IM extraction system was shut down for a 7-day period April 20 through April 27, 2009, for annual maintenance.

The IM No. 3 facility treated approximately 15,502,632 gallons of extracted groundwater during first quarter 2009. The IM No. 3 facility also treated approximately 17,127 gallons of water generated from the groundwater monitoring program and 37,550 gallons of water from IM No. 3 injection well development. Five containers of solids from the IM No. 3 facility were transported offsite during the reporting period.

Periods of planned and unplanned extraction system downtime (that together resulted in approximately 10.4 percent of downtime during first quarter 2009) are summarized below. The times shown are in Pacific Standard Time (PST) to be consistent with other data collected (e.g., water level data) at the site.

February 2009

- **February 18, 2009 (planned):** The extraction well system was offline from 9:24 a.m. to 5:23 p.m. during the scheduled monthly maintenance outage. Extraction well downtime was 7 hours and 59 minutes.
- **February 18, 2009 (planned):** The extraction well system was offline from approximately 5:41 p.m. to 6:25 p.m. due to switching from the emergency generator to City of Needles power. Extraction system downtime was 44 minutes.
- **February 23, 2009 (unplanned):** The extraction well system was offline from 6:47 a.m. to 7:00 a.m. and again from 7:53 a.m. to 8:48 a.m. due to maintenance on the ferrous chloride system. Extraction system downtime was 1 hour and 8 minutes.
- **February 23, 2009 (planned):** The extraction well system was offline from 11:53 a.m. to 11:55 a.m., 12:02 p.m. to 12:05 p.m., and again from 12:10 p.m. to 12:11 p.m., due to testing of extraction well piping leak detection system. Extraction system downtime was 4 minutes.
- **February 24, 2009 (planned):** The extraction well system was offline from 4:06 p.m. to 4:08 p.m., and again from 4:18 p.m. to 4:23 p.m., when the system was shut down for the annual change-out of the emergency generator. Extraction system downtime was 7 minutes.

- **February 27, 2009 (planned):** The extraction well system was offline from 12:30 p.m. to 12:31 p.m. to test the leak detection system in valve vault 1. Extraction system downtime was 1 minute.

March 2009

- **March 4, 2009 (planned):** The extraction well system was offline from 8:20 a.m. to 8:36 a.m. when the extraction wells were shut down temporarily to measure the level of each extraction well. Extraction well downtime was 16 minutes.
- **March 13-14, 2009 (unplanned):** The extraction well system was offline from 10:01 p.m. on March 13 to 1:38 a.m. on March 14 due to a pump flow sensor failure in the raw water feed pump. Extraction system downtime was 3 hours and 37 minutes.
- **March 16, 2009 (unplanned):** The extraction well system was offline from 5:38 p.m. to 6:58 p.m. due to a hose disconnection at the microfilter. Extraction system downtime was 1 hour and 20 minutes.
- **March 18, 2009 (planned):** The extraction well system was offline from 6:51 a.m. to 4:59 p.m. and again from 5:20 p.m. to 7:21 p.m. during the scheduled monthly maintenance outage. Extraction system downtime was 12 hours and 9 minutes.
- **March 20, 2009 (planned):** The extraction well system was offline from 8:21 a.m. to 8:23 a.m., 11:01 a.m. to 11:02 a.m., 11:09 a.m. to 11:10 a.m., 11:17 a.m. to 11:18 a.m., 11:25 a.m. to 11:26 a.m., 11:33 a.m. to 11:34 a.m., 11:40 a.m. to 11:41 a.m., and 12:00 p.m. to 12:01p.m. when the system was shut down for testing of the leak detection system. Extraction system downtime was 9 minutes.
- **March 22, 2009 (unplanned):** The extraction well system was offline from 8:49 a.m. to 9:03 a.m. due to a leak at the microfilter. Extraction system downtime was 14 minutes.
- **March 23, 2009 (planned):** The extraction well system was offline from 7:48 a.m. to 8:43 p.m. due to plant testing. Extraction system downtime was 55 minutes.
- **March 27, 2009 (unplanned):** The extraction well system was offline from 5:01 a.m. to 6:51 a.m., 7:03 a.m. to 7:54 a.m., 9:08 a.m. to 9:41 a.m., 12:28 p.m. to 12:44 p.m., and 12:45 p.m. to 1:52 p.m. due to maintenance on the ferrous chloride system. Extraction system downtime was 4 hours and 37 minutes.
- **March 28, 2009 (unplanned):** The extraction well system was offline from 1:12 a.m. to 4:54 a.m. and again from 6:56 a.m. to 7:37 a.m. due to maintenance on the ferrous chloride system. Extraction system downtime was 4 hours and 23 minutes.
- **March 28, 2009 (unplanned):** The extraction well system was offline from 10:28 a.m. to 12:36 p.m. due to high pH at AIT606. Extraction system downtime was 2 hours and 8 minutes.
- **March 29, 2009 (unplanned):** The extraction well system was offline from 5:40 a.m. to 6:23 a.m. due to maintenance on the ferrous chloride system. Extraction system downtime was 42 minutes.

- **March 29-30, 2009 (unplanned):** The extraction well system was offline from 11:15 p.m. on March 29 to 2:50 a.m. on March 30 due to a power outage. Extraction system downtime was 3 hours and 55 minutes.
- **March 30, 2009 (unplanned):** The extraction well system was offline from 5:12 a.m. to 7:22 a.m. and 9:21 a.m. to 9:23 a.m. due to maintenance on the ferrous chloride system. Extraction system downtime was 2 hours and 12 minutes.
- **March 31, 2009 (unplanned):** The extraction well system was offline from 1:23 a.m. to 1:42 a.m., from 3:49 a.m. to 5:19 a.m. and 6:29 a.m. to 7:53 a.m. due to maintenance on the ferrous chloride system. Extraction system downtime was 2 hours and 53 minutes.

April 2009

- **April 2, 2009 (unplanned):** The extraction well system was offline from 7:42 a.m. to 7:59 a.m. due to low ferrous chloride flow. Extraction system downtime 17 minutes.
- **April 8, 2009 (planned):** The extraction well system was offline from 7:52 a.m. to 8:27 a.m. and again from 8:33 a.m. to 9:07 a.m. for RO system maintenance. Extraction system downtime was 1 hour and 9 minutes.
- **April 8, 2009 (planned):** The extraction well system was offline from 11:31 a.m. to 11:32 a.m., 11:47 a.m. to 11:48 a.m., 11:53 a.m. to 11:54 a.m., 11:59 a.m. to 12:00 p.m., and 12:11 p.m. to 12:12 p.m. when the system was shut down for testing of the leak detection system. Extraction system downtime was 5 minutes.
- **April 19, 2009 (unplanned):** The extraction well system was offline from 6:17 a.m. to 6:33 a.m. due to primary RO permeate hose failure. Extraction system downtime was 16 minutes.
- **April 19, 2009 (unplanned):** The extraction well system was offline from 7:29 p.m. to 8:57 p.m. when the City of Needles power supply imbalance alarmed and shut down the extraction wells. Extraction system downtime was 1 hour and 28 minutes.
- **April 20-27, 2009 (planned):** The extraction well system was offline from 7:01 a.m. on April 20 to 6:46 a.m. on April 26 and again from 7:32 a.m. on April 26 to 11:43 a.m. on April 27 to perform annual preventive maintenance. Extraction system downtime was 7 days, 3 hours, and 56 minutes.

Appendix B
Chromium Sampling Results for Monitoring Wells in Floodplain Area

TABLE B-1
Groundwater Sampling Results for Floodplain Monitoring Wells, April 2008 through April 2009
Interim Measures Performance Monitoring
PG&E Topock Compressor Station

	Sample Date	Hexavalent Chromium (µg/L)	Dissolved Chromium (total) (µg/L)	Selected Field Parameters			Groundwater and River Elevations at Sampling Time	
				ORP (mV)	Dissolved Oxygen (mg/L)	Specific Conductance (µS/cm)	Groundwater Elevation Salinity-adjusted AMSL	River Elevation Downstream I-3 Station
Shallow Zone								
MW-27-020	03-Oct-08	ND (0.2)	ND (1.0)	-66	0.3	1,097	455.1	455.1
MW-28-025	08-Oct-08	ND (0.2)	ND (1.0)	14	0.2	1,245	454.7	454.8
MW-29	30-Sep-08	0.38 J	1.68	-269	0.3	3,507	455.4	454.5
	10-Dec-08	ND (0.2) J	ND (1.0)	-63	2.6	3,333	453.7	452.3
	12-Mar-09	ND (0.2)	ND (1.0)	-162	0.3	3,265	455.7	455.5
MW-32-020	03-Oct-08	ND (0.2)	ND (1.0)	-7	0.1	55,840	454.1	454.5
	10-Mar-09	ND (2.1)	4.56	-170	0.9	44,711	455.3	456.1
MW-32-035	06-May-08	---	1.90	-120	0.1	25,580	456.4	457.4
	03-Oct-08	ND (0.2)	ND (1.0)	-52	0.1	22,365	454.5	453.9
MW-33-040	05-May-08	ND (0.2)	ND (1.0)	59	3.0	5,564	456.1	455.5
	06-Oct-08	ND (1.0)	1.08	-118	0.8	11,782	455.0	454.9
	09-Dec-08	ND (1.0)	2.10	42	1.0	8,831	453.1	452.3
	12-Mar-09	ND (0.2)	ND (1.0)	-36	0.2	6,393	455.3	454.4
MW-43-025	07-May-08	---	ND (1.0)	-165	0.2	1,617	455.8	454.6
	02-Oct-08	ND (0.2)	ND (1.0)	-98	0.2	1,361	455.0	454.8
Middle Zone								
MW-27-060	03-Oct-08	0.32	ND (1.0)	-83	0.2	4,430	455.0	455.0
	10-Dec-08	ND (0.2)	ND (1.0)	-18	0.1	4,293	452.7	452.7
MW-33-090	05-May-08	21.1	20.2	45	0.1	11,160	456.1	455.4
	06-Oct-08	21.1	19.2	-209	0.1	10,635	454.9	454.5
	11-Dec-08	23.2	22.6	61	0.1	11,030	452.9	452.2
	13-Mar-09	22.2	20.1	59	0.2	11,097	455.7	456.2
MW-34-055	07-Oct-08	ND (0.2)	ND (1.0)	-108	0.1	1,107	454.8	454.8
MW-36-070	03-Oct-08	ND (0.2)	ND (1.0)	-29	0.0	1,630	454.5	454.6
MW-39-050	01-Oct-08	ND (0.2)	ND (1.0)	-231	0.2	2,702	454.6	455.0
MW-39-060	01-Oct-08	ND (0.2)	ND (1.0)	-215	0.2	3,518	454.6	455.3
MW-39-070	01-Oct-08	ND (0.2)	ND (1.0)	-279	0.1	5,190	453.9	454.5
MW-42-055	06-May-08	ND (1.0)	ND (1.0)	-100	0.2	15,580	456.4	457.4
	03-Oct-08	ND (0.2)	ND (1.0)	-123	0.2	13,322	454.8	455.4
	09-Dec-08	ND (1.0)	ND (1.0)	-93	0.1	13,640	452.4	452.2
	09-Mar-09	ND (1.0)	ND (1.0)	-167	0.2	13,292	454.7	454.0
MW-42-065	06-May-08	ND (1.0)	ND (1.0)	-23	0.1	16,680	456.5	457.6
	03-Oct-08	ND (0.2) J	1.09	-32	0.3	14,084	455.0	455.3
	09-Dec-08	ND (1.0)	ND (1.0)	-12	0.1	15,360	452.5	452.1
	09-Mar-09	ND (1.0)	ND (1.0)	-130	0.2	15,615	454.8	454.0
MW-44-070	07-May-08	ND (0.2)	ND (1.0)	-107	0.1	4,321	454.5	457.4
	07-Oct-08	ND (0.2)	ND (1.0)	-159	0.1	3,510	454.1	453.8
	10-Dec-08	ND (0.2)	ND (1.0)	-88	0.1	3,351	452.4	452.4
	12-Mar-09	ND (0.2)	ND (1.0)	-170	0.2	3,472	455.9	455.9

Refer to table footnotes for data qualifier explanation.

TABLE B-1
Groundwater Sampling Results for Floodplain Monitoring Wells, April 2008 through April 2009
Interim Measures Performance Monitoring
PG&E Topock Compressor Station

	Sample Date	Hexavalent Chromium (µg/L)	Dissolved Chromium (total) (µg/L)	Selected Field Parameters			Groundwater and River Elevations at Sampling Time	
				ORP (mV)	Dissolved Oxygen (mg/L)	Specific Conductance (µS/cm)	Groundwater Elevation Salinity-adjusted AMSL	River Elevation Downstream I-3 Station
Middle Zone								
MW-52S	07-May-08	ND (1.0)	ND (1.0)	-226	0.0	15,500	---	453.8
	01-Oct-08	ND (1.0)	ND (1.0)	-173	0.5	17,800	---	455.2
	11-Dec-08	ND (1.0)	ND (1.0)	---	---	---	---	452.2
	12-Mar-09	ND (1.0)	ND (1.0)	-100	0.4	11,450	---	454.6
Deep Wells								
MW-27-085	06-May-08	ND (1.0)	ND (1.0)	16	0.4	18,720	456.7	457.0
	03-Oct-08	ND (0.2)	1.72	7	0.2	16,341	454.8	454.7
	10-Dec-08	ND (1.0)	ND (1.0)	19	0.1	17,370	452.6	452.6
	11-Mar-09	ND (1.0)	ND (1.0)	-105	0.5	17,175	454.9	454.8
MW-28-090	07-May-08	ND (0.2)	ND (1.0)	-112	0.2	7,956	455.0	454.3
	08-Oct-08	ND (0.2)	ND (1.0)	-83	0.1	7,700	454.9	455.0
	09-Dec-08	ND (1.0)	ND (1.0)	-55	0.2	8,242	452.8	452.8
	11-Mar-09	ND (0.2)	ND (1.0)	-160	0.7	8,109	454.7	454.4
MW-33-150	06-May-08	8.83	9.21	24	0.1	18,150	456.9	457.7
	06-Oct-08	8.84	9.07	-223	0.1	16,991	454.9	453.9
	06-Oct-08 FD	8.91	7.86	FD	FD	FD	FD	FD
	11-Dec-08	10.4	9.73	85	0.1	18,260	453.3	452.4
	12-Mar-09	9.00	10.9	-39	0.1	17,695	455.2	454.5
MW-33-210	05-May-08	10.6	9.93	139	0.2	21,150	456.4	455.6
	06-Oct-08	12.4	11.7	-190	0.1	19,726	455.0	454.1
	11-Dec-08	13.2	12.8	67	0.1	20,110	453.5	452.3
	12-Mar-09	11.5	11.8	-18	0.1	20,497	454.8	454.6
MW-34-080	08-Apr-08	ND (1.0)	ND (1.0)	29	0.3	9,061	457.3	457.7
	06-May-08	ND (0.2)	ND (1.0)	-3	0.2	9,911	456.7	457.1
	04-Jun-08	ND (1.0)	ND (1.0)	-114	1.0	9,403	456.1	456.1
	08-Jul-08	ND (1.0)	ND (1.0)	-103	0.2	9,300	455.8	456.2
	20-Aug-08	ND (0.2)	ND (1.0)	-26	0.2	9,337	456.1	455.5
	03-Sep-08	ND (1.0)	ND (1.0)	-286	0.1	8,837	454.5	454.5
	07-Oct-08	ND (0.2)	1.52	-126	0.1	8,610	454.6	454.4
	06-Nov-08	ND (0.2)	ND (1.0)	24	0.1	8,665	453.4	453.0
	10-Dec-08	ND (1.0)	ND (1.0)	1	0.1	8,249	452.4	452.2
	07-Jan-09	ND (0.2)	ND (1.0)	14	0.1	7,611	452.8	452.6
	03-Feb-09	ND (1.0)	ND (1.0)	-31	0.4	7,667	454.7	454.6
	10-Mar-09	ND (1.0)	1.69	-72	0.2	8,824	456.0	455.5
	06-Apr-09	ND (1.0)	ND (1.0)	11	0.2	8,594	456.3	456.5
MW-34-100	08-Apr-08	280	276	20	0.2	17,878	456.8	457.6
	08-Apr-08 FD	292	274	FD	FD	FD	FD	FD
	06-May-08	234	228	52	0.2	19,660	456.5	457.2
	06-May-08 FD	238	228	FD	FD	FD	FD	FD
	04-Jun-08	268	323	70	0.7	18,918	456.0	456.4
	08-Jul-08	250	266	22	0.2	18,910	456.1	456.4
	08-Jul-08 FD	257	268	FD	FD	FD	FD	FD

Refer to table footnotes for data qualifier explanation.

TABLE B-1
Groundwater Sampling Results for Floodplain Monitoring Wells, April 2008 through April 2009
Interim Measures Performance Monitoring
PG&E Topock Compressor Station

	Sample Date	Hexavalent Chromium (µg/L)	Dissolved Chromium (total) (µg/L)	Selected Field Parameters			Groundwater and River Elevations at Sampling Time	
				ORP (mV)	Dissolved Oxygen (mg/L)	Specific Conductance (µS/cm)	Groundwater Elevation Salinity-adjusted AMSL	River Elevation Downstream I-3 Station
Deep Wells								
MW-34-100	20-Aug-08	283	287	75	0.2	19,420	456.1	455.8
	20-Aug-08 FD	250	253	FD	FD	FD	FD	FD
	03-Sep-08	294	308	-264	0.2	18,510	454.4	454.7
	07-Oct-08	272	245	17	0.1	18,088	454.4	454.7
	07-Oct-08 FD	286 J	242	FD	FD	FD	FD	FD
	06-Nov-08	364	447	45	0.1	18,650	454.1	453.0
	10-Dec-08	481	422	10	0.1	17,840	452.3	452.1
	10-Dec-08 FD	519	435	FD	FD	FD	FD	FD
	07-Jan-09	456	442	18	0.2	17,680	452.8	452.8
	03-Feb-09	170	152	27	0.2	13,460	454.4	454.5
	10-Mar-09	97.9	123	-1	0.2	19,330	455.5	455.2
	06-Apr-09	74.7	83.8	25	0.2	18,560	456.3	456.5
MW-36-090	03-Oct-08	0.61	1.46	-68	0.0	2,240	454.0	454.8
	12-Mar-09	ND (0.2)	ND (1.0)	-85	0.1	1,479	453.9	454.6
	12-Mar-09 FD	ND (0.2)	ND (1.0)	FD	FD	FD	FD	FD
MW-36-100	07-Oct-08	88.4	89.0	-200	0.1	12,687	453.6	454.2
	12-Mar-09	63.5	90.6	-100	0.5	12,929	455.3	456.3
MW-39-080	01-Oct-08	7.58	8.05	-257	0.1	12,105	454.1	454.8
	11-Mar-09	4.67	5.66	-90	0.1	12,330	454.3	454.7
MW-39-100	01-Oct-08	706	613	-19	0.2	20,895	455.0	455.5
	13-Mar-09	708	920	19	0.3	22,478	455.1	455.4
MW-43-075	02-Oct-08	ND (0.2)	ND (1.0)	-90	0.1	14,010	454.7	454.2
MW-43-090	02-Oct-08	ND (0.2)	ND (1.0)	-85	0.1	19,543	456.0	454.4
MW-44-115	07-Apr-08	685	689	100	0.8	13,480	455.4	455.8
	08-May-08	620	590	-2	0.1	14,330	455.4	455.1
	02-Jun-08	564	542	-142	0.1	13,811	454.9	455.3
	07-Jul-08	493	478	-108	0.2	13,570	455.3	455.7
	19-Aug-08	498 J	555	-66	0.2	13,730	454.2	454.4
	02-Sep-08	488	489	-274	0.1	13,550	454.1	454.3
	07-Oct-08	456	502	-185	0.1	12,917	453.9	454.0
	07-Oct-08 FD	527 J	466	FD	FD	FD	FD	FD
	06-Nov-08	429	529	39	0.1	13,400	453.3	453.4
	11-Dec-08	426	403	20	0.0	13,060	452.1	452.1
	07-Jan-09	428	425	14	0.3	12,840	452.6	453.0
	02-Feb-09	434	433	-61	0.2	10,685	454.0	454.6
	02-Feb-09 FD	434	425	FD	FD	FD	FD	FD
	10-Mar-09	434	472	-142	0.1	13,337	454.4	454.3
	06-Apr-09	406	425	5	0.2	12,740	455.9	456.6
	06-Apr-09 FD	406	428	FD	FD	FD	FD	FD
MW-44-125	07-Apr-08	318	326	-6	0.3	10,272	455.7	455.5
	08-May-08	253	342	1	0.1	12,400	456.3	455.5
	24-Jun-08	293	339	-77	0.0	17,300	456.7	456.7

Refer to table footnotes for data qualifier explanation.

TABLE B-1
Groundwater Sampling Results for Floodplain Monitoring Wells, April 2008 through April 2009
Interim Measures Performance Monitoring
PG&E Topock Compressor Station

	Sample Date	Hexavalent Chromium (µg/L)	Dissolved Chromium (total) (µg/L)	Selected Field Parameters			Groundwater and River Elevations at Sampling Time	
				ORP (mV)	Dissolved Oxygen (mg/L)	Specific Conductance (µS/cm)	Groundwater Elevation Salinity-adjusted AMSL	River Elevation Downstream I-3 Station
Deep Wells								
MW-44-125	07-Jul-08	281	291	-155	0.2	13,860	455.5	455.2
	19-Aug-08	294	297	-65	0.7	10,910	455.0	454.4
	07-Oct-08	55.9	64.5	-150	0.1	3,249	454.2	453.6
	06-Nov-08	312	317	52	0.1	14,260	454.1	453.5
	06-Nov-08 FD	301	316	FD	FD	FD	FD	FD
	12-Dec-08	189	200	56	0.0	14,420	452.7	452.3
	07-Jan-09	300	290	-32	0.2	14,350	453.2	453.1
	02-Feb-09	255	250	-78	0.2	11,015	454.3	454.6
	10-Mar-09	112	126	-194	0.2	12,525	454.9	454.3
	06-Apr-09	170	166	-5	0.2	12,810	456.5	456.6
MW-46-175	07-Apr-08	95.6	100	-52	0.2	17,588	455.7	455.4
	07-May-08	77.9	74.7	-121	0.1	18,470	455.1	453.6
	02-Jun-08	74.2	86.8	-225	0.1	18,176	455.6	455.5
	02-Jun-08 FD	73.6	87.0	FD	FD	FD	FD	FD
	08-Jul-08	75.3	83.4	-192	0.1	17,700	455.8	455.7
	20-Aug-08	98.2	91.4	-103	0.2	18,470	456.0	456.8
	03-Sep-08	100	112	-314	0.1	17,770	454.9	454.9
	03-Sep-08 FD	103	102	FD	FD	FD	FD	FD
	08-Oct-08	105	87.2	-207	0.1	17,622	454.7	454.3
	06-Nov-08	130	171	6	0.1	18,180	454.3	454.5
	11-Dec-08	178	167	1	0.0	17,810	452.9	452.1
	07-Jan-09	190	196	-5	0.1	16,850	453.0	452.4
	07-Jan-09 FD	192	205	FD	FD	FD	FD	FD
	03-Feb-09	143	136	7	0.2	12,570	454.8	454.7
	12-Mar-09	90.5	89.2	-213	0.1	18,232	455.6	454.8
	06-Apr-09	68.5	77.0	-8	0.1	17,740	456.3	456.4
MW-46-205	07-May-08	4.52	4.25	57	0.1	22,620	455.8	453.8
	08-Oct-08	ND (4.9)	4.32	-127	0.1	21,491	454.8	454.5
	09-Dec-08	4.28	4.47	58	0.1	22,400	453.2	452.6
	12-Mar-09	4.98	5.95	-75	0.1	22,290	455.4	454.6
MW-49-135	06-Oct-08	ND (0.2)	1.59	-147	0.2	13,684	455.4	455.5
	11-Mar-09	ND (1.0)	ND (1.0)	-97	0.7	15,088	456.4	455.8
MW-49-275	30-Sep-08	ND (1.0)	ND (1.0)	-322	0.1	24,030	455.8	454.7
	11-Mar-09	ND (1.0)	ND (1.0)	-237	0.2	27,452	456.2	455.1
MW-49-365	06-Oct-08	ND (1.0)	ND (1.0)	-296	0.1	38,436	457.1	455.1
	11-Mar-09	ND (5.2)	ND (1.0)	-240	0.1	42,113	457.2	454.4
MW-52D	07-May-08	ND (1.0)	ND (1.0)	-192	0.9	24,050	---	453.7
	01-Oct-08	ND (1.0)	ND (1.0)	-262	0.0	28,600	---	454.8
	11-Dec-08	ND (1.0)	ND (1.0)	---	---	---	---	452.2
	12-Mar-09	ND (1.0)	6.63	-111	0.3	21,900	---	454.8
MW-52M	07-May-08	ND (1.0)	ND (1.0)	-230	0.0	20,800	---	453.7
	01-Oct-08	ND (1.0)	ND (1.0)	-191	0.0	23,400	---	455.2

Refer to table footnotes for data qualifier explanation.

TABLE B-1
Groundwater Sampling Results for Floodplain Monitoring Wells, April 2008 through April 2009
Interim Measures Performance Monitoring
PG&E Topock Compressor Station

	Sample Date	Hexavalent Chromium (µg/L)	Dissolved Chromium (total) (µg/L)	Selected Field Parameters			Groundwater and River Elevations at Sampling Time	
				ORP (mV)	Dissolved Oxygen (mg/L)	Specific Conductance (µS/cm)	Groundwater Elevation Salinity-adjusted AMSL	River Elevation Downstream I-3 Station
Deep Wells								
MW-52M	11-Dec-08	ND (1.0)	ND (1.0)	-73	0.2	17,431	451.2	452.2
	12-Mar-09	ND (1.0)	ND (1.0)	-174	0.1	14,480	---	454.8
MW-53D	07-May-08	ND (1.0)	ND (1.0)	-160	0.0	37,300	---	453.6
	01-Oct-08	ND (1.0)	ND (1.0)	-279	0.0	34,000	---	454.3
	11-Dec-08	ND (1.0)	ND (1.0)	-13	0.3	27,252	---	452.2
	12-Mar-09	ND (2.1)	ND (2.0)	-19	0.3	26,760	---	455.2
MW-53M	07-May-08	ND (1.0)	ND (1.0)	-167	1.7	20,940	---	453.6
	01-Oct-08	ND (1.0)	ND (1.0)	-153	1.7	25,900	---	454.0
	11-Dec-08	ND (1.0)	ND (1.0)	---	---	---	---	452.3
	12-Mar-09	ND (1.0)	ND (2.0)	-173	0.1	17,220	---	455.5

NOTES:

ND = not detected at listed reporting limit (RL)
FD = field duplicate
AMSL = above mean sea level
LF = lab filtered
J = concentration or RL estimated by laboratory or data validation
(---) = data not collected, available, rejected, or field instrumentation malfunctioned
µg/L= micrograms per liter
mV = millivolts
ORP = oxidation-reduction potential
µS/cm = microSiemens per centimeter
^ = initial results suspect, sample being reanalyzed

Samples taken after February 1, 2008, were field filtered due to the approved change from analysis method SW7199 to E218.6 for hexavalent chromium analyses (DTSC, 2008b).

Beginning in July 2005, samples analyzed for chromium (total) by Method SW6010B or SW6020 were filtered and preserved in the field after sample collection, as per DTSC's June 30, 2005 letter.

The RLs for certain hexavalent chromium results from Method SW7199 analyses have been elevated above the standard RL of 0.2 µg/L due to required sample dilution to accommodate matrix interferences.

Groundwater and river elevations in feet above AMSL rounded to 0.1 foot. River elevations from presssure transducer record at I-3.

TABLE B-2
Groundwater Sampling Results for Other Monitoring Wells in PMP Area, April 2008 through April 2009
Interim Measures Performance Monitoring
PG&E Topock Compressor Station

Well ID	Sample Date	Hexavalent Chromium (µg/L)	Dissolved Chromium (total) (µg/L)	Selected Field Parameters		
				ORP (mV)	Dissolved Oxygen (mg/L)	Specific Conductance (µS/cm)
Shallow Zone						
MW-09	06-Oct-08	282	280	137	3.79	3,520
MW-12	05-May-08	2,580	2,800	-7.0	6.43	6,780
	07-Oct-08	2,680	3,000	105	5.71	6,490
	07-Oct-08 FD	2,580	2,990	FD	FD	FD
	11-Dec-08	2,460	2,740	23.2	6.12	6,310
	12-Mar-09	2,490	2,660	67.0	5.24	6,880
MW-13	02-Oct-08	23.2	23.0	61.9	4.85	2,070
MW-14	03-Oct-08	27.9 J	29.1	125	6.58	1,620
MW-19	07-Oct-08	682	786	72.4	6.02	2,510
MW-20-070	07-Oct-08	2,010	2,070	110	7.31	3,190
	12-Mar-09	2,290	2,710	64.0	6.65	3,440
MW-21	06-May-08	ND (1.0)	3.01	-84.9	0.68	15,100
	02-Oct-08	ND (1.0)	ND (1.0)	11.2	0.56	16,200
	11-Dec-08	1.86	ND (1.0)	52.2	2.33	4,410
	11-Mar-09	1.90	2.32	41.8	2.84	12,200
MW-22	29-Jul-08	---	ND (1.0)	---	---	---
	03-Oct-08	ND (0.2)	ND (1.0)	-151	0.00	36,800
	11-Dec-08	---	10.4	-101	0.22	34,400
	12-Mar-09	ND (2.1)	2.72	-98.2	0.17	25,500
MW-24A	08-May-08	---	10.0	-367	0.28	11,300
	16-Oct-08	---	6.02	-254	0.70	10,600
MW-25	07-Oct-08	544	618	122	6.41	1,300
	07-Oct-08 FD	552	572	FD	FD	FD
MW-26	05-May-08	---	2,600	9.10	19.1	4,220
	08-Oct-08	2,560	2,410	97.4	2.40	4,120
	10-Mar-09	1,990	2,220	63.7	8.07	4,330
	10-Mar-09 FD	2,100	2,720	FD	FD	FD
MW-31-060	06-Oct-08	534	498	124	4.82	3,340
MW-35-060	07-Oct-08	24.3	26.8	185	0.80	7,960
	07-Oct-08 FD	26.5	27.7	FD	FD	FD
	11-Mar-09	35.7	33.0	12.1	1.30	6,970
MW-47-055	07-May-08	34.8	32.7	-0.1	2.20	4,350
	08-Oct-08	ND (49)	50.3	-119	2.54	4,270
	10-Dec-08	71.8	72.7	52.2	2.33	4,410
	12-Mar-09	28.4	27.0	110	2.43	4,510
	12-Mar-09 FD	27.6	30.2	FD	FD	FD
TW-02S	03-Oct-08	860	748	134	3.28	5,850
Middle Zone						
MW-20-100	08-Oct-08	6,770	8,140	89.3	3.27	3,710
	13-Mar-09	5,490	5,470	186	2.54	3,970

TABLE B-2
Groundwater Sampling Results for Other Monitoring Wells in PMP Area, April 2008 through April 2009
Interim Measures Performance Monitoring
PG&E Topock Compressor Station

Well ID	Sample Date	Hexavalent Chromium (µg/L)	Dissolved Chromium (total) (µg/L)	Selected Field Parameters		
				ORP (mV)	Dissolved Oxygen (mg/L)	Specific Conductance (µS/cm)
MW-37S	03-Oct-08	7.59	8.74	91.4	1.81	5,430
	03-Oct-08 FD	7.68 J	7.80	FD	FD	FD
MW-50-095	07-May-08	154	187	-53	2.34	5,630
	07-May-08 FD	164	192	FD	FD	FD
	06-Oct-08	ND (89)	87.7	90.9	1.78	5,580
	10-Dec-08	82.2	73.4	55.0	2.00	5,260
	10-Dec-08 FD	78.2	74.5	FD	FD	FD
	12-Mar-09	60.1	72.6	100	2.26	5,420
	12-Mar-09 FD	61.2	71.1	FD	FD	FD
MW-51	08-May-08	---	4,600	74.9	1.78	12,700
	08-Oct-08	4,160	4,600	111	1.70	11,800
	12-Mar-09	3,990	5,000	73.0	1.61	12,500
Deep Wells						
MW-20-130	08-Oct-08	8,990	11,700	97.9	1.70	13,200
	13-Mar-09	7,500	7,720	134	1.52	14,300
MW-31-135	06-Oct-08	ND (8.6)	20.3	103	0.43	11,300
MW-35-135	07-Oct-08	32.0	32.8	168	0.48	10,500
MW-37D	06-Oct-08	451	542	106	0.53	16,100
	12-Mar-09	425	682	79.0	0.70	17,300
MW-40D	06-Oct-08	ND (100)	102	180	0.45	17,300
	11-Mar-09	115	135	-44.8	0.38	17,000
MW-41D	03-Oct-08	ND (0.2)	ND (1.0)	-110	0.08	23,100
	11-Mar-09	ND (1.0)	2.80	-150	0.08	22,800
MW-47-115	07-May-08	18.2	18.3	-37.2	0.24	14,200
	08-Oct-08	ND (15)	15.6	-174	0.14	13,800
	10-Dec-08	13.3	13.6	-18	0.11	15,100
	11-Mar-09	18.6	20.8	-73	0.24	13,900
MW-50-200	08-May-08	10,500	11,000	47.9	2.86	23,800
	07-Oct-08	7,390	8,890	101	2.47	21,400
	12-Dec-08	8,040	8,700	60.4	2.27	21,400
	13-Mar-09	9,910	12,400	156	2.69	24,200
MW-54-085	15-Apr-08	ND (0.2)	ND (1.0)	-202	0.20	10,100
	03-Jun-08	ND (0.2)	ND (1.0)	-139	0.26	11,500
	09-Jul-08	ND (0.2)	ND (1.0)	-178	0.17	10,900
	19-Aug-08	ND (0.2)	ND (1.0)	-159	0.16	11,400
	04-Sep-08	ND (0.2)	ND (1.0)	-151	0.20	10,900
	01-Oct-08	ND (0.2)	ND (1.0)	-144	0.27	10,800
	08-Dec-08	ND (1.0)	ND (5.0)	-160	0.16	10,900
	09-Mar-09	ND (0.2)	ND (1.0)	-251	0.38	11,400
MW-54-140	14-Apr-08	ND (0.2)	ND (1.0)	-162	0.16	12,400
	03-Jun-08	ND (0.2)	ND (1.0)	-139	0.20	13,900
	09-Jul-08	ND (1.0)	ND (1.0)	-164	0.20	13,300

TABLE B-2
Groundwater Sampling Results for Other Monitoring Wells in PMP Area, April 2008 through April 2009
Interim Measures Performance Monitoring
PG&E Topock Compressor Station

Well ID	Sample Date	Hexavalent Chromium (µg/L)	Dissolved Chromium (total) (µg/L)	Selected Field Parameters		
				ORP (mV)	Dissolved Oxygen (mg/L)	Specific Conductance (µS/cm)
MW-54-140	19-Aug-08	ND (1.0)	ND (1.0)	-126	0.13	13,800
	04-Sep-08	ND (1.0)	ND (1.0)	-154	0.20	13,400
	01-Oct-08	ND (1.0)	ND (1.0)	-155	0.14	13,300
	08-Dec-08	ND (1.0)	ND (5.0)	-131	0.13	13,400
	09-Mar-09	ND (1.0)	ND (1.0)	-235	0.26	14,000
MW-54-195	14-Apr-08	ND (1.0)	ND (1.0)	-202	0.15	21,800
	03-Jun-08	ND (1.0)	ND (1.0)	-199	0.13	21,500
	09-Jul-08	ND (1.0)	ND (1.0)	-210	0.11	20,300
	19-Aug-08	ND (1.0)	ND (1.0)	-172	0.19	20,800
	04-Sep-08	ND (1.0)	ND (1.0)	-184	0.33	19,500
	01-Oct-08	ND (1.0) J	ND (1.0)	-208	0.10	19,900
	09-Dec-08	ND (1.0) J	ND (5.0)	-234	0.13	20,500
	09-Mar-09	ND (2.0)	ND (1.0)	-260	0.34	21,200
TW-02D	03-Oct-08	561	644	100	0.00	15,500
TW-04	08-May-08	22.6	23.2	-107	0.13	22,700
	02-Oct-08	19.9	17.5	-94.2	0.10	21,300
	02-Oct-08 FD	19.0	20.5	FD	FD	FD
	10-Dec-08	9.81	10.0	30.5	0.07	23,000
	10-Mar-09	14.0	13.0	31.3	0.14	23,400
TW-05	02-Oct-08	9.76	8.89	187	0.56	11,700

NOTES:

Analytical results are validated.
ND = not detected at listed reporting limit (RL)
FD = field duplicate
(---) = data not collected, available, or field instrumentation malfunctioned
µg/L= micrograms per liter
mg/L = milligrams per liter
mV = millivolts
ORP = oxidation-reduction potential
µS/cm = microSiemens per centimeter
PMP = Interim Measure Performance Monitoring Program

Samples taken after February 1, 2008, were field filtered due to the approved change from analysis Method SW7199 to E218.6 for hexavalent chromium analyses (DTSC, 2008b).

Samples analyzed for chromium (total) by Method SW6010B or SW6020 were filtered and preserved in the field after sample collection, as directed in DTSC's June 30, 2005, letter.

Monitoring wells MW-24A, MW-24B were excluded from the sampling program during the uplands insitu pilot study.

Dissolved chromium (total) was analyzed by method SW6010B or SW6020, hexavalent chromium analyzed by method SM3500-CrB and total dissolved solids were analyzed by method SM2540C.

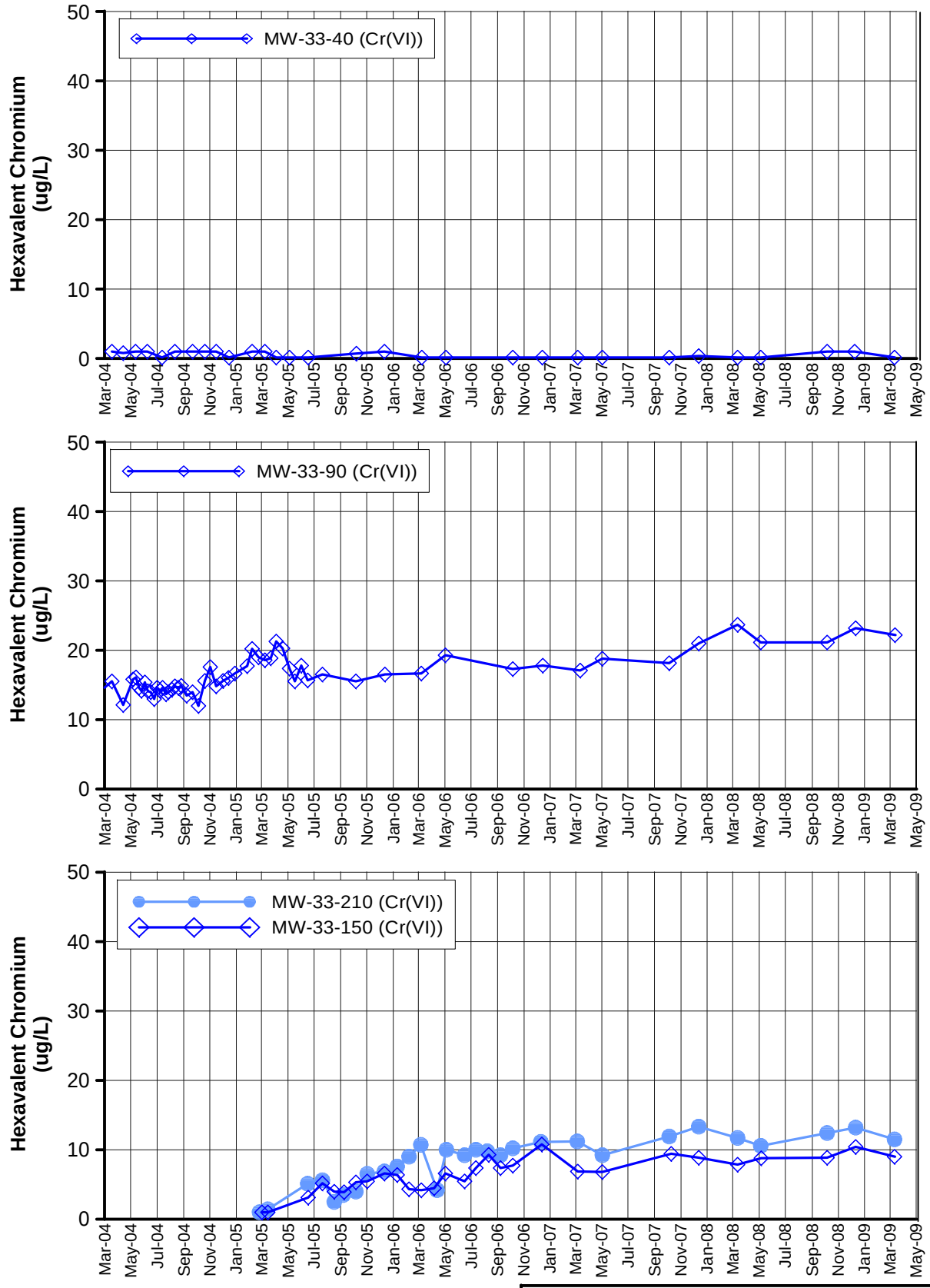

FIGURE B-1
HEXAVALENT CHROMIUM
IN MW-33 CLUSTER

INTERIM MEASURES PERFORMANCE MONITORING
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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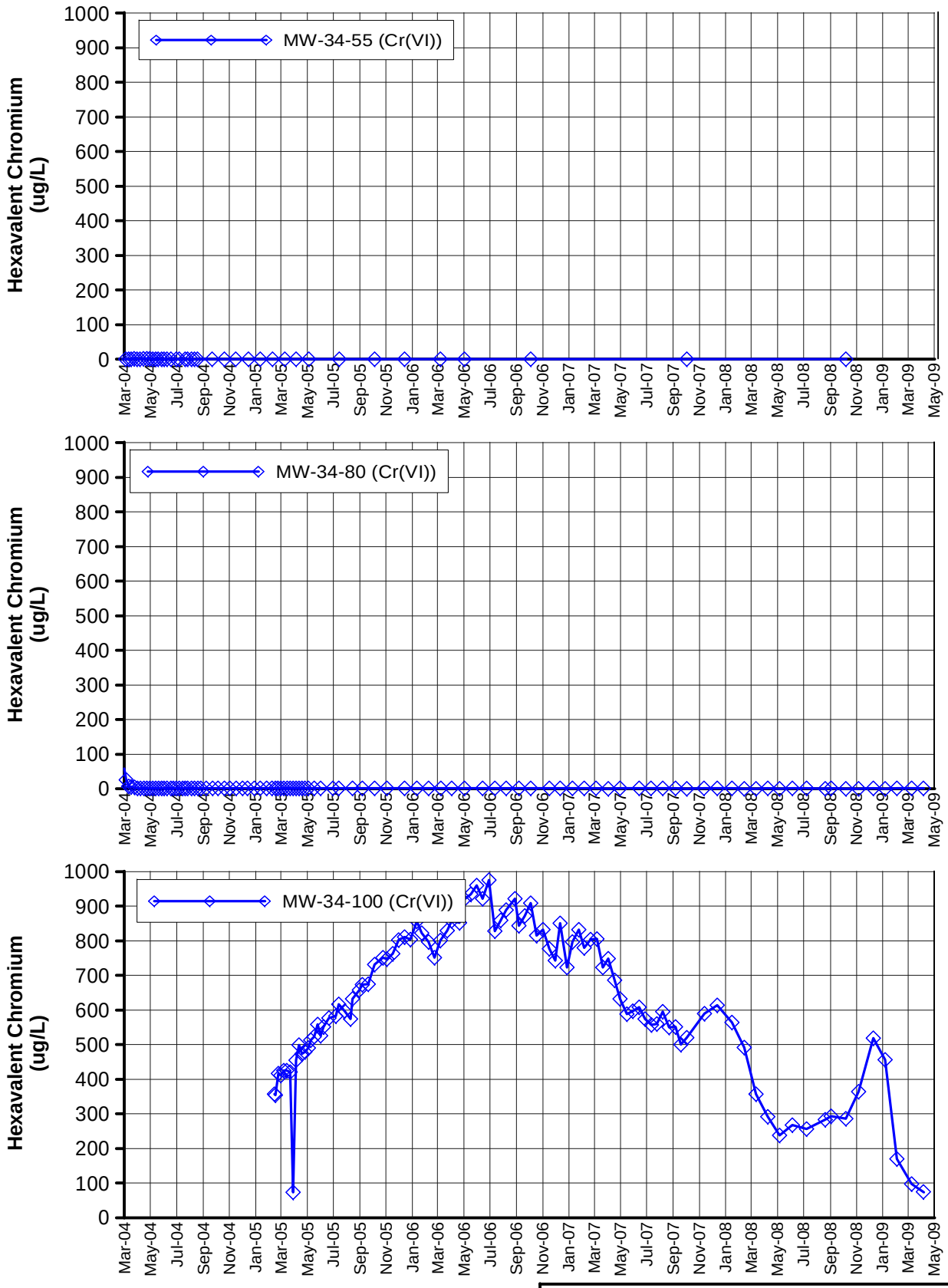

FIGURE B-2
HEXAVALENT CHROMIUM IN MW-34 CLUSTER

INTERIM MEASURES PERFORMANCE MONITORING
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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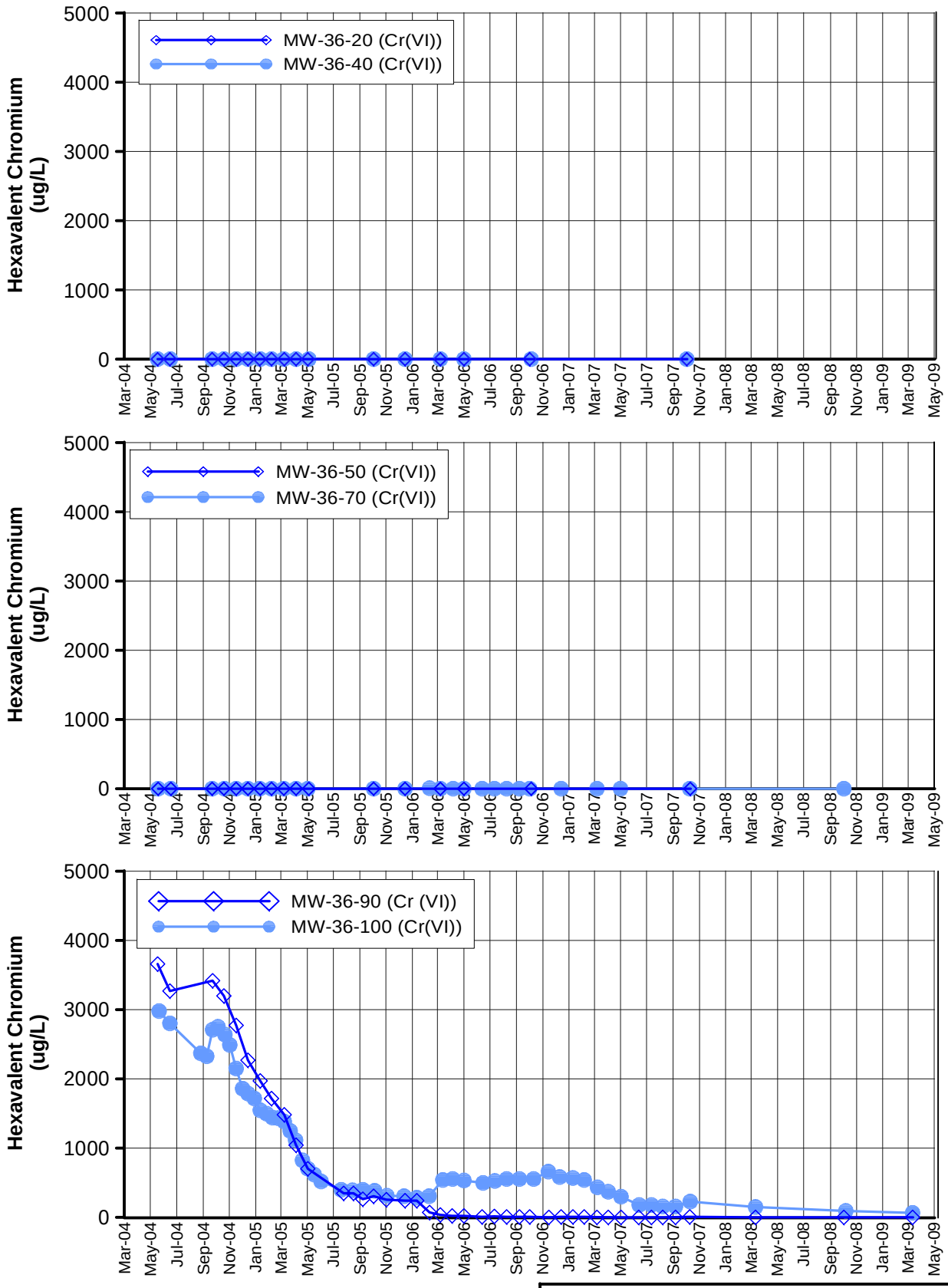

FIGURE B-3
HEXAVALENT CHROMIUM
IN MW-36 CLUSTER
INTERIM MEASURES PERFORMANCE MONITORING
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

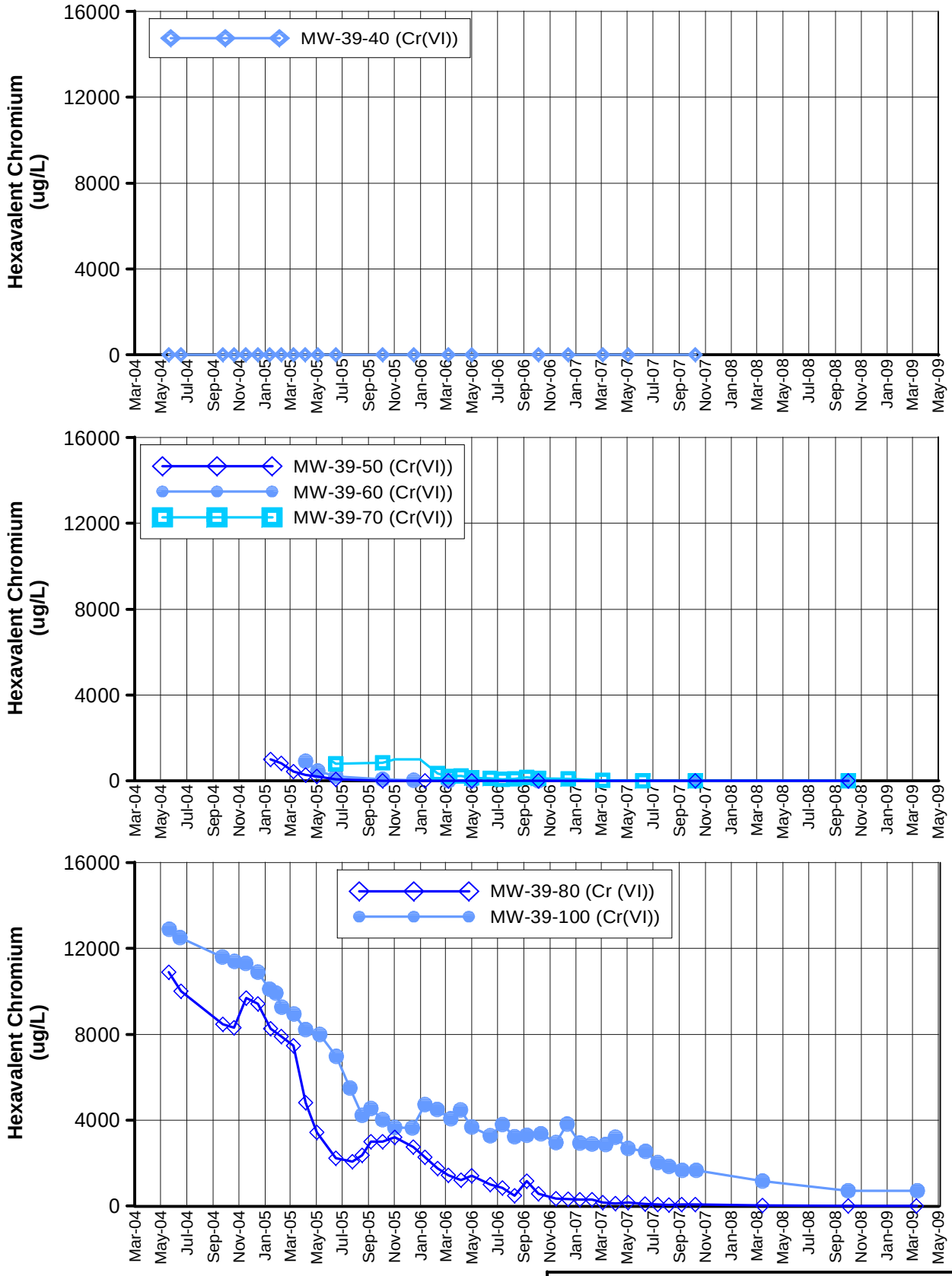

FIGURE B-4
HEXAVALENT CHROMIUM
IN MW-39 CLUSTER
INTERIM MEASURES PERFORMANCE MONITORING
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

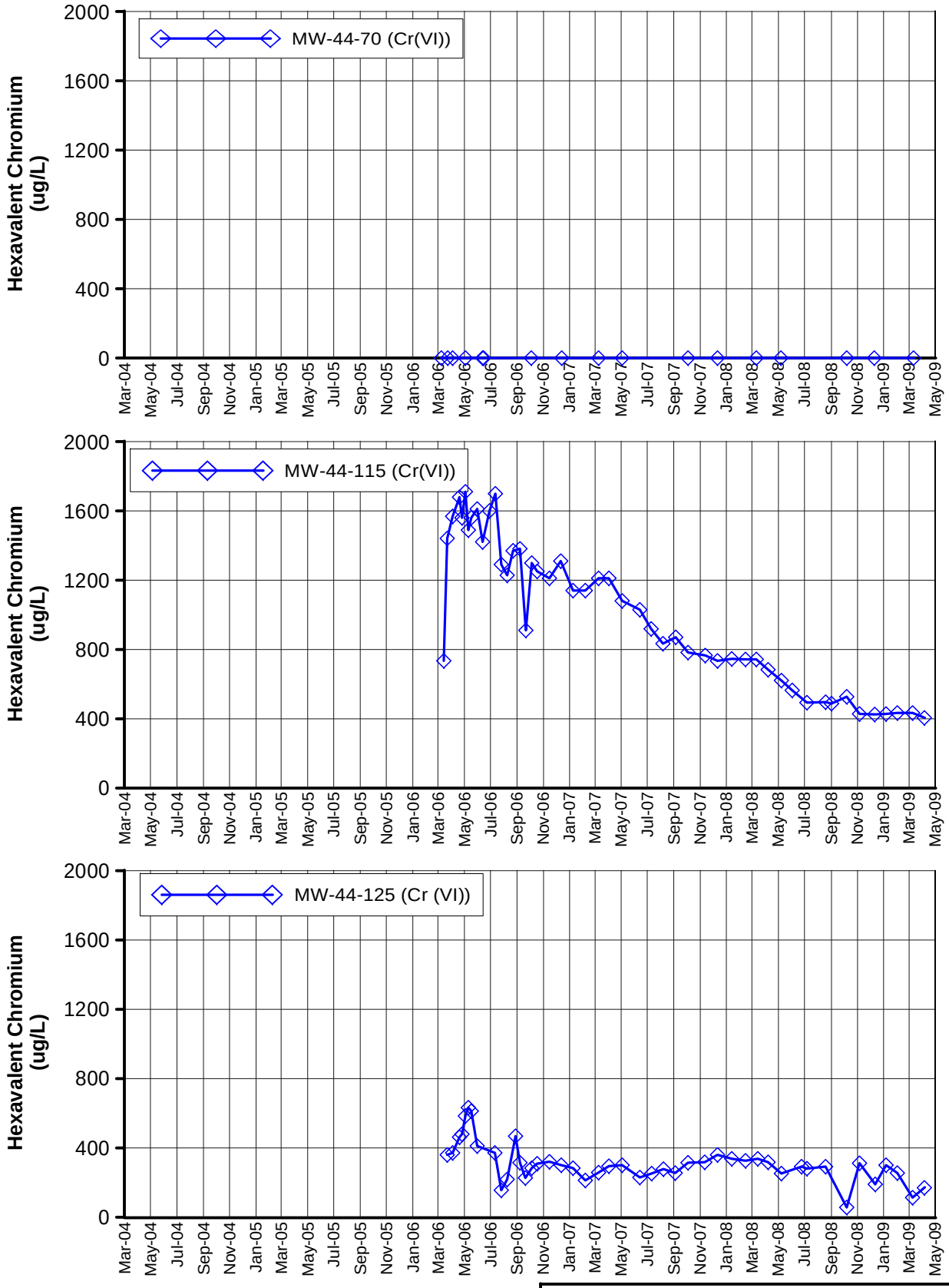

FIGURE B-5
HEXAVALENT CHROMIUM IN MW-44 CLUSTER

INTERIM MEASURES PERFORMANCE MONITORING
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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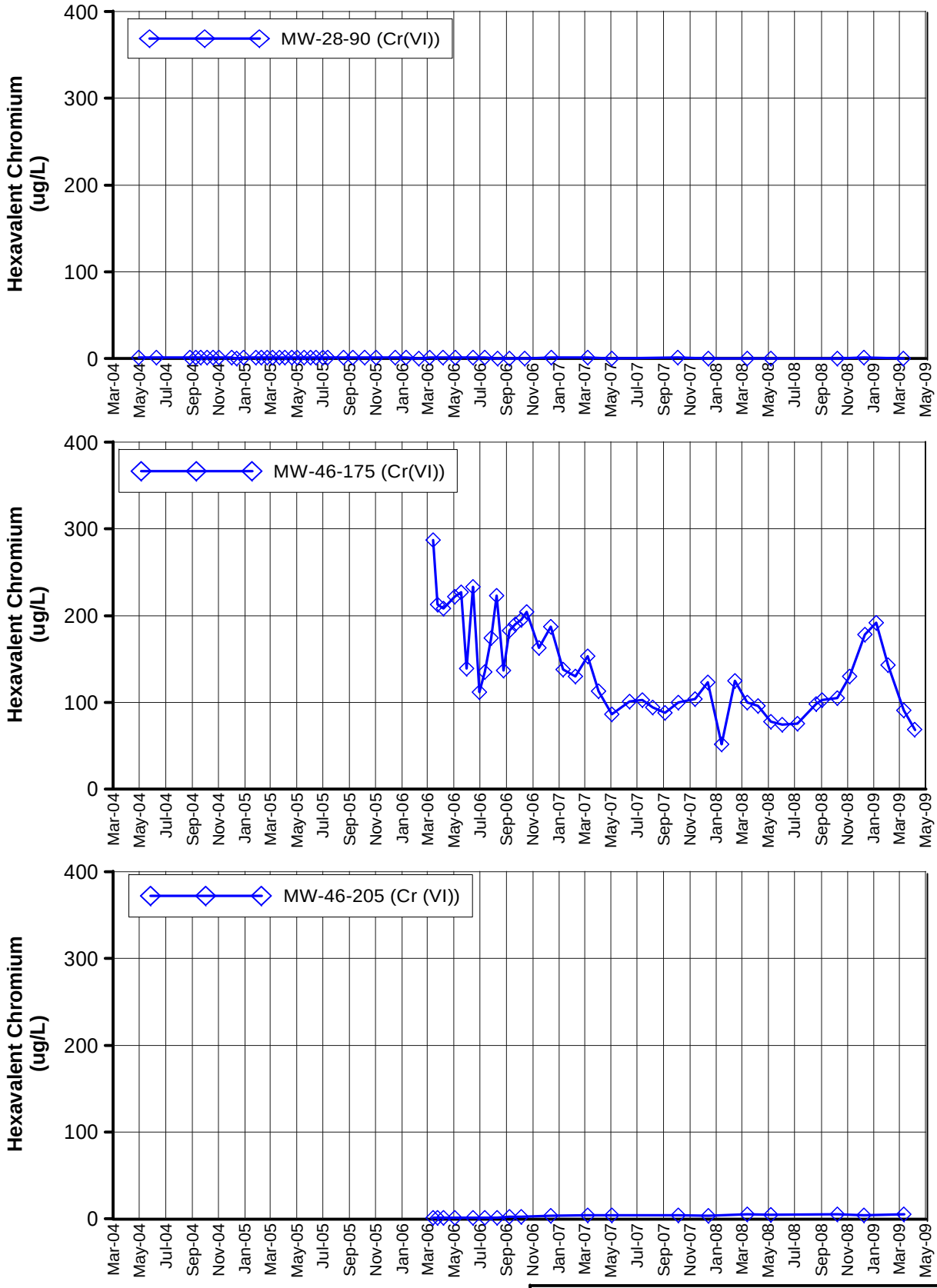

FIGURE B-6
HEXAVALENT CHROMIUM
IN MW-46 CLUSTER
INTERIM MEASURES PERFORMANCE MONITORING
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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Appendix C
Hydraulic Data for Reporting Period

TABLE C-1
Average Monthly and Quarterly Groundwater Elevations, February through April 2009
Interim Measures Performance Monitoring
PG&E Topock Compressor Station

Well ID	Aquifer Zone	February 2009	March 2009	April 2009	Quarter Average	Days in Quarter Average
I-3	River Station	454.46	456.37	457.13	456.03	89
MW-20-070	Shallow Zone	453.11	454.28	455.46	454.31	89
MW-20-100	Middle Zone	452.70	453.93	455.13	453.95	89
MW-20-130	Deep Wells	452.52	453.85	454.94	453.80	89
MW-22	Shallow Zone	454.34	455.33	456.20	455.31	89
MW-25	Shallow Zone	454.56	455.29	456.24	455.38	89
MW-26	Shallow Zone	454.26	455.02	455.95	455.10	89
MW-27-020	Shallow Zone	454.33	456.12	456.94	455.83	89
MW-27-060	Middle Zone	454.28	456.07	456.93	455.78	88
MW-27-085	Deep Wells	454.46	456.18	456.96	455.90	89
MW-28-025	Shallow Zone	454.29	456.12	456.93	455.82	89
MW-28-090	Deep Wells	454.35	456.15	456.94	455.85	89
MW-30-050	Middle Zone	454.00	455.63	456.56	455.43	89
MW-31-060	Shallow Zone	454.03	455.26	456.23	455.20	89
MW-31-135	Deep Wells	453.42	454.74	455.84	454.69	89
MW-32-035	Shallow Zone	454.23	455.82	456.72	455.63	89
MW-33-040	Shallow Zone	454.26	455.71	456.59	455.55	89
MW-33-090	Middle Zone	454.44	455.91	456.79	455.74	89
MW-33-150	Deep Wells	454.52	455.89	456.74	455.75	89
MW-34-055	Middle Zone	454.34	456.14	456.98	455.86	89
MW-34-080	Deep Wells	454.33	456.13	456.94	455.83	89
MW-34-100	Deep Wells	454.24	455.95	456.85	455.71	89
MW-35-060	Shallow Zone	454.88	456.49	457.26	455.78	61
MW-35-135	Deep Wells	455.03	456.29	457.14	456.18	89
MW-36-020	Shallow Zone	454.25	455.79	456.74	455.63	89
MW-36-040	Shallow Zone	454.14	455.78	456.70	455.57	89
MW-36-050	Middle Zone	454.13	455.81	456.71	455.59	89
MW-36-070	Middle Zone	454.02	455.71	456.61	455.48	89
MW-36-090	Deep Wells	453.24	454.82	455.89	454.68	89
MW-36-100	Deep Wells	453.56	455.04	456.16	454.95	89
MW-39-040	Shallow Zone	453.94	455.52	456.47	455.34	89
MW-39-050	Middle Zone	453.74	455.31	456.28	455.14	89
MW-39-060	Middle Zone	453.60	455.13	456.14	454.99	89
MW-39-070	Middle Zone	453.27	454.74	455.85	454.65	89
MW-39-080	Deep Wells	453.24	454.69	455.82	454.61	89
MW-39-100	Deep Wells	453.87	455.15	456.25	455.12	89
MW-42-030	Shallow Zone	453.82	455.37	456.29	455.20	89
MW-42-065	Middle Zone	454.05	455.61	456.53	455.43	89
MW-43-025	Shallow Zone	454.34	456.28	456.99	455.91	89
MW-43-090	Deep Wells	454.68	456.64	457.32	456.25	89
MW-44-070	Middle Zone	454.22	455.96	456.93	455.74	89
MW-44-115	Deep Wells	453.85	455.43	456.36	455.25	89
MW-44-125	Deep Wells	454.23	455.85	456.78	455.65	89
MW-45-095a	Deep Wells	453.19	454.97	456.35	454.88	89
MW-46-175	Deep Wells	454.44	455.88	456.72	455.71	89
MW-47-055	Shallow Zone	454.64	455.99	456.86	455.86	89
MW-47-115	Deep Wells	454.68	455.94	456.83	455.84	89
MW-49-135	Deep Wells	454.86	456.36	457.19	456.16	89

TABLE C-1

Average Monthly and Quarterly Groundwater Elevations, February through April 2009

Interim Measures Performance Monitoring

PG&E Topock Compressor Station

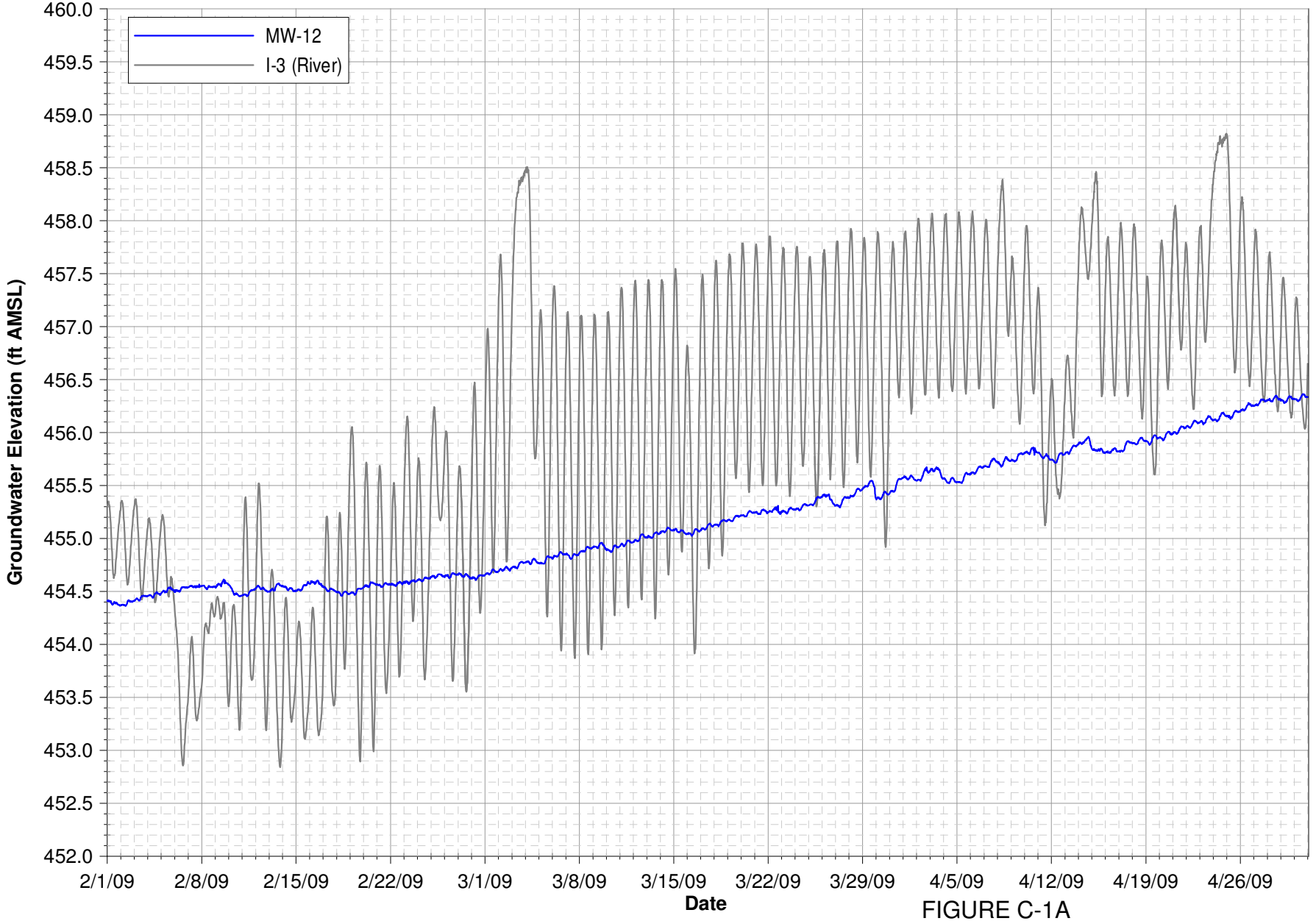
Well ID	Aquifer Zone	February 2009	March 2009	April 2009	Quarter Average	Days in Quarter Average
MW-50-095	Middle Zone	454.27	455.40	456.33	455.36	89
MW-51	Middle Zone	454.25	455.02	455.98	455.10	89
MW-54-085	Deep Wells	454.59	455.44	INC	454.96	50
MW-54-140	Deep Wells	454.88	456.33	457.05	456.11	89
MW-54-195	Deep Wells	455.11	456.24	456.97	456.13	89
MW-55-045	Middle Zone	455.68	456.78	457.42	456.65	89
MW-55-120	Deep Wells	455.62	456.58	457.42	456.56	89
PT2D	Deep Wells	453.05	454.52	455.47	454.38	89
PT5D	Deep Wells	453.26	454.77	455.78	454.63	89
PT6D	Deep Wells	453.51	455.01	455.93	454.85	89
RRB	River Station	454.82	456.82	457.59	456.45	89

NOTES:

Averages include data collected from February 2009 through April 2009.

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

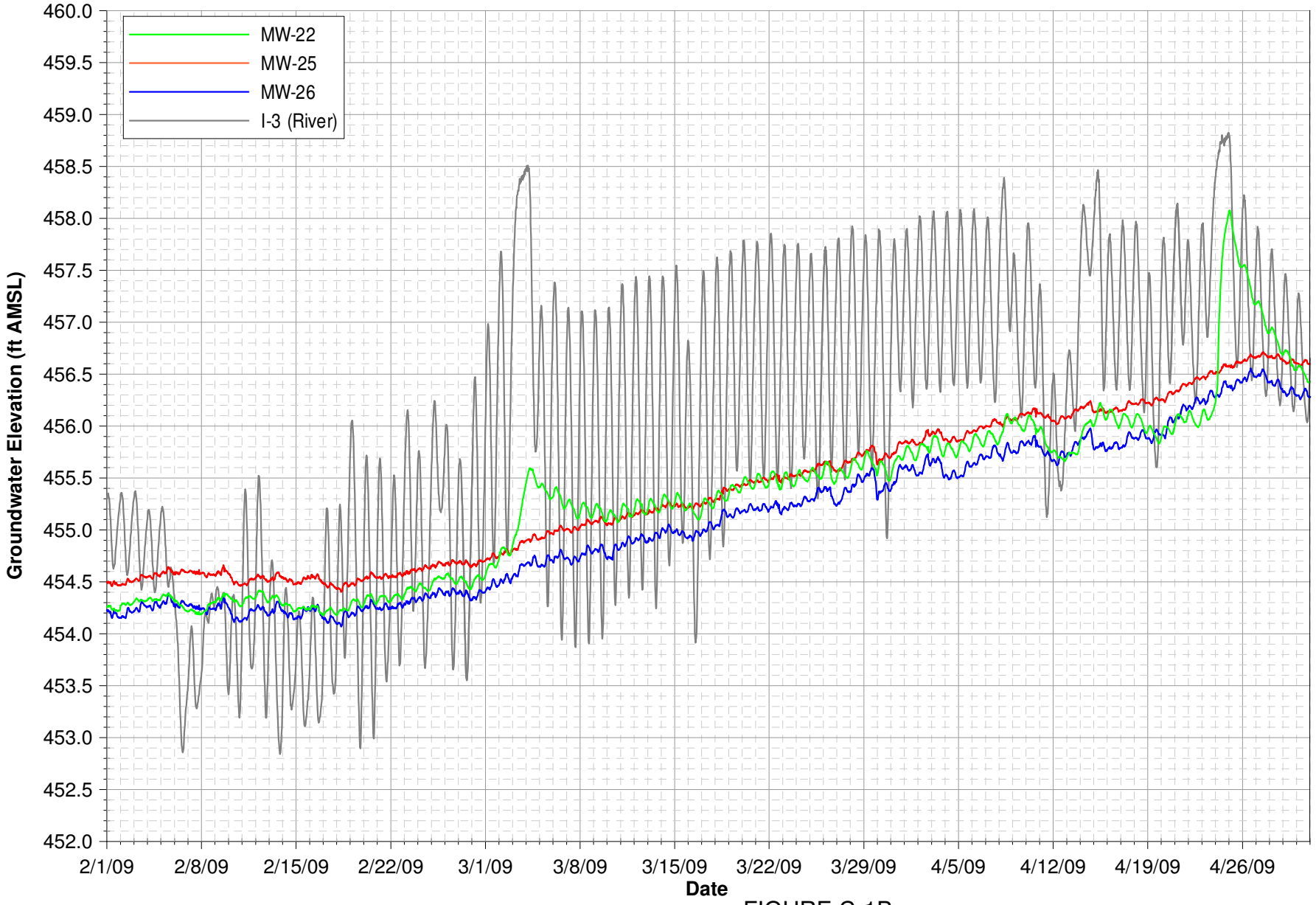
INC = data incomplete over reporting period.



Note:
Data subject to review.

FIGURE C-1A
MW-12 HYDROGRAPH
INTERIM MEASURES PERFORMANCE MONITORING
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

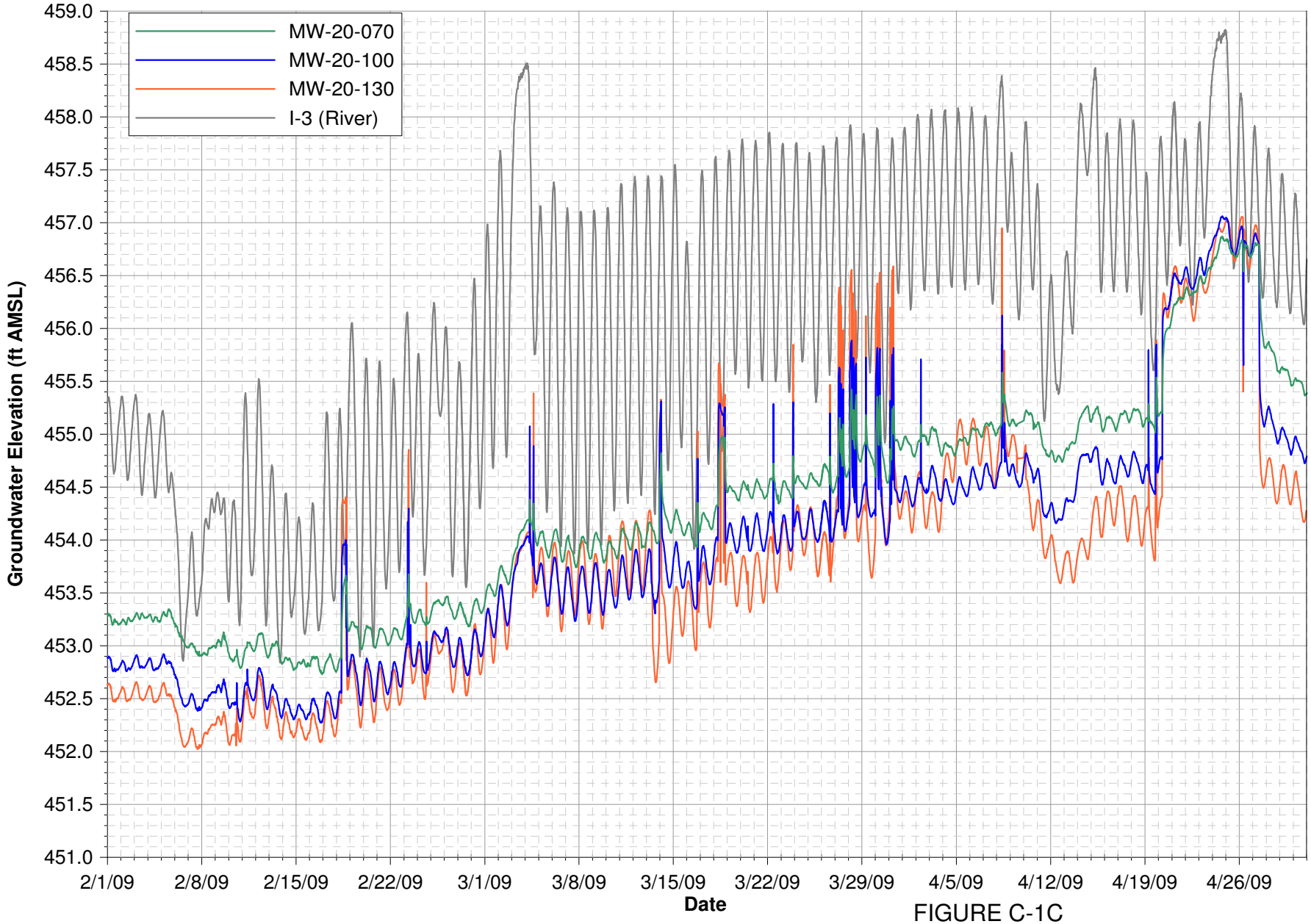
CH2MHILL



Notes:
Data subject to review.

FIGURE C-1B
MW-22, MW-25, AND MW-26 HYDROGRAPHS
INTERIM MEASURES PERFORMANCE MONITORING
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

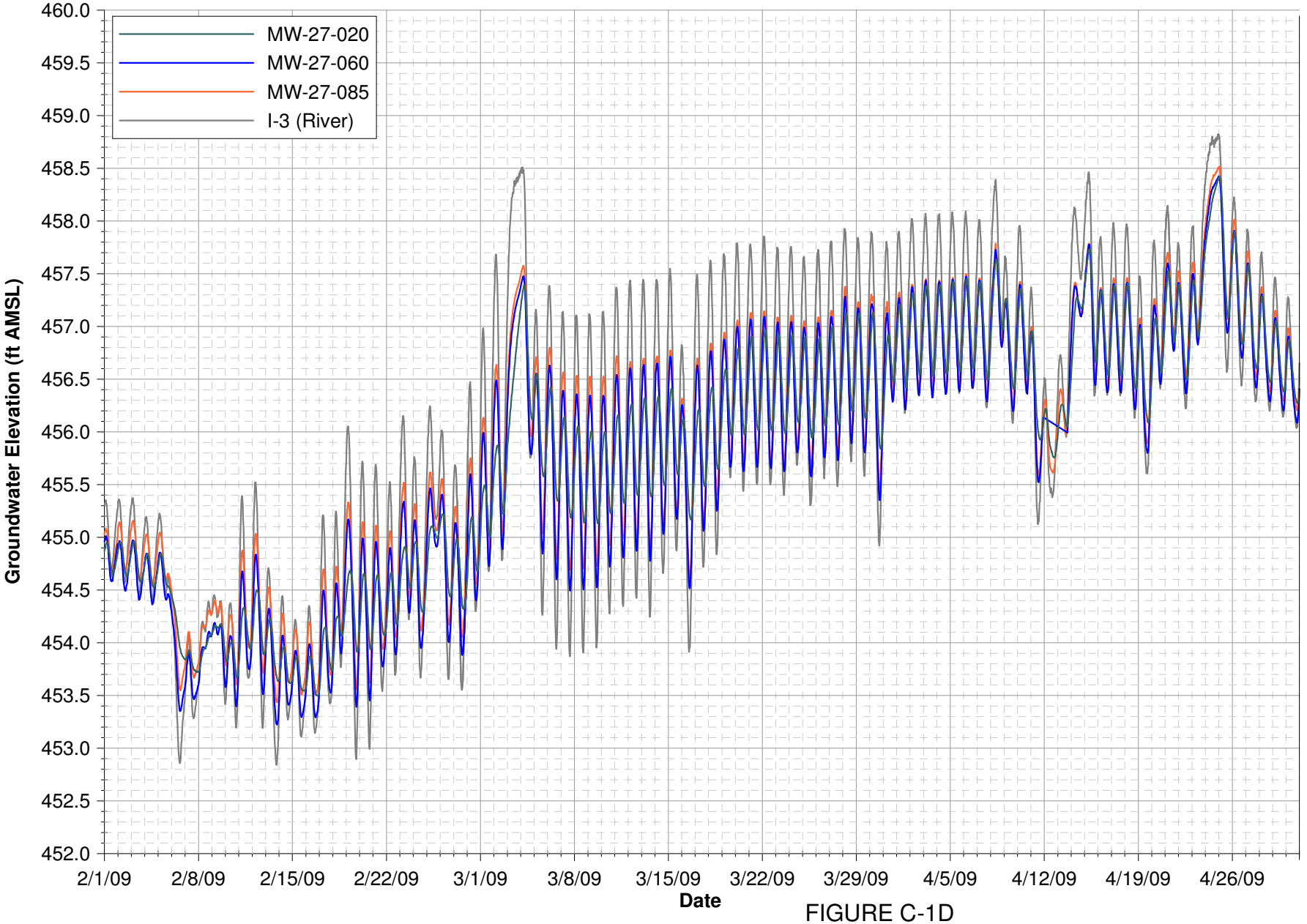
CH2MHILL



Notes:
Data subject to review.

FIGURE C-1C
MW-20 CLUSTER HYDROGRAPHS
INTERIM MEASURES PERFORMANCE MONITORING
PG& E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

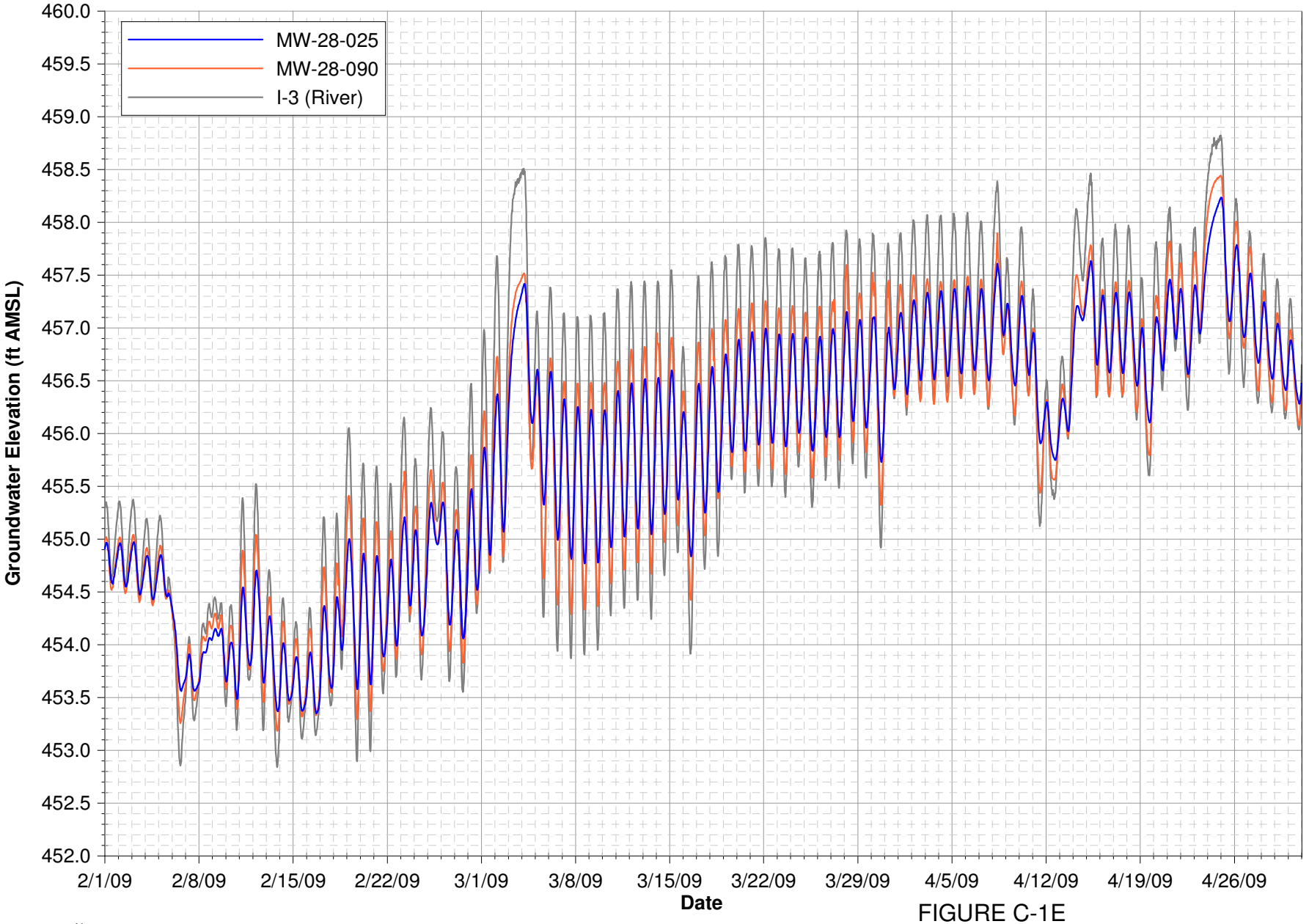
CH2MHILL



Notes:
Data subject to review.

FIGURE C-1D
MW-27 CLUSTER HYDROGRAPHS
INTERIM MEASURES PERFORMANCE MONITORING
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

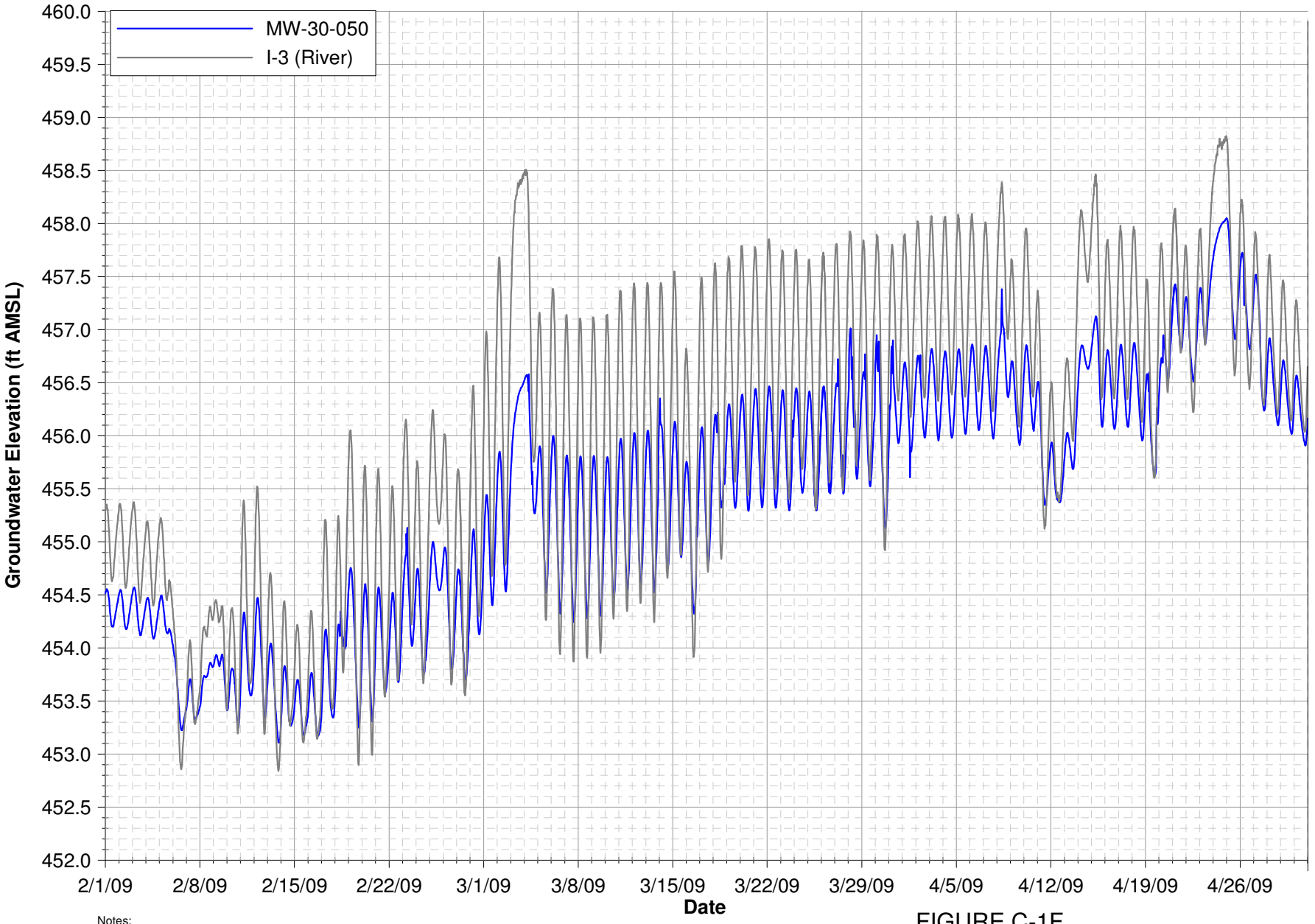
CH2MHILL



Notes:
Data subject to review.

FIGURE C-1E
MW-28 WELL HYDROGRAPHS
INTERIM MEASURES PERFORMANCE MONITORING
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

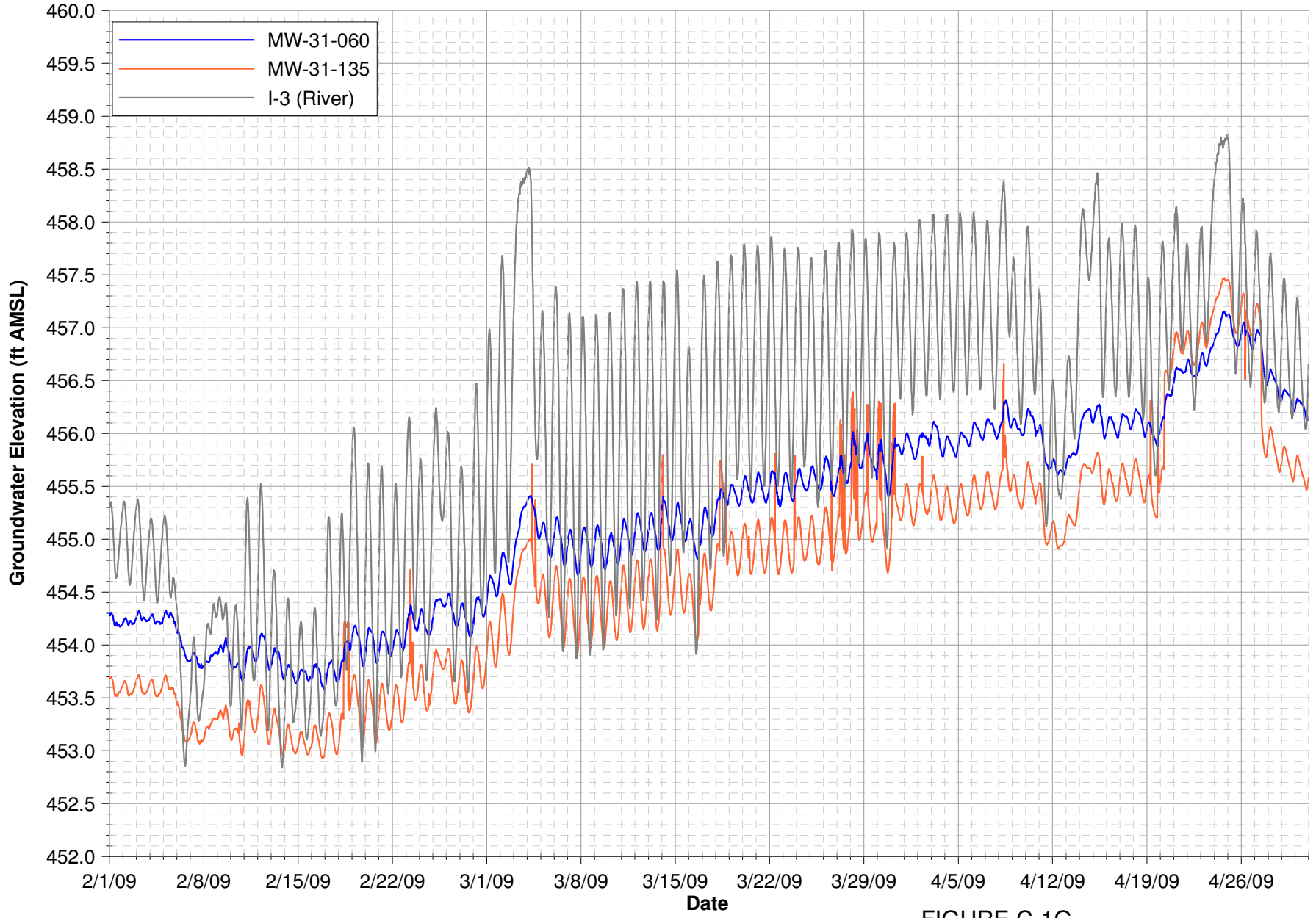
CH2MHILL



Notes:
Data subject to review.

FIGURE C-1F
MW-30-50 WELL HYDROGRAPH
INTERIM MEASURES PERFORMANCE MONITORING
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

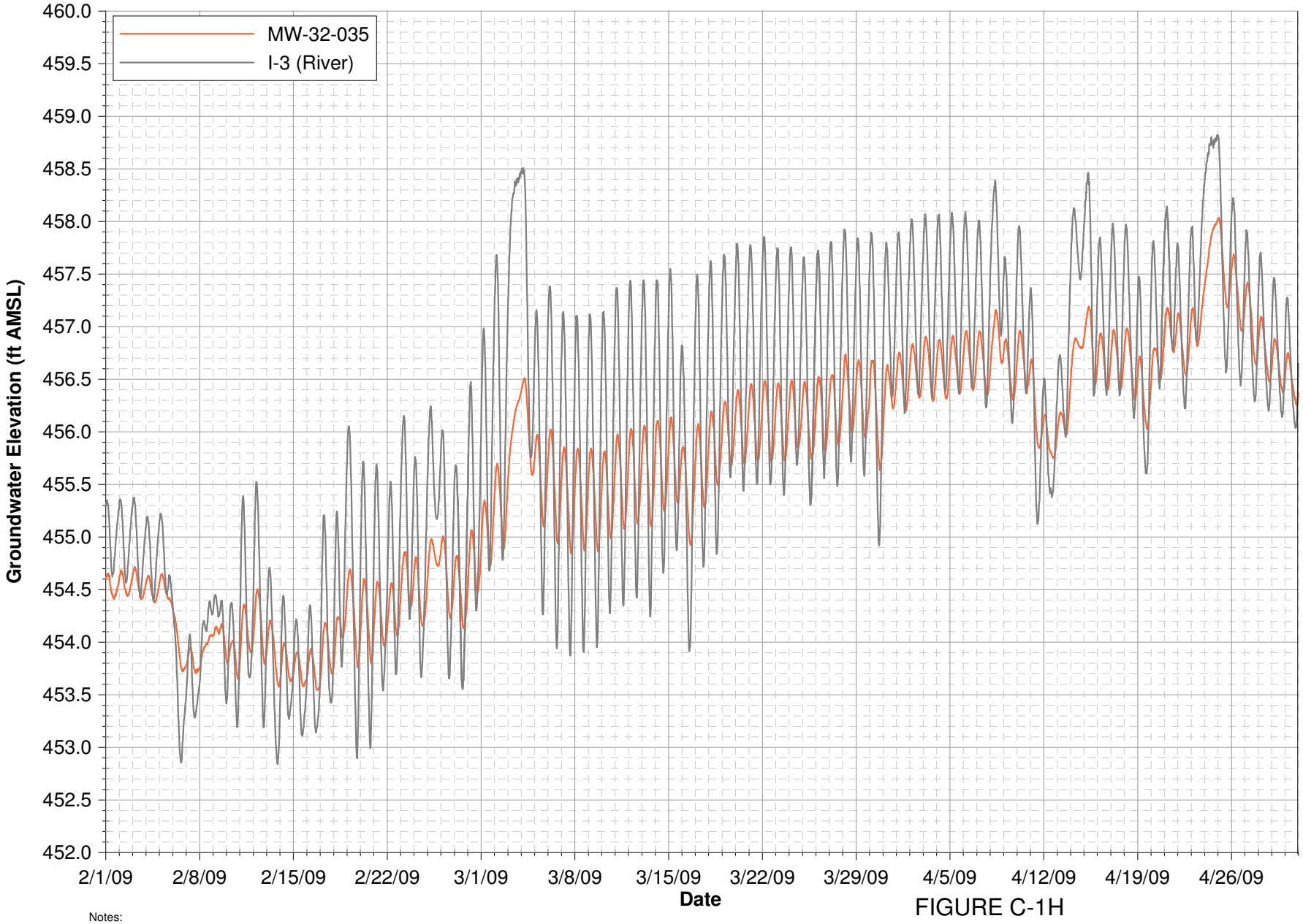
CH2MHILL



Notes:
Data subject to review.

FIGURE C-1G
MW-31 WELL HYDROGRAPHS
INTERIM MEASURES PERFORMANCE MONITORING
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

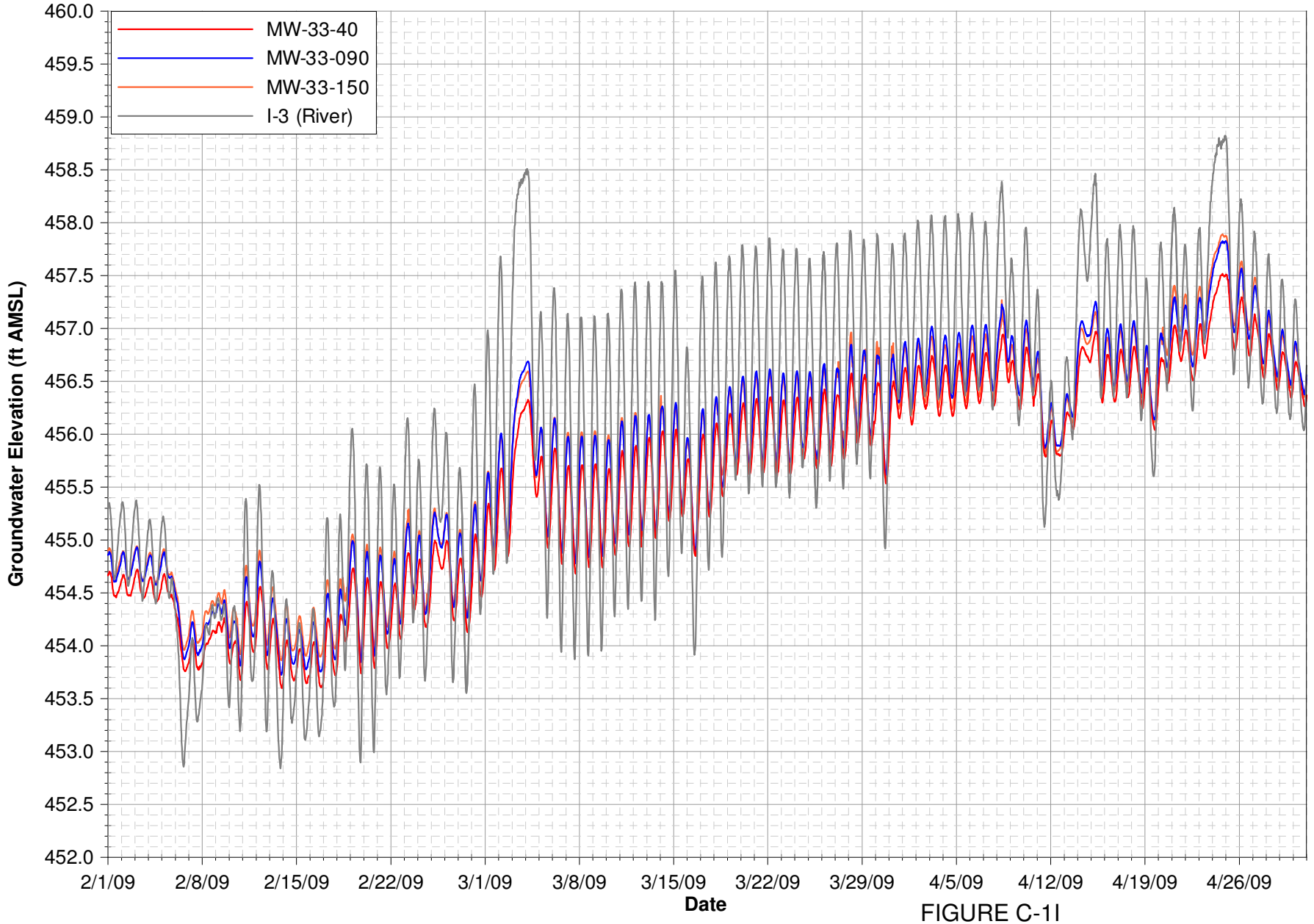
CH2MHILL



Notes:
Data subject to review.

FIGURE C-1H
MW-32-035 WELL HYDROGRAPH
INTERIM MEASURES PERFORMANCE MONITORING
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

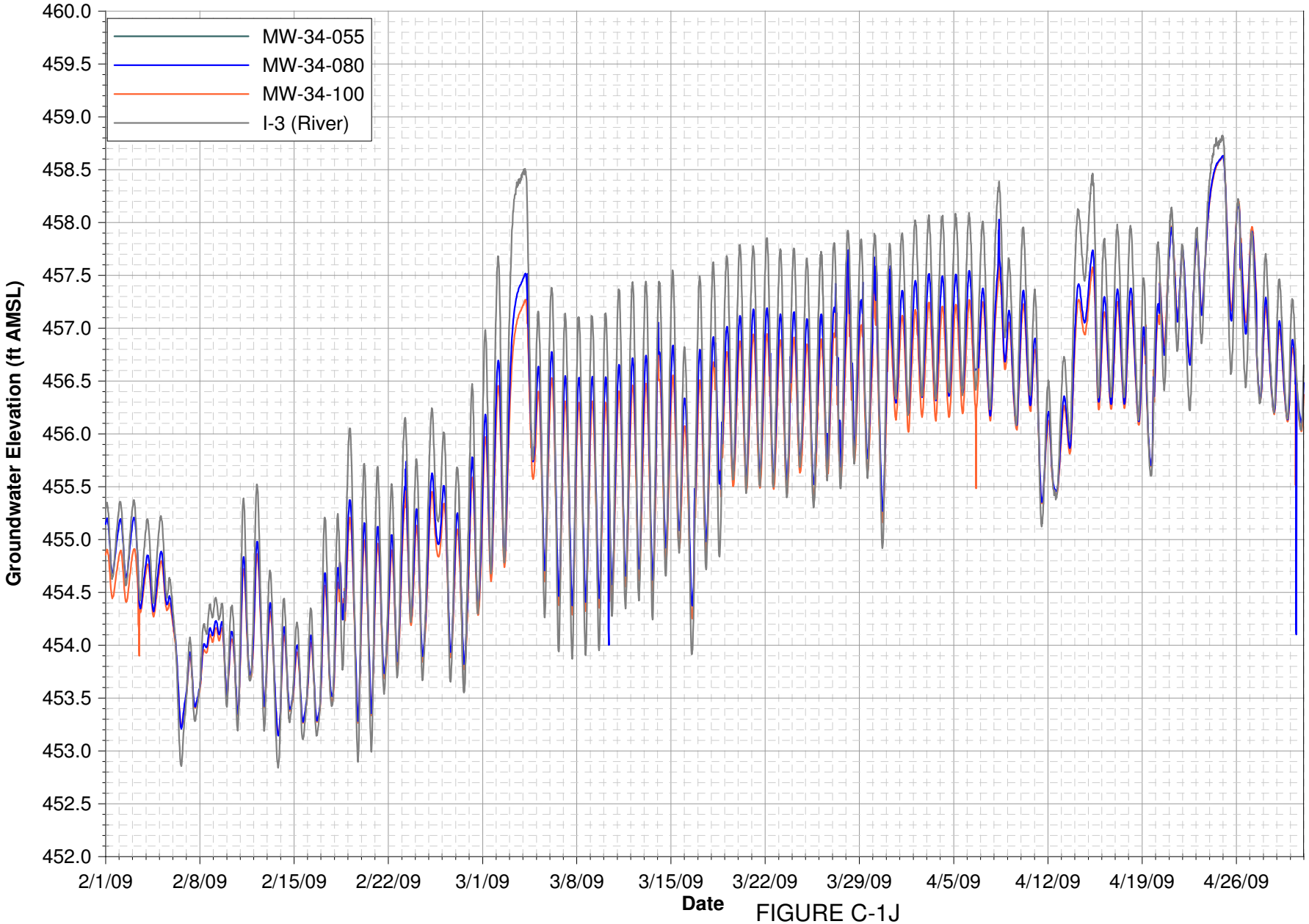
CH2MHILL



Notes:
Data subject to review.

FIGURE C-1I
MW-33 CLUSTER HYDROGRAPHS
INTERIM MEASURES PERFORMANCE MONITORING
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

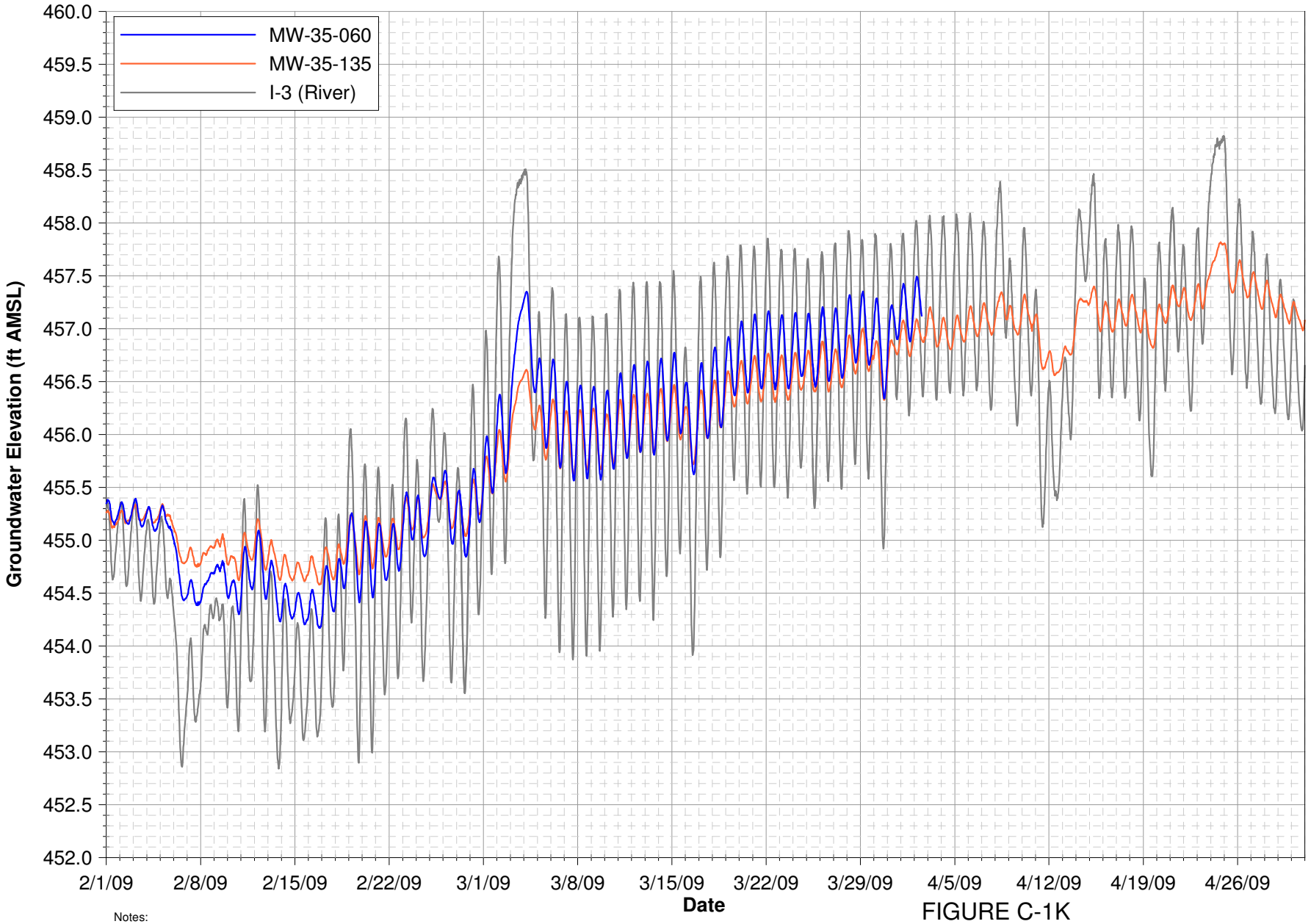
CH2MHILL



Notes:
Data subject to review.

FIGURE C-1J
MW-34 CLUSTER HYDROGRAPHS
INTERIM MEASURES PERFORMANCE MONITORING
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

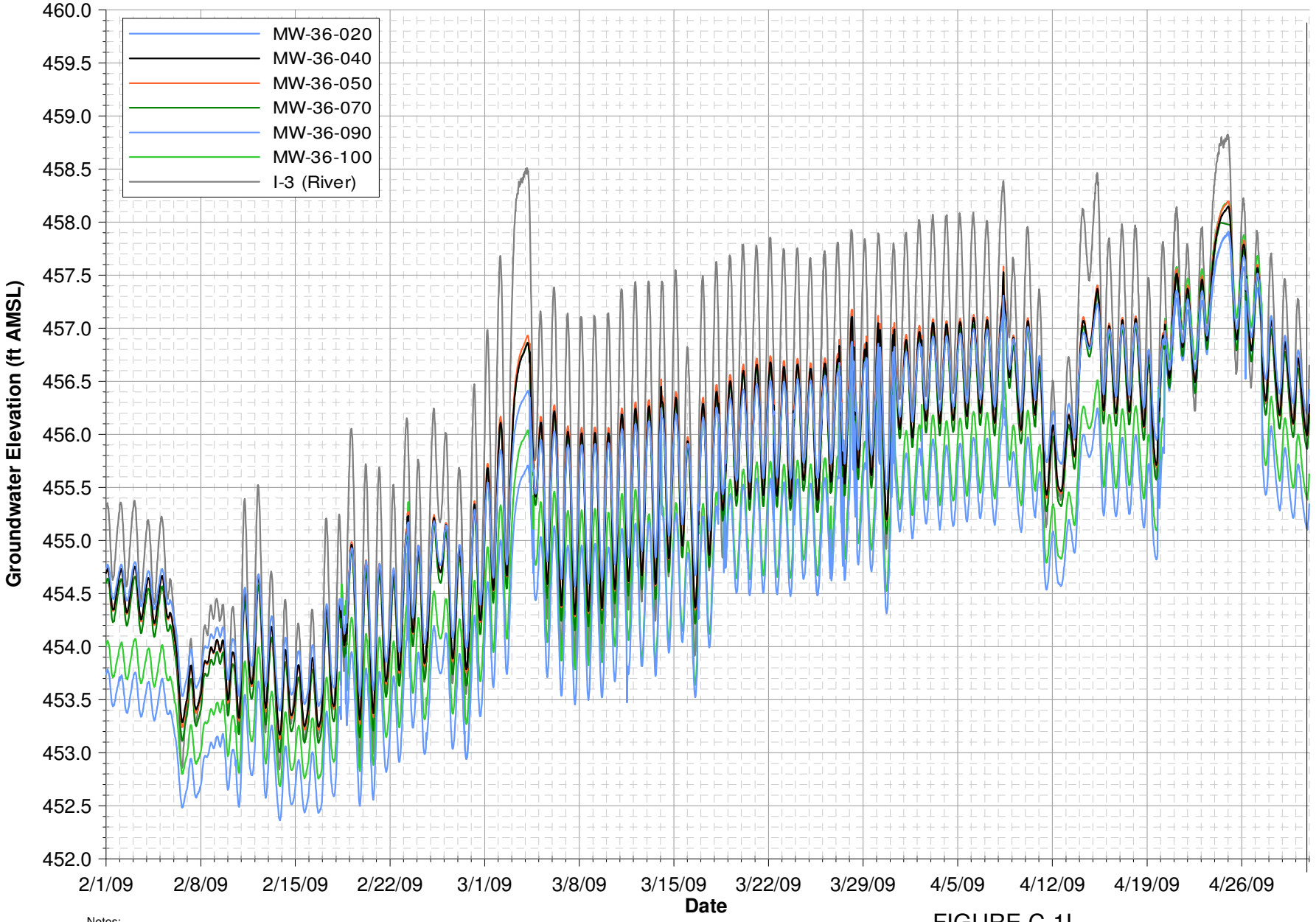
CH2MHILL



Notes:
Data subject to review.
MW-35-060 data unavailable from 4/2/09 to present.

FIGURE C-1K
MW-35 WELL HYDROGRAPHS
INTERIM MEASURES PERFORMANCE MONITORING
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

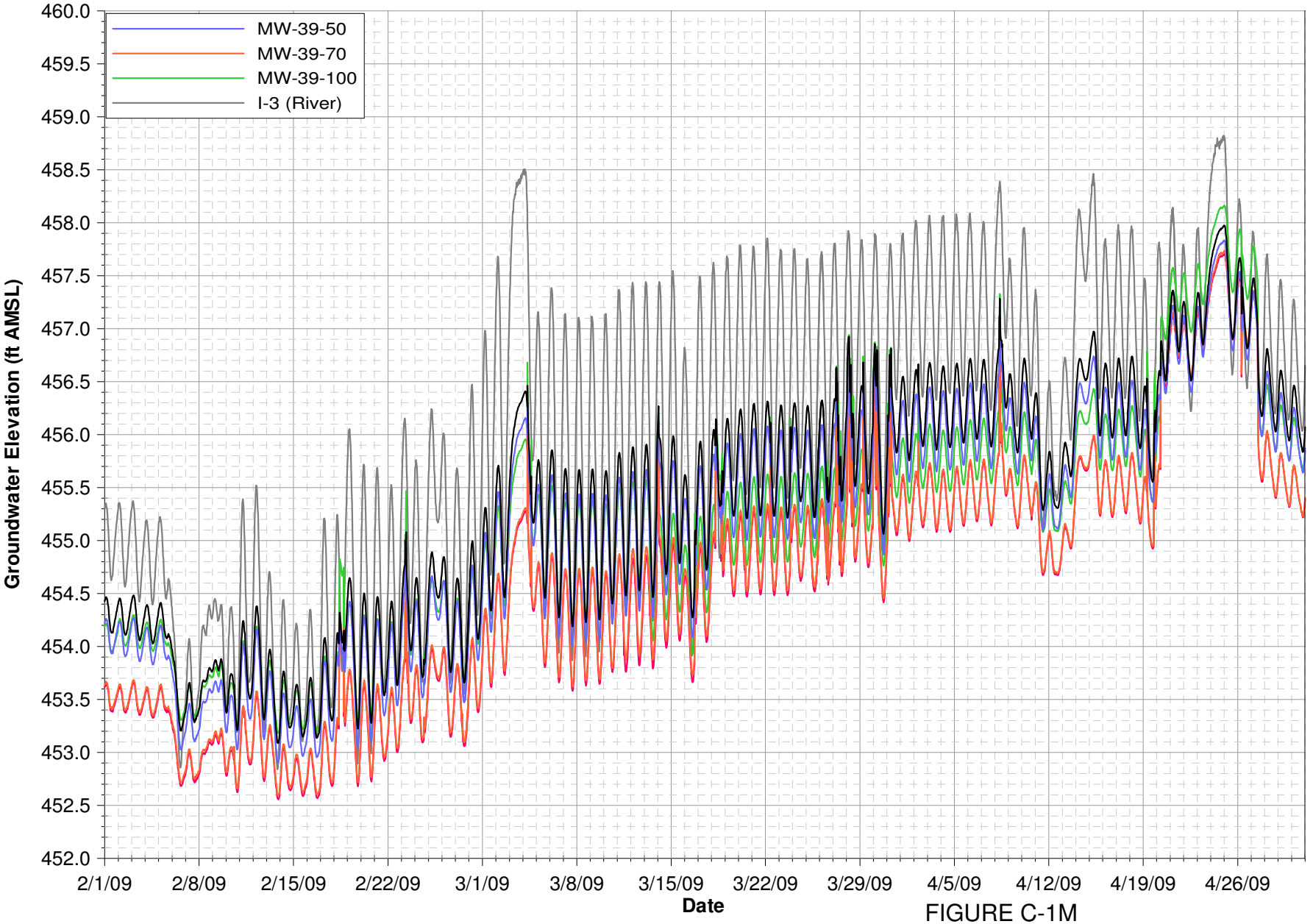
CH2MHILL



Notes:
Data subject to review..

FIGURE C-1L
MW-36 CLUSTER
INTERIM MEASURES PERFORMANCE MONITORING
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL



Notes:
Data subject to review.

FIGURE C-1M
MW-39 CLUSTER HYDROGRAPHS
INTERIM MEASURES PERFORMANCE MONITORING
PG & E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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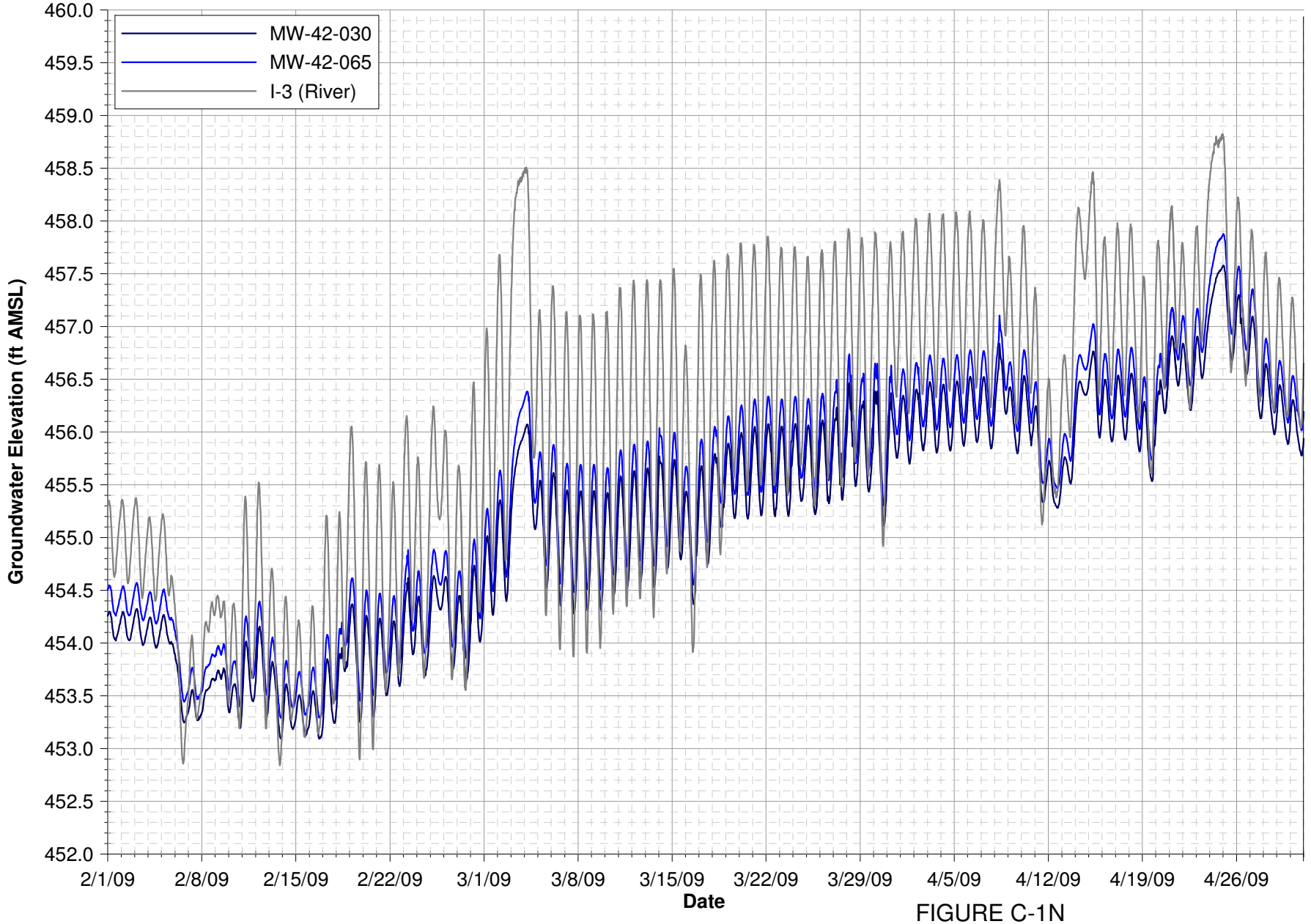

Notes:
Data subject to review.

FIGURE C-1N
MW-42 CLUSTER HYDROGRAPHS
INTERIM MEASURES PERFORMANCE MONITORING
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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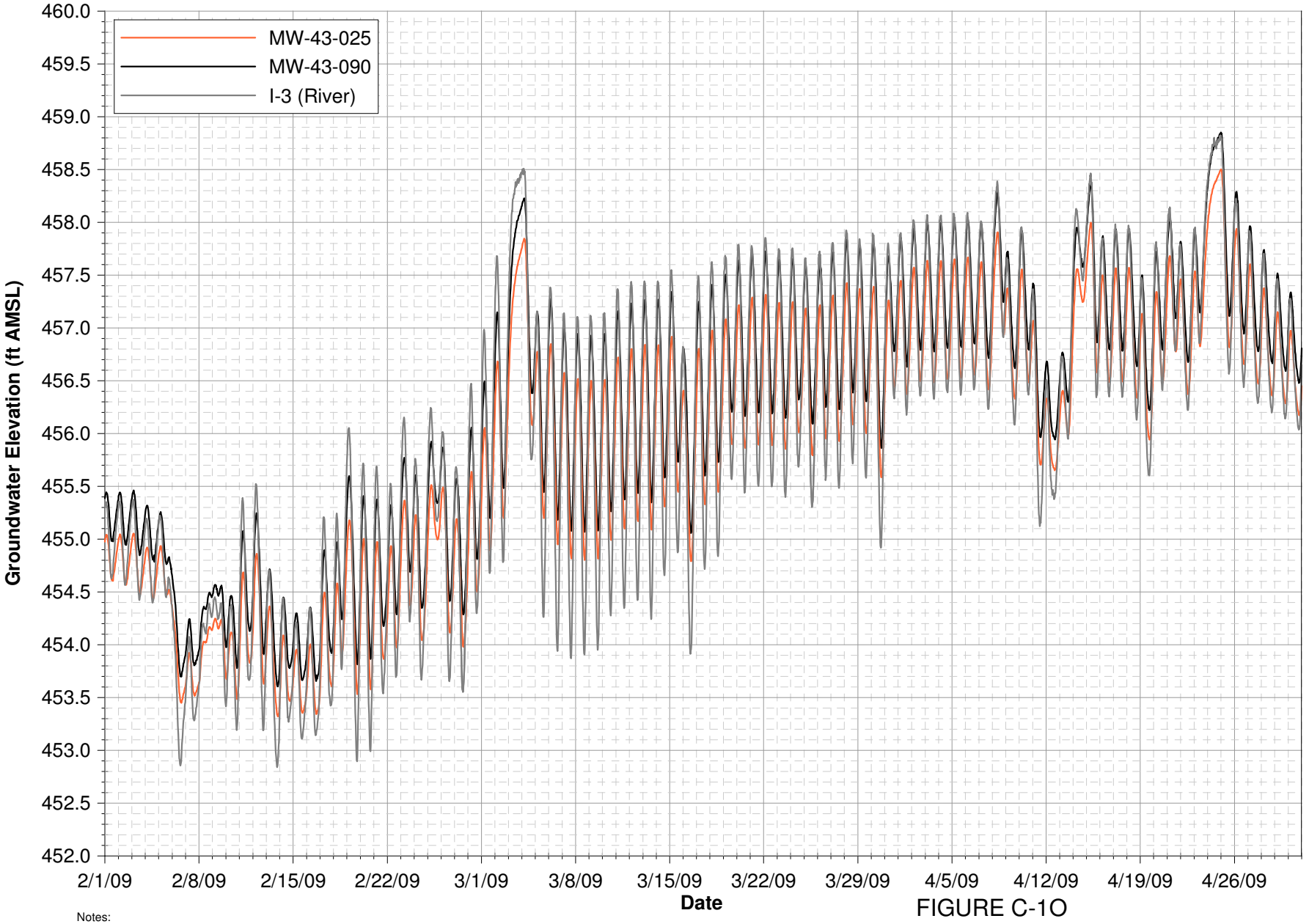

Notes:
Data subject to review.

FIGURE C-1O
MW-43 CLUSTER HYDROGRAPHS
INTERIM MEASURES PERFORMANCE MONITORING
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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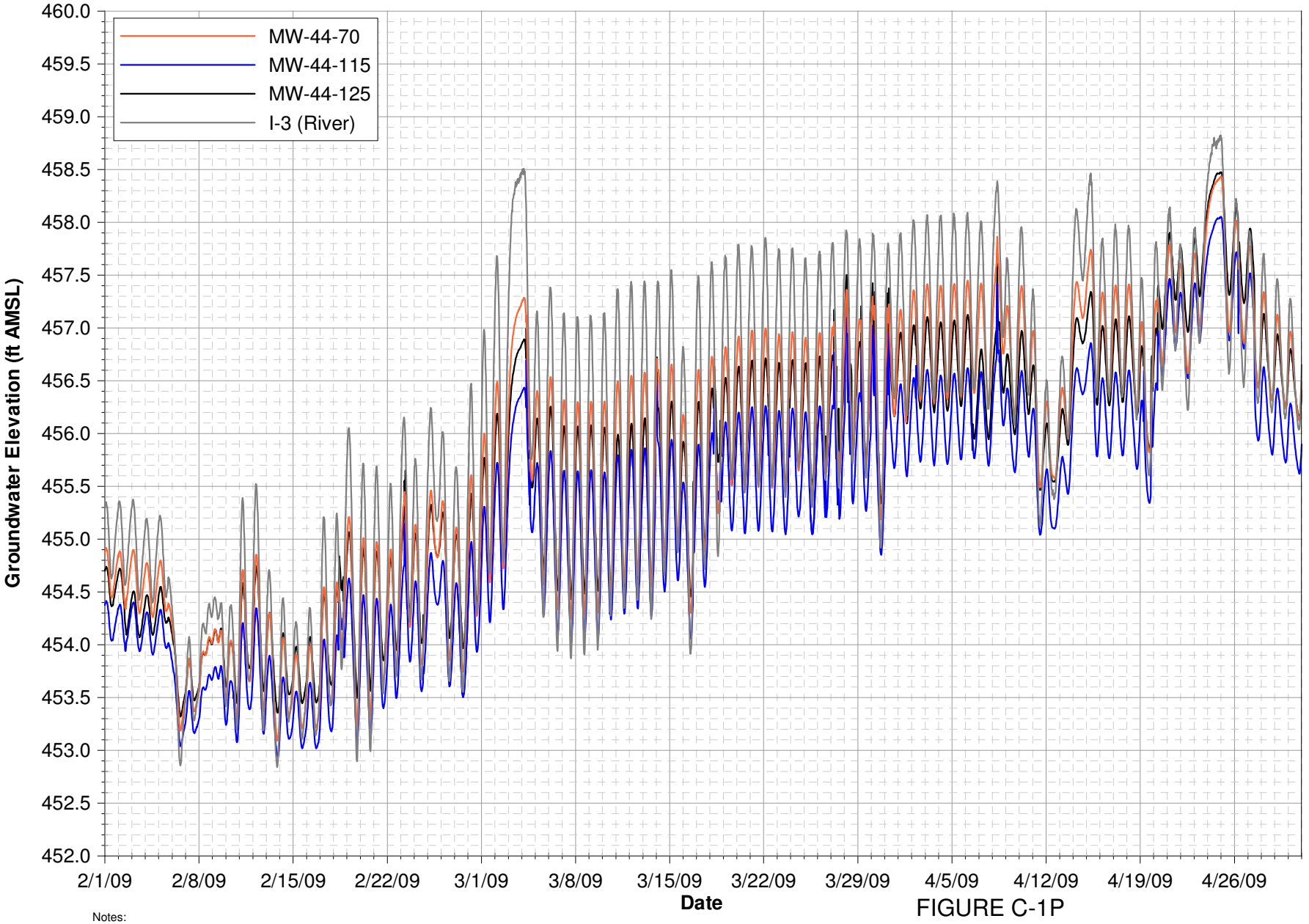

Notes:
Data subject to review.

FIGURE C-1P
MW-44 CLUSTER HYDROGRAPHS
INTERIM MEASURES PERFORMANCE MONITORING
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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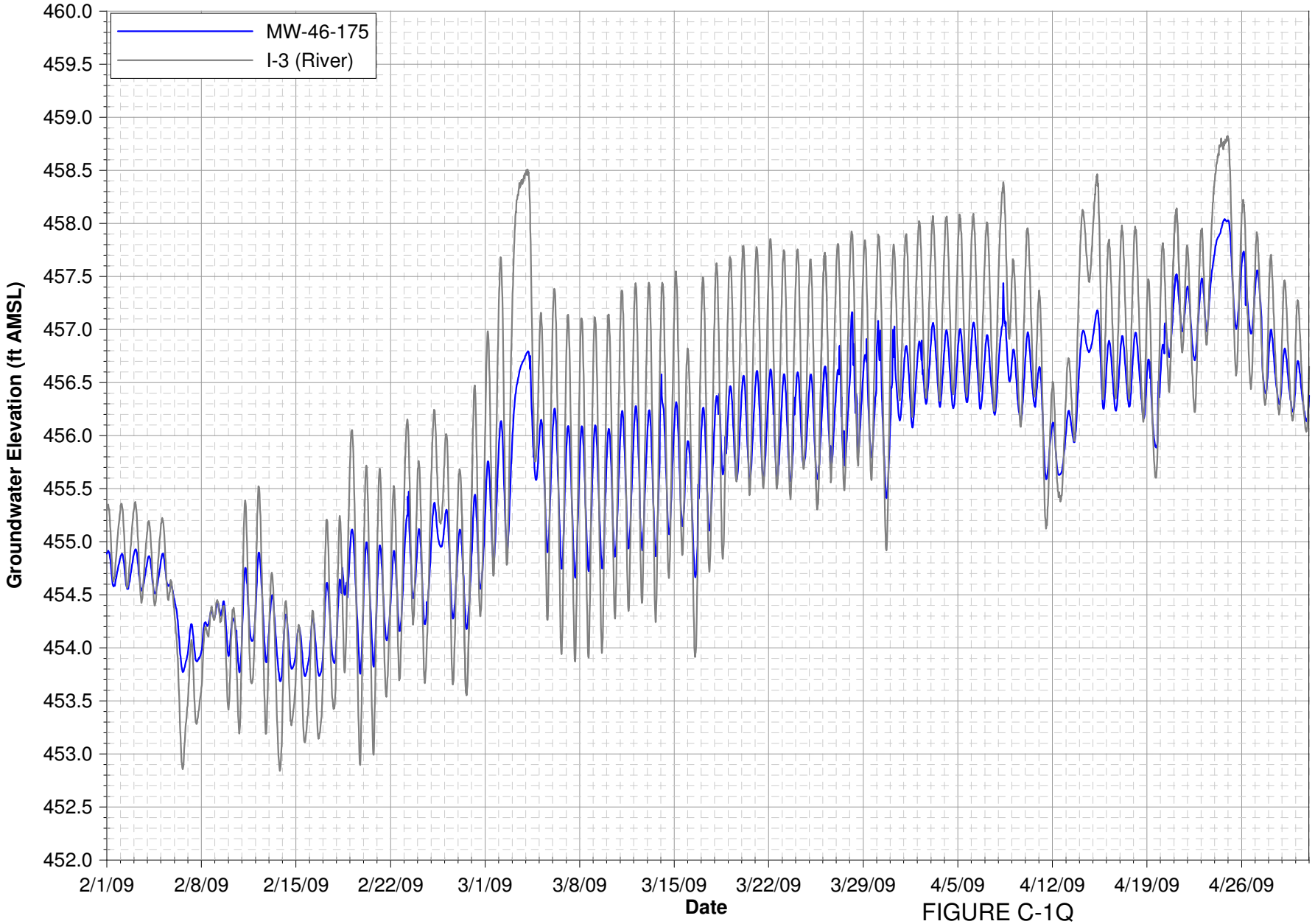
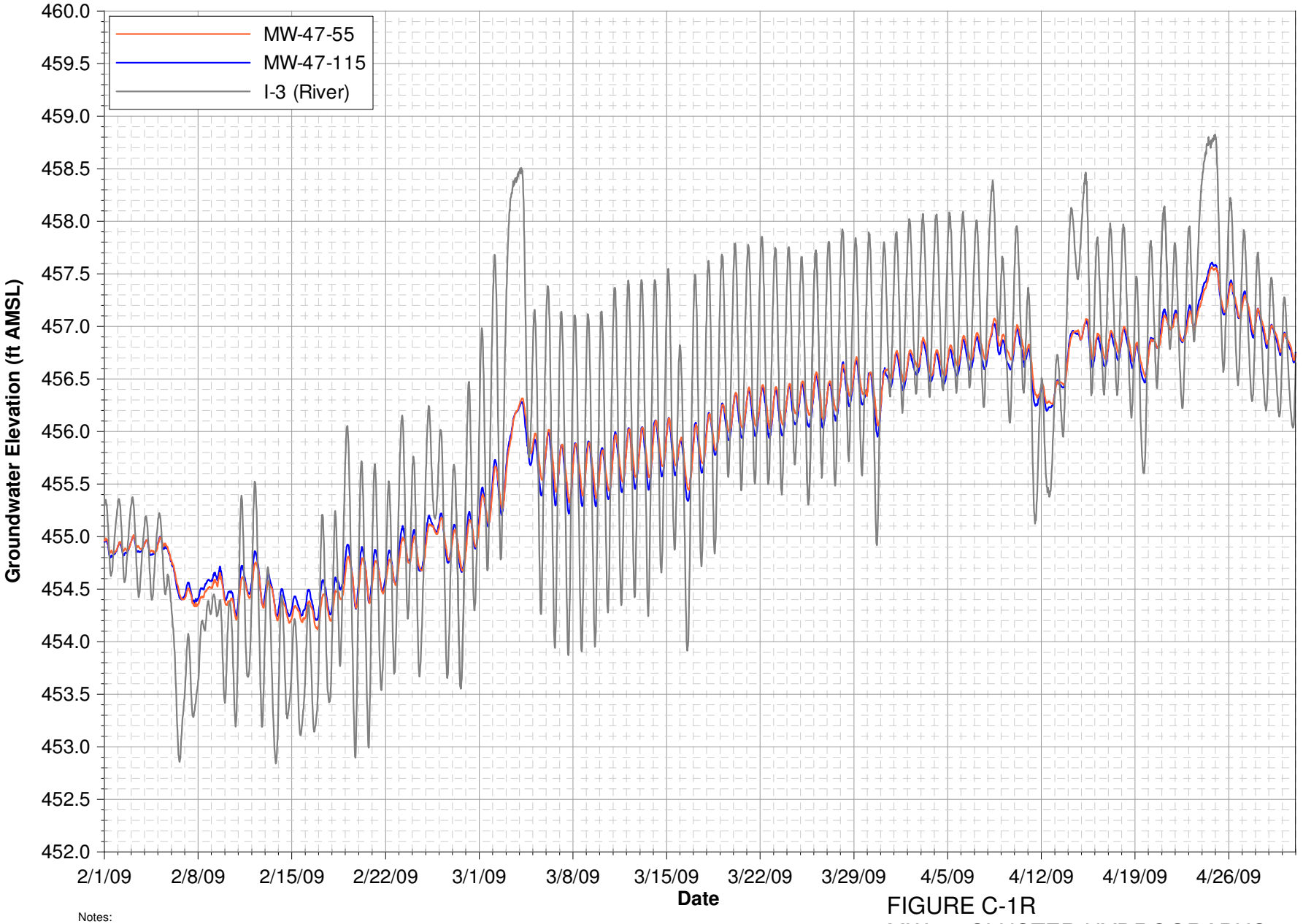


Notes:
Data subject to review.

FIGURE C-1Q
MW-46-175 HYDROGRAPH
INTERIM MEASURES PERFORMANCE MONITORING
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL



Notes:
Data subject to review.

FIGURE C-1R
MW-47 CLUSTER HYDROGRAPHS
INTERIM MEASURES PERFORMANCE MONITORING
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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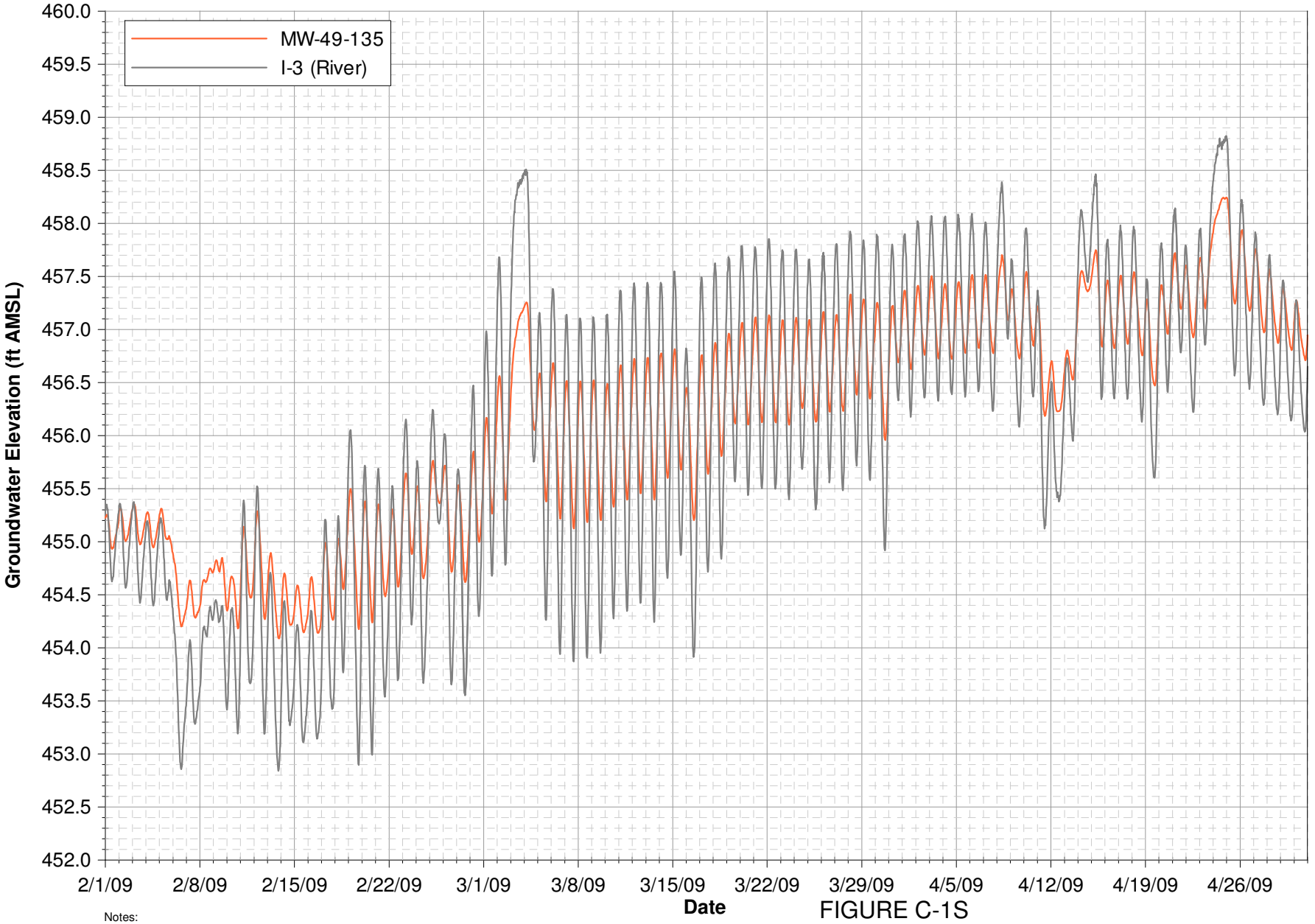
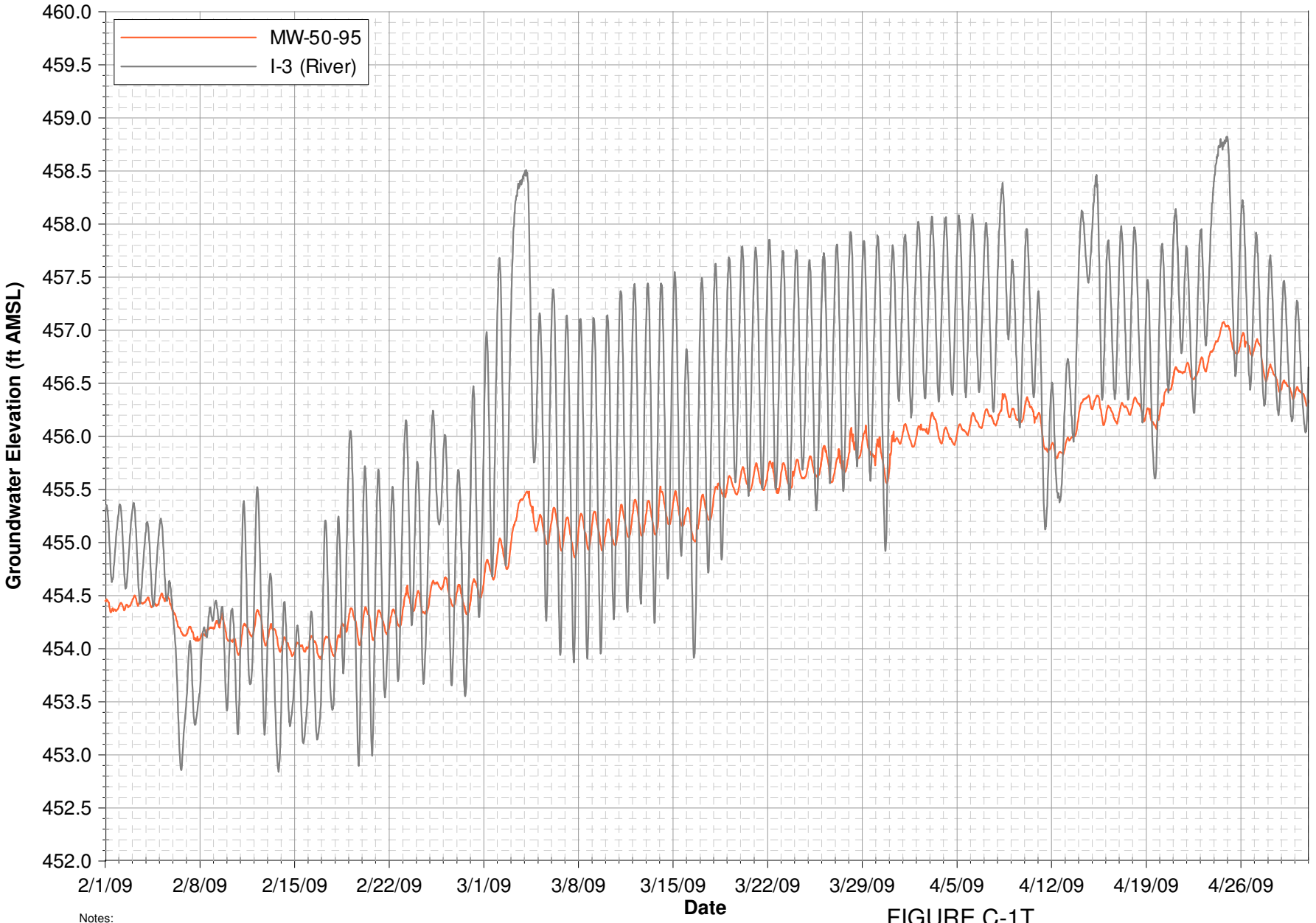


Notes:
Data subject to review.

FIGURE C-1S
MW-49-135 HYDROGRAPH
INTERIM MEASURES PERFORMANCE MONITORING
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

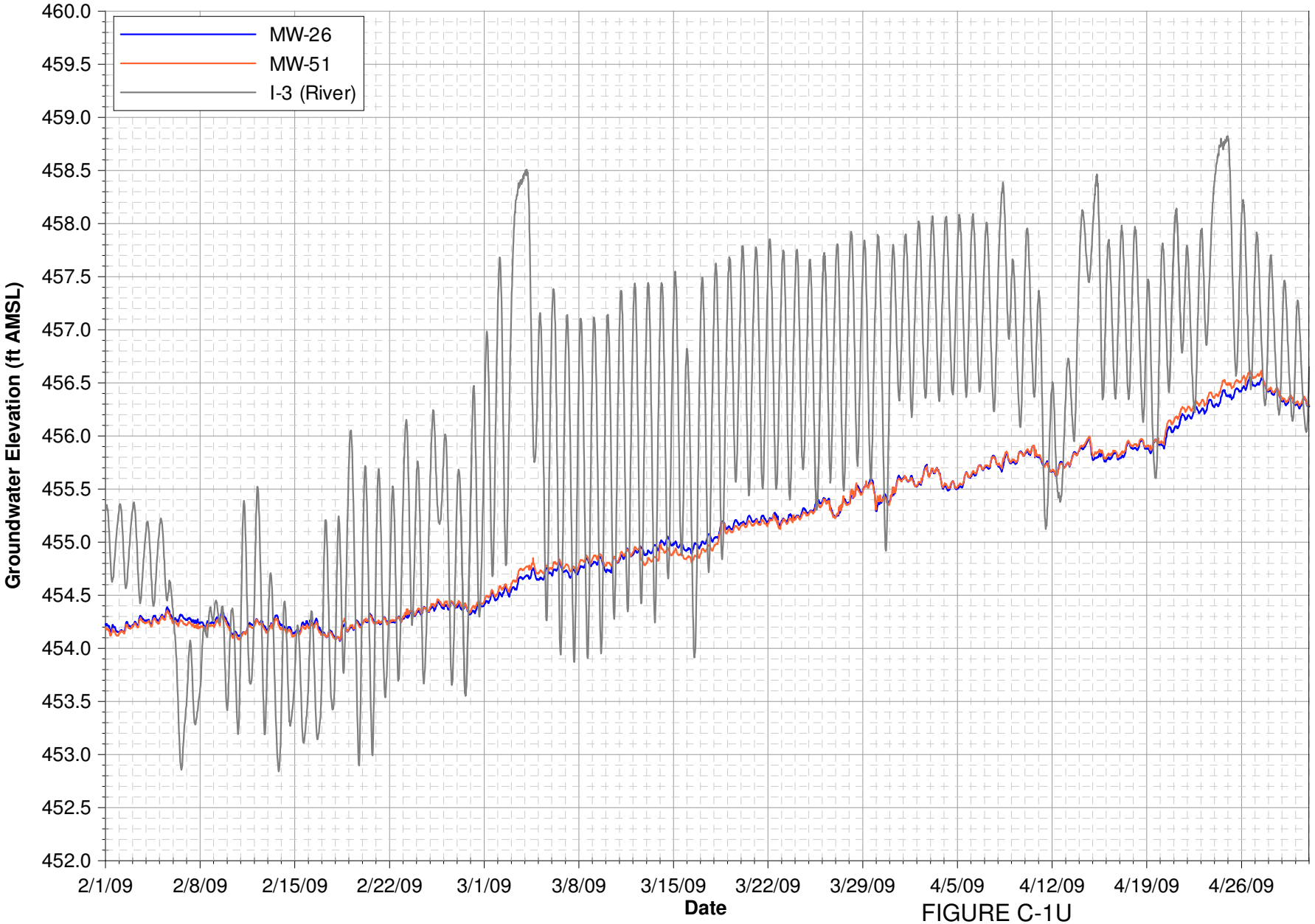
CH2MHILL



Notes:
Data subject to review.

FIGURE C-1T
MW-50-95 HYDROGRAPH
INTERIM MEASURES PERFORMANCE MONITORING
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

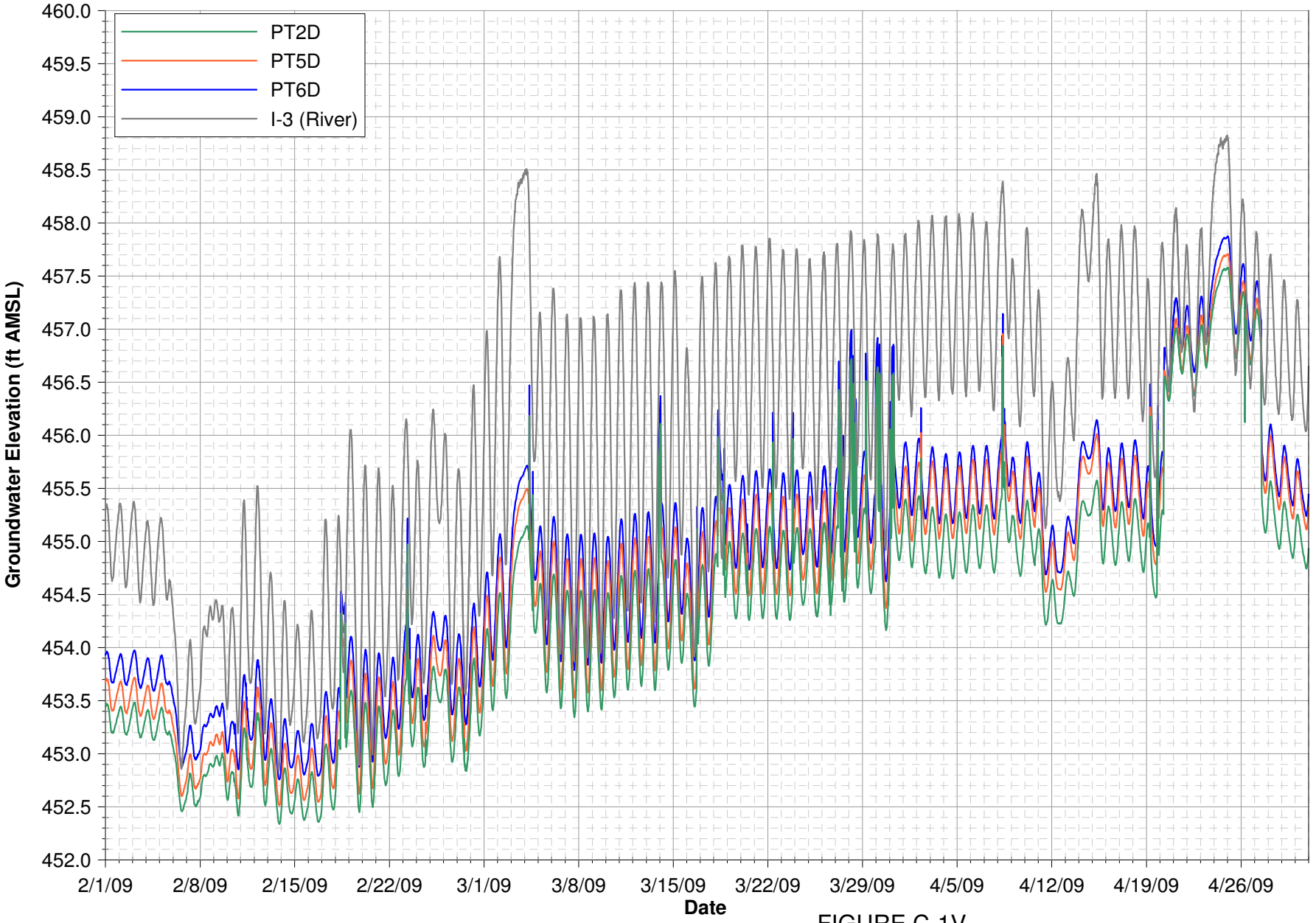
CH2MHILL



Notes:
Data subject to review.

FIGURE C-1U
MW-51 & MW-26 HYDROGRAPHS
INTERIM MEASURES PERFORMANCE MONITORING
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

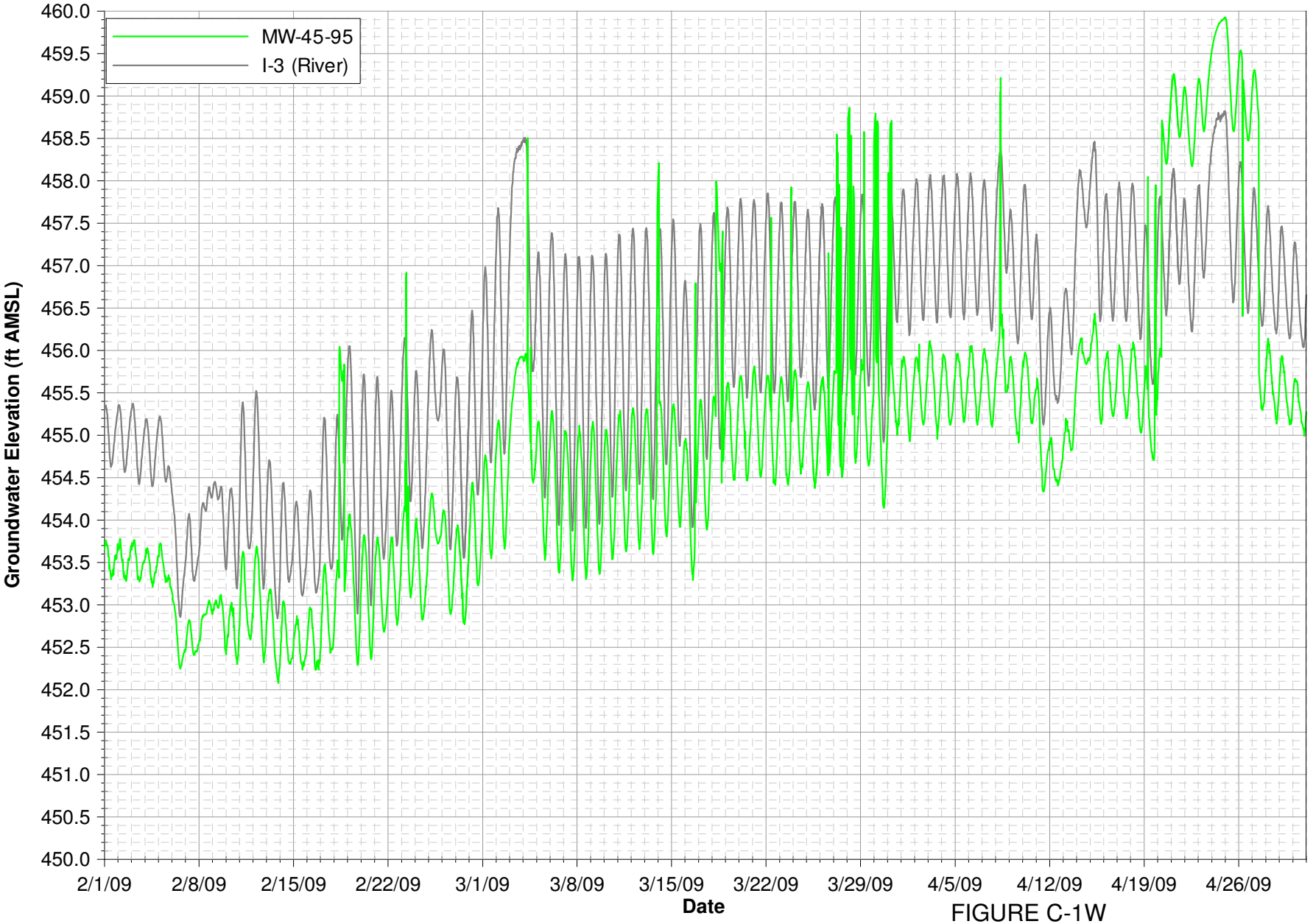
CH2MHILL



Note:
Data subject to review.

FIGURE C-1V
INSITU PILOT STUDY WELL HYDROGRAPHS
INTERIM MEASURES PERFORMANCE MONITORING
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL



Notes:
Data subject to review.

FIGURE C-1W
MW-45-95 HYDROGRAPH
INTERIM MEASURES PERFORMANCE MONITORING
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

Appendix D
Chemical Performance Monitoring Analytical Results

TABLE D-1

Chemical Performance Monitoring Results, March 2005 through April 2009

Interim Measures Performance Monitoring

PG&E Topock Compressor Station

Location	Sample Date	Total Dissolved Solids	Oxygen-18	Deuterium	Chloride	Sulfate	Nitrate	Bromide	Alkalinity (total)	Dissolved Metals				
										Calcium	Magnesium	Potassium	Sodium	Boron
Monitoring Wells														
MW-20-70	10-Mar-05	1940	-7.1	-59.0	740	378	9.98	ND (1.0)	81.7	198	55.4	9.89	431	0.412
	15-Jun-05	1980	-7.0	-60.0	749	388	9.79	ND (1.0)	73.8	189	55.4	10.5	433	0.414
	15-Jun-05 FD	2050	-8.3	-57.0	760	392	9.81	ND (1.0)	71.3	204	60.7	11.4	468	0.445
	11-Oct-05	1950	-7.2	-57.0	737	359	9.48	0.641	69.9	198	49.9	14.6	323	0.402
	15-Dec-05	1830	-7.1	-49.0	645	326	9.90	ND (1.0)	77.8	138	42.3	14.5	267	0.441
	10-Mar-06	1940	-7.2	-54.0	679	358	10.5	ND (0.5)	82.2	161	48.6	9.22	424	0.427
	05-May-06	1750	-8.2	-55.9	696	376	9.86	0.574	74.5	162	49.2	9.55	461	0.476
	03-Oct-06	1890	-8.1	-60.4	677	357	13.0	ND (5.0)	85.0	158	47.6	9.82	472	0.535
	03-Oct-06 FD	1840	-8.1	-60.5	669	352	12.9	ND (5.0)	80.0	154	45.9	9.51	466	0.515
	13-Dec-06	1910	-7.6	-61.2	678	352	12.7	0.699	77.5	149	44.3	9.09	458	0.459
	14-Mar-07	1740	-8.5	-64.3	689	358	13.7	0.641	80.0	139	42.2	8.83	451	0.503
	03-May-07	1750	-8.4	-66.7	697	344	25.1	ND (1.0)	77.5	139	41.2	8.65	390	0.477
	11-Oct-07	1820	-8.2	-63.9	699	367	15.6	ND (1.0)	80.0	130	39.1	11.0	600	0.54
	12-Mar-08	1790	-7.6	-65.2	695	360	22.1	ND (1.0)	77.0	139	41.2	10.7	403	0.51
	07-Oct-08	1900	-8.5	-64.4	650	360	15.0	0.61	83.0	136	37.9	10.5	400	0.608
	12-Mar-09	1900	-7.74	-60.8	670	330	17.0	ND (1.0)	79.0	128	40.2	9.95	496	0.549
MW-20-100	10-Mar-05	2490	-5.2	-49.0	466	511	9.98	ND (1.0)	84.2	133	19.8	8.98	712	0.859
	15-Jun-05	2500	-4.7	-46.0	921	506	9.02	ND (1.0)	84.0	137	21.3	9.06	592	0.713
	11-Oct-05	2400	-5.3	-48.0	887	484	8.87	0.731	82.3	170	23.7	15.2	500	0.718
	15-Dec-05	2340	-5.4	-40.0	813	404	9.65	ND (1.0)	82.7	136	21.4	14.8	406	0.709
	10-Mar-06	2500	-5.6	-50.3	861	475	9.94	ND (0.5)	92.5	171	27.0	7.75	597	0.803
	05-May-06	2260	-5.1	-46.4	927	522	9.99	ND (1.0)	82.5	193	32.0	10.8	577	0.716
	03-Oct-06	2320	-5.8	-51.5	863	456	13.4	ND (5.0)	90.0	202	34.4	10.9 J	568	0.874
	13-Dec-06	1960	-6.2	-54.4	861	459	12.3	0.83	97.5	205	32.2	11.4	579	0.889
	13-Dec-06 FD	2200	-6.2	-54.5	874	457	12.2	0.851	92.5	205	32.2	9.55	575	0.881
	14-Mar-07	2180	-6.8	-57.8	847	477	14.2	0.785	87.5	194	31.7	9.90	521	0.715
	03-May-07	2300	-7.3	-59.2	879	493	23.2	ND (1.0)	87.5	209	36.0	12.0 J	559	0.699
	03-May-07 FD	2330	-6.7	-59.3	888	484	19.7	ND (1.0)	87.5	208	34.6	9.63 J	532	0.686
	10-Oct-07	2160	-7.2	-57.2	858	468	3.25	ND (1.0)	92.0	190	32.0	15.0	560	0.81
	12-Mar-08	2470	-6.9	-58.3	827	442	19.2	ND (1.0)	870	218	35.4	11.9	469	0.702

TABLE D-1

Chemical Performance Monitoring Results, March 2005 through April 2009

Interim Measures Performance Monitoring

PG&E Topock Compressor Station

Location	Sample Date	Total Dissolved Solids	Oxygen-18	Deuterium	Chloride	Sulfate	Nitrate	Bromide	Alkalinity (total)	Dissolved Metals				
										Calcium	Magnesium	Potassium	Sodium	Boron
Monitoring Wells														
MW-20-100	08-Oct-08	2200	-7.9	-60.2	760	420	16.0	ND (1.0)	90.0	215	36.8	10.3	453	0.669
	13-Mar-09	2200	-7.08	-58.2	770	420	16.0	ND (1.0)	97.0	213	36.4	11.6	543	0.89
MW-20-130	09-Mar-05	5520	-5.8	-56.0	3120	1080	10.9	ND (1.0)	68.9	219	12.1	24.7	2250	1.90
	09-Mar-05 FD	6200	-5.4	-51.0	3080	1080	10.9	ND (1.0)	68.9	231	12.8	25.4	2390	1.99
	15-Jun-05	7790	-5.0	-48.0	3410	1230	11.1	ND (1.0)	68.7	352	23.2	31.3	2980	2.75
	07-Oct-05	7330	-5.0	-47.0	3010	1210	10.9	1.04 J	72.4	349	13.9	38.4	2070	2.41
	16-Dec-05	7860	-5.8	-43.0	3260	1000	10.7	ND (2.5)	63.2	324	16.3	44.4	1780	1.98
	10-Mar-06	8610	-5.5	-48.8	3370	1250	10.6	ND (0.5)	74.5	312	18.9	27.7	2730	2.03
	05-May-06	7700	-5.3	-47.2	3900	1280	8.95	ND (1.0)	69.2	349	20.3	27.7	2810	2.40
	18-Oct-06	8450	-6.3	-51.4	3680	1100	11.5	ND (5.0)	70.0	358	20.9	28.0	2870	2.28
	13-Dec-06	7890	-6.0	-54.9	3970	1250	10.6	0.896	72.5	335	19.7	27.6	2900	2.31
	13-Dec-06 FD	8250	-5.9	-54.4	3950	1260	10.5	1.09	72.5	328	19.1	27.3	2830	2.24
	08-Mar-07	8450	-6.5	-57.7	3930	1240	11.3	1.08	70.0	353	21.3	27.0	2760	2.24
	08-Mar-07 FD	8510	-6.6	-57.4	3900	1210	11.3	1.06	72.5	351	21.3	26.8	2750	2.19
	03-May-07	8150	-7.7	-60.0	4020	1310	9.80 J	ND (1.0)	75.0	338	22.5	27.8	2550	2.49
	03-May-07 FD	8100	-6.9	-60.1	3950	1290	20.4 J	ND (1.0)	72.5	338	21.9	27.3	2550	2.47
	05-Oct-07	7980	-7.0	-57.5	3670	1070	11.6	ND (1.0)	77.0	310	19.0	31.0	2900	2.40
	12-Mar-08	8460	-6.2	-58.7	3690	1220	14.3	ND (1.0)	75.0	342	23.4	47.0	2260	2.07
	08-Oct-08	7800	-7.3	-59.6	3500	1200	12.0	ND (2.5)	81.0	329	22.0	40.1	1990	2.23
	13-Mar-09	8100	-6.58	-56.4	3600	1100	11.0	ND (2.5)	79.0	350	22.7	41.4	2550	2.16
MW-25	09-Mar-05	877	-8.4	-62.0	247	169	3.64	ND (0.5)	158	77.6	16.1	6.24	211	0.441
	14-Jun-05	942	-8.6	-61.0	289	183	3.89	ND (0.5)	137	93.5	20.0	8.91	253	0.464
	14-Jun-05 FD	980	-7.2	-59.0	294	185	3.94	ND (0.5)	137	100	20.9	9.06	268	0.475
	04-Oct-05	950	-8.2	-68.0	252	171	3.77	ND (0.5)	141	83.3	14.9	9.93	164	0.362
	04-Oct-05 FD	910	-8.3	-60.0	251	171	3.75	ND (0.5)	146	94.6	15.3	10.2	185	0.371
	14-Dec-05	838	-8.4	-55.0	224	158	3.74	ND (0.5)	153	75.5	14.5	9.80	143	0.396
	14-Dec-05 FD	896	-8.4	-50.0	219	155	3.75	ND (0.5)	156	73.0	14.1	9.71	151	0.382
	09-Mar-06	910	-8.4	-64.1	245	164	3.83	ND (0.5)	170	76.4	15.6	6.97	210	0.39
	03-May-06	907	-9.0	-59.4	272	172	3.95	ND (0.5)	150	78.0	17.3	7.38	222	0.418
	03-May-06 FD	924	-9.0	-61.0	274	173	3.94	ND (0.5)	155	79.7	17.8	7.53	245	0.431

TABLE D-1

Chemical Performance Monitoring Results, March 2005 through April 2009

Interim Measures Performance Monitoring

PG&E Topock Compressor Station

Location	Sample Date	Total Dissolved Solids	Oxygen-18	Deuterium	Chloride	Sulfate	Nitrate	Bromide	Alkalinity (total)	Dissolved Metals				
										Calcium	Magnesium	Potassium	Sodium	Boron
Monitoring Wells														
MW-25	03-Oct-06	892	-8.9	-62.7	222	158	4.09	ND (0.5)	163	73.3	15.0	7.25	206	0.466
	06-Mar-07	843	-9.0	-66.9	221	164	3.95	ND (0.5)	160	72.9	14.4	6.85	203	0.459
	02-Oct-07	796	-9.0	-65.8	189	155	4.58	ND (1.0)	180	66.0	14.0	7.90	200	0.49
	02-Oct-07 FD	758	-9.0	-65.7	195	157	4.40	ND (1.0)	190	63.0	13.0	7.70	220	0.46
	07-Oct-08	740	-9.9	-68.5	170	150	4.30	ND (0.5)	200	59.2	12.9	9.89	143	0.559
	07-Oct-08 FD	730	-10.1	-69.1	170	150	4.40	ND (0.5)	210	58.4	12.9	10.2	144	0.559
MW-26	08-Mar-05	1840	-8.8	-70.0	756	370	4.48	ND (0.5)	98.7	166	41.6	10.7	439	0.557
	08-Mar-05 FD	1800	-8.7	-70.0	708	338	4.45	ND (0.5)	96.1	166	40.9	11.4	438	0.559
	13-Jun-05	2130	-8.2	-65.0	847	371	4.90	ND (0.5)	103	178	44.6	14.0	511	0.663
	04-Oct-05	2120	-7.8	-68.0	779	372	4.88	0.601	109	166	40.4	19.8	352	0.526
	12-Dec-05	2610	-8.5	-55.0	788	372	4.88	0.546	99.7	162	39.9	20.3	349	0.613
	08-Mar-06	2070	-8.6	-60.4	772	324	4.90	ND (0.5)	121	155	38.1	11.7	434 J	0.621
	01-May-06	2130	-8.9	-62.7	927	382	4.87	ND (0.5)	121	165	42.0	12.8	555	0.723
	03-Oct-06	2220	-8.8	-63.0	894	370	6.22	ND (2.5)	105	170	43.9	12.8	510	0.692
	12-Mar-07	2280	-9.0	-67.0	917	387	6.02	0.646	90.0	163	41.6	12.9	621	0.622
	02-Oct-07	2180	-8.6	-66.3	945	391	7.84	ND (1.0)	100	170	42.0	15.0	620	0.66
	12-Mar-08	2500	-8.1	-67.2	908	398	10.7 J	ND (1.0)	103	176	44.1 J	16.2 J	498	0.589
	12-Mar-08 FD	2420	-8.9	-68.2	905	398	7.61 J	ND (1.0)	102	160	32.8 J	12.7 J	462	0.601
	08-Oct-08	2400	-8.7	-66.5	930	440	10.0	ND (1.0)	110	183	45.8	14.6	555	0.591
	10-Mar-09	2300	-8.41	-65.3	870	440 J	9.80	1.40	100	172	47.9	14.8	585	0.604
	10-Mar-09 FD	2300	-8.68	-65.8	860	440 J	9.70	1.50	100	174	46.2	15.6	631	0.65
MW-27-20	08-Mar-05	1250	-12	-102.0	190	432	ND (0.5)	ND (0.5)	215	137	56.6	4.89	195	ND (0.2)
	18-Jul-05	---	-11.9	-98.0	81.9	228	ND (0.5)	ND (0.5)	160	96.1	30.1	4.27	94.8	ND (0.2)
	05-Oct-05	742	-11.8	-102.0	91.1	252	ND (0.5)	ND (0.5)	175	88.6	31.4	5.48	81.0	ND (0.2)
	14-Dec-05	1020	-11.7	-91.0	118	347	ND (0.5)	ND (0.5)	216	116	41.8	6.96	116	ND (0.2)
	06-Mar-06	664	-12.1	-90.9	89.7	231	ND (0.2)	ND (0.2)	385	89.1	28.8	4.90	103	ND (0.2)
	14-Jun-06	730	-12	-89.8	98.3	272	ND (0.5)	ND (0.5)	195	91.1	28.5	2.79 J	96.9	ND (0.2)
	03-Oct-06	600	-13.1	-96.6	90.8	261	ND (0.5)	ND (0.5)	160	102	34.5	6.45	113	ND (0.2)
	02-Oct-07	802	-12.5	-96.3	102	320	ND (1.0)	ND (1.0)	170	97.0	34.0	5.30	150	0.22
	03-Oct-08	---	---	---	94.0	240	ND (0.5)	---	---	87.9	29.5	---	110	---

TABLE D-1

Chemical Performance Monitoring Results, March 2005 through April 2009

Interim Measures Performance Monitoring

PG&E Topock Compressor Station

Location	Sample Date	Total Dissolved Solids	Oxygen-18	Deuterium	Chloride	Sulfate	Nitrate	Bromide	Alkalinity (total)	Dissolved Metals				
										Calcium	Magnesium	Potassium	Sodium	Boron
Monitoring Wells														
MW-28-25	10-Mar-05	880	-12.2	-95.0	112	302	ND (0.5)	ND (0.5)	204	129	36.3	3.50	122	ND (0.2)
	15-Jun-05	974	-11.6	-91.0	108	359	ND (0.5)	ND (0.5)	221	133	38.9	6.54	117	ND (0.2)
	06-Oct-05	884	-11.7	-95.0	99.8	300	ND (0.5)	ND (0.5)	197	123	37.0	6.61	88.7	ND (0.2)
	16-Dec-05	1010	-11.4	-90.0	128	348	ND (0.5)	ND (0.5)	212	134	41.5	6.46	107	ND (0.2)
	09-Mar-06	746	-11.5	-93.9	84.4	225	ND (0.5)	ND (0.5)	244	98.5	27.5	4.15 J	88.5	ND (0.2)
	05-May-06	741	-11.4	-90.3	110	302	ND (0.5)	ND (0.5)	216	117	35.7	5.77	118	ND (0.2)
	11-Oct-06	1050	-12.2	-95.0	86.3	247	ND (0.5)	ND (0.5)	225	133	40.8	5.47	132	ND (0.2)
	04-Oct-07	812	-12.1	-98.7	110	307	ND (1.0)	ND (1.0)	230	120	37.0 J	4.80	150	0.26 J
	08-Oct-08	---	---	---	100	280	ND (0.5)	---	220	109	34.7	---	102	---
MW-30-30	10-Mar-05	38800	-9.8	-79.0	16000	4270	ND (5.0)	7.91	421	1590	1600	95.4	13600	4.97
	07-Oct-05	36400	-8.5	-75.0	17600	4000	ND (0.5)	ND (10)	521	1020	842	93.6	7650	5.20
	15-Dec-05	35700	-8.7	-59.0	19700	4070	ND (1.0)	3.13	504	1060	894	110	8540	6.14
	13-Mar-06	39700 J	-8.8	-70.5	18600	4530	ND (0.5)	ND (50)	650	1050	892	77.2	11300	4.62
	02-May-06	32400	-10.3	-70.7	15400	3300	ND (0.5)	ND (5.0)	756	882	828	59.4	10300	3.95
	10-Oct-06	29400	-9.4	-68.7	17800	4400	ND (2.5)	ND (2.5)	550	729	653	55.0	10200	4.32
	08-Oct-07	27400	-9.0	-73.9	13700	3370	ND (1.0)	3.88	800	650	540	56.0	9600	4.50
MW-30-50	10-Mar-05	6470 J	-8.3	-68.0	4660	672	ND (0.5)	1.03	324	335	107	16.5	2040	1.15
	07-Oct-05	6860	-9.4	-79.0	3060	857	ND (0.5)	0.899 J	252	438	101	37.0	1780	1.27
	16-Dec-05	5850	-10.5	-65.0	2360	578	ND (0.5)	0.645	212	265	77.9	32.9	1260	1.19
	09-Mar-06	5380	-9.8	-83.5	2420	651	ND (0.5)	ND (0.5)	275	226	66.2	14.6	1640	1.18
	02-May-06	5420	-10.4	-73.6	2380	612	ND (0.5)	3.41	261	243	70.3	16.4	1750	1.22
	11-Oct-06	4170	-10.7	-82.2	1980	468	ND (0.5)	ND (0.5)	290	171	48.5	14.0	1370	1.11
	11-Oct-06 FD	3930	-11	-82.6	1810	462	ND (0.5)	ND (0.5)	298	163	46.1	14.1	1340	1.08
MW-31-60	09-Mar-05	1540	-8.6	-63.0	649	210	4.94	ND (0.5)	76.6	108	17.3	5.97	424	0.401
	13-Jun-05	1660	-8.2	-65.0	745	207	4.12	ND (0.5)	70.0	121	18.9	6.57	403	0.388
	06-Oct-05	1660	-8.6	-65.0	691	206	4.01	ND (0.5)	77.3	109	16.5	9.75	308	0.462
	13-Dec-05	1620	-8.7	-54.0	669	199	4.14	ND (0.5)	73.0	87.0	15.4	9.32	275	0.359
	15-Mar-06	1560 J	-8.6	-65.6	661	191	4.37	ND (0.5)	89.3	106	17.5	7.30	403	0.393
	15-Mar-06 FD	1640 J	-8.6	-64.9	662	192	4.34	ND (0.5)	81.9	101	16.8	6.94	391	0.383
	01-May-06	1630	-9.6	-63.2	691	209	4.58	ND (0.5)	79.6	118	20.1	7.78	467	0.449

TABLE D-1

Chemical Performance Monitoring Results, March 2005 through April 2009

Interim Measures Performance Monitoring

PG&E Topock Compressor Station

Location	Sample Date	Total Dissolved Solids	Oxygen-18	Deuterium	Chloride	Sulfate	Nitrate	Bromide	Alkalinity (total)	Dissolved Metals				
										Calcium	Magnesium	Potassium	Sodium	Boron
Monitoring Wells														
MW-31-60	05-Oct-06	1620	-9.4	-66.3	687	205	5.00	ND (0.5)	80.0	113	20.6	9.60 J	325	0.464
	12-Mar-07	1750	-9.3	-69.0	757	222	4.93	ND (0.5)	72.5	116	20.3	6.05	454	0.402 J
	04-Oct-07	1720	-9.4	-69.6	799	208	5.15	ND (1.0)	80.0	150	26.0	7.30	580	0.64
	06-Oct-08	2000	-10.2	-72.2	810	240	4.20	ND (1.0)	81.0	150	26.0	9.39	460	0.399
MW-32-20	09-Mar-05	12500	-7.2	-65.0	6930	1660	ND (0.5)	3.51	123	838	302	36.9	4000	2.76
	17-Jun-05	10200	-9.0	-67.0	4810	690	ND (0.5)	ND (2.5)	676	566	231	23.3	2620	1.75
	04-Oct-05	28800	-7.8	-65.0	14200	2420	ND (5.0)	6.19	733	1380 J	613 J	91.1 J	5400 J	4.75 J
	16-Dec-05	24600	-7.8	-61.0	12200	2140	ND (1.0)	3.48	861	1470	552	90.4	4950	4.16
	10-Mar-06	20900	-8.3	-65.5	10600	1970	ND (0.5)	ND (0.5)	432	1350	530	56.1	6440	3.54
	04-May-06	16900	-8.1	-64.9	9430	1380	ND (0.5)	2.35	218	937	445	46.0	4780	2.87
	02-Oct-06	46200 J	-8.6	-67.1	20200	3190	ND (2.5)	7.30	660	1870	1070	87.0	11300	6.34
	11-Dec-06	37900	-8.0	-67.0	17900	3020	ND (5.0)	7.67	825	1530	785	81.7	8420	4.98
	06-Mar-07	27600	-8.7	-72.7	16200	2210	0.925	5.93	765	1460	635	64.4	7110	3.92
	30-Apr-07	17700	-9.6	-78.1	9820	1310	ND (0.2)	3.78	770	965	484	51.4	5520	3.02
	01-Oct-07	37200	-8.3	-70.1	20600	3160	ND (1.0)	6.44	700	1800	1100	93.0	9900	5.70
	10-Mar-08	26000	-9.4	-72.6	15800	2280	ND (1.0)	5.66	800	1190	710	67.4	11600	2.31
	03-Oct-08	---	---	---	21000	3500	ND (5.0)	---	640	1700	1080	---	9550	---
	10-Mar-09	29000	-8.91	-70.5	15000	2100 J	ND (5.0)	15.0	750	1620	970	96.6	7020	3.53
MW-32-35	09-Mar-05	3560	-8.2	-68.0	1770	465	ND (0.5)	0.845	260	312	85.5	13.0	944	1.07
	17-Jun-05	7550	-9.5	-72.0	3520	787	ND (0.5)	ND (2.5)	223	506	120	14.8	2110	1.18
	04-Oct-05	8340	-8.3	-70.0	3840	765	ND (0.5)	ND (5.0)	208	567	134	29.3	1530	1.26
	16-Dec-05	7660	-8.8	-63.0	3510	710	ND (1.0)	1.02	219	606	128	30.0	1580	1.25
	10-Mar-06	9230	-8.6	-74.0	4210	1010	ND (0.5)	ND (0.5)	234	654	129	19.2	2360	1.13
	04-May-06	9840	-9.1	-67.8	4960	1130	ND (0.5)	ND (0.5)	218	693	148	19.5	2800	1.38
	02-Oct-06	11200	-9.4	-71.4	5430	1050	ND (2.5)	ND (2.5)	290	839	165	23.9	3260	1.48
	11-Dec-06	10400	-9.0	-70.4	5090	1000	ND (0.5)	1.90	338	845	173	22.5	2620	1.43
	06-Mar-07	12600	-10.2	-75.4	6070	1200	ND (0.5)	2.65	360	1080	209	23.5	2910	1.35
	30-Apr-07	12100	-9.9	-78.7	6610	1280	ND (0.2)	2.60	475	1250	273	26.2	3280	1.35
	01-Oct-07	13700	-8.9	-72.7	6830	1120	ND (1.0)	2.62	490	1000	390	29.0	4000	1.70
	03-Oct-08	15000	-9.8	-73.1	7600	1300	ND (2.5)	3.10	550	829	150	52.3	3490	1.49

TABLE D-1

Chemical Performance Monitoring Results, March 2005 through April 2009

Interim Measures Performance Monitoring

PG&E Topock Compressor Station

Location	Sample Date	Total Dissolved Solids	Oxygen-18	Deuterium	Chloride	Sulfate	Nitrate	Bromide	Alkalinity (total)	Dissolved Metals				
										Calcium	Magnesium	Potassium	Sodium	Boron
Monitoring Wells														
MW-34-55	10-Mar-05	6230	-10.8	-82.0	2620	739	ND (0.5)	0.654	240	366	71.3	29.1	1900	1.19
	15-Jul-05	---	-10.3	-84.0	2250	607	ND (0.5)	ND (0.5)	242	247	52.0	16.5	1420	1.02
	05-Oct-05	5150	-10.6	-88.0	2170	619	ND (0.5)	ND (0.5)	232	272	59.1	25.8	1230	1.20
	14-Dec-05	5100	-10.8	-74.0	2150	552	ND (0.5)	0.588	236	217	45.0	27.2	965	0.937
	08-Mar-06	4850	-10.8	-86.8	2080	593	ND (0.5)	ND (0.5)	272	256	54.2	13.5	1640	0.956
	03-May-06	4320	-11.5	-84.3	2070	500	ND (0.5)	ND (0.5)	302	198	44.8	11.1	1360	0.846
	04-Oct-06	1680 J	-12.2	-94.8	443	230	ND (0.5)	ND (0.5)	368	37.6	8.08	4.59	536	0.54
	03-Oct-07	730	-11.3	-96.6	109	266	ND (1.0)	ND (1.0)	190	15.0	3.30	3.30	290	0.26
	07-Oct-08	700	-13	-100.0	100	250	ND (0.5)	---	170	72.4	16.9	5.26	192	0.248
MW-34-80	08-Mar-05	6940	-10.4	-83.0	4180	1040	ND (0.5)	1.01	304	439	68.1	28.0	2750	1.65
	15-Mar-05	8980	---	---	3920	ND (5.0)	ND (1.0)	---	288	445	65.7	29.7	2990	---
	30-Jun-05	7840	-8.4	-82.0	3910	979	ND (0.5)	ND (0.5)	302	497	76.5	27.7	2670	1.66
	05-Oct-05	10200	-10.1	-85.0	3880	1060	ND (0.5)	ND (0.5)	302	429	72.5	47.4	1660	1.57
	14-Dec-05	8800	-10.2	-71.0	3700	880	ND (0.5)	0.854	297	432	68.3	54.9	1710	1.54
	09-Mar-06	7830	-9.9	-86.8	3520	986	ND (0.5)	ND (0.5)	313	383	65.8	24.0	2420	1.49
	03-May-06	7950	-11.7	-77.6	3700	921	ND (0.5)	ND (0.5)	297	425	70.3	23.9	2480	1.38
	04-Oct-06	7080	-11.3	-81.8	3210	786	ND (0.5)	0.737	268	341	65.4	21.1	2170	1.31
	12-Dec-06	6510	-10.5	-80.9	3190	789	ND (0.5)	0.742	288	298	62.9	18.9	2040	1.26
	05-Mar-07	6360 J	-11.5	-85.8	3300	783	ND (0.5)	0.72	205	315	68.3	19.4	2020	1.29
	30-Apr-07	6390	-11.5	-88.9	3320 J	889 J	ND (0.2)	ND (1.0)	245	282	57.0	18.6	2080	1.33
	03-Oct-07	5490	-11.3	-87.8	2630	696	ND (1.0)	ND (1.0)	240	220	53.0	21.0	2000	1.20
	13-Dec-07	5420	-10.9	-88.6	2380	698	ND (1.0)	ND (1.0)	264	193	49.1	25.4	1450	1.09
	12-Mar-08	5500	-11.4	-87.3	2510	739	ND (1.0)	ND (1.0)	238	237	52.6	19.2	2030	1.14
	06-May-08	5820	-11.4	-87.3	2460	753	ND (0.2)	0.525	216	230	49.0	30.0	1600	1.20
	07-Oct-08	5300	-11.8	-87.6	2400	720	ND (2.0)	ND (2.0)	250	223	46.3	22.0	1220	0.765
	10-Dec-08	5300	-11	-93.1	2190	698	ND (1.0)	ND (1.0)	253	147	45.2	20.6	3880	1.11
	10-Mar-09	5100	-10.9	-84.8	2300	700 J	ND (2.5)	ND (2.5)	240	219	46.3	22.2	1480	1.08
MW-34-100	14-Mar-05	10800	---	---	5010	1210	ND (1.0)	---	175	221	17.4	34.1	3600	---
	21-Jun-05	11300	-9.7	-75.0	5350	1270	1.05	ND (0.5)	179	229	17.4	27.1	3510	2.22
	21-Jun-05 FD	10900 J	-9.5	-77.0	4920	1180	1.03	ND (0.5)	179	243	18.2	32.1	3740	2.36

TABLE D-1

Chemical Performance Monitoring Results, March 2005 through April 2009

Interim Measures Performance Monitoring

PG&E Topock Compressor Station

Location	Sample Date	Total Dissolved Solids	Oxygen-18	Deuterium	Chloride	Sulfate	Nitrate	Bromide	Alkalinity (total)	Dissolved Metals				
										Calcium	Magnesium	Potassium	Sodium	Boron
Monitoring Wells														
MW-34-100	05-Oct-05	10400	-9.9	-83.0	4530	1150	1.20	ND (0.5)	172	171	13.8	55.2	2450	2.57
	05-Oct-05 FD	10400	-9.9	-83.0	4680	1200	1.21	ND (0.5)	172	228	14.1	50.9	2730	2.57
	14-Dec-05	---	---	---	---	---	---	---	---	226	14.9	62.9	2530	2.32
	14-Dec-05 FD	---	---	---	---	---	---	---	---	220	15.1	64.2	2530	2.40
	08-Mar-06	10000	-11.4	-75.5 J	4720	1180	1.39	---	152	179	12.1	32.5	3580	2.41
	08-Mar-06 FD	10100	-10.1	-102 J	4920	1220	1.39	---	159	182	11.9	36.5	3530	2.46
	30-Apr-07	10600	-10.9	-80.7	5920	1040	1.38	---	123	186	12.0	31.5	3840	2.39
	30-Apr-07 FD	11900	-11.2	-82.1	5880	1050	1.37	---	123	189	12.0	32.1	3920	2.40
	03-Oct-07	10700	-10.2	-78.2	5350	970	1.19	ND (1.0)	120	170	11.0	44.0	4300	2.50
	03-Oct-07 FD	10500	-10.6	-78.4	5360	953	1.03	ND (1.0)	120	160	10.0	43.0	4300	2.40
	07-Oct-08	11000	-10.9	-80.8	5400	1200	ND (2.5)	ND (2.5)	140	158	10.6	54.5	2970 J	2.35
	07-Oct-08 FD	11000	-11	-81.3	5600	1200	ND (2.5)	ND (2.5)	140	184	11.5	56.7	3880 J	2.59
Surface Water Stations														
R-27	07-Mar-05	669	-12.3	-102.0	92.7	244	ND (0.5)	ND (0.5)	136	82.8	31.3	4.72	108	ND (0.2)
	14-Jun-05	686	-11.4	-92.0	90.9	266	ND (0.5)	ND (0.5)	127	81.9	29.8	6.04	98.9	ND (0.2)
	05-Oct-05	678	-11.6	-94.0	85.1	255	ND (0.5)	ND (0.5)	130	101	36.2	6.56	91.2	ND (0.2)
	16-Dec-05	718	-11.7	-87.0	87.9	253	ND (0.5)	ND (0.5)	126	85.5	29.5	5.99	75.6	ND (0.2)
	06-Mar-06	656	-11.8	-92.1	90.6	268	ND (0.5)	ND (0.5)	144	83.5	29.4	5.44 J	101	ND (0.2)
	03-May-06	567	-12.8	-93.9	93.1	267	ND (0.5)	ND (0.5)	139	87.0	31.1	3.12 J	106	ND (0.2)
	04-Oct-06	752 J	-12.2	-94.9	91.5	261	ND (0.5)	ND (0.5)	128	82.9	31.5	6.24 J	98.1	ND (0.2)
	20-Dec-06	680	-12.7	-98.1	94.5	266	ND (0.5)	ND (0.5)	138	83.2	30.9	3.64	106	ND (0.2)
	13-Mar-07	750 J	-13	-99.5	96.5	267	0.537	ND (0.5)	130	86.9	31.3	4.73	106	ND (0.2)
	08-May-07	715 J	-12.9	-104.0	92.6	269	ND (0.5)	ND (0.5)	143	84.3	29.8	5.55	100	ND (0.2)
	11-Sep-07	650	-12.5	-101.0	89.4	253	0.336	ND (0.2)	132	74.2	28.9	5.47	86.5	ND (0.2)
	05-Dec-07	---	-11.7	-99.0	94.7	256	ND (1.0)	ND (0.2)	137	89.8	31.7	6.60	93.4	0.157
	02-Apr-08	---	---	---	93.0	267	ND (1.0)	ND (1.0)	136	80.2	30.7	5.50	106	0.432
	17-Jun-08	682	-13	-101.0	91.6	254	ND (1.0)	ND (1.0)	134	76.2	31.8	6.69	89.7	ND (0.2)
R-28	08-Mar-05	651	-12.5	-102.0	90.4	231	ND (13)	ND (0.5)	132	83.7	31.4	5.02	107	ND (0.2)
	14-Jun-05	680	-11.6	-95.0	91.2	268	ND (0.5)	ND (0.5)	127	78.5	28.5	5.08	94.5	ND (0.2)
	05-Oct-05	672	-11.6	-94.0	85.5	255	ND (0.5)	ND (0.5)	122	85.7	30.4	6.30	77.0	ND (0.2)

TABLE D-1
Chemical Performance Monitoring Results, March 2005 through April 2009
Interim Measures Performance Monitoring
PG&E Topock Compressor Station

Location	Sample Date	Total Dissolved Solids	Oxygen-18	Deuterium	Chloride	Sulfate	Nitrate	Bromide	Alkalinity (total)	Dissolved Metals				
										Calcium	Magnesium	Potassium	Sodium	Boron
Surface Water Stations														
R-28	16-Dec-05	710	-11.5	-83.0	88.1	254	ND (0.5)	ND (0.5)	126	87.2	29.8	6.11	76.8	ND (0.2)
	06-Mar-06	675	-12.3	-93.4	91.0	270	ND (0.5)	ND (0.5)	146	76.6	26.6	5.22 J	91.5	ND (0.2)
	03-May-06	586	-13	-92.1	93.4	270	ND (0.5)	ND (0.5)	136	88.1	31.4	4.04 J	107	ND (0.2)
	04-Oct-06	644 J	-12.6	-95.3	90.9	259	ND (0.5)	ND (0.5)	133	84.2	32.1	6.17 J	96.5	ND (0.2)
	20-Dec-06	615	-12.4	-99.6	93.3	262	ND (0.5)	ND (0.5)	143	85.7	32.0	4.66	108	ND (0.2)
	14-Mar-07	710	-12.8	-100.0	96.7	268	0.534	ND (0.5)	133	87.9	31.0	5.71	105	ND (0.2)
	09-May-07	690	-13	-102.0	95.8	271	ND (0.5)	ND (0.5)	143	86.1	30.5	5.92	103	ND (0.2)
	12-Sep-07	682	-12.4	-99.4	106	296	0.372	ND (0.2)	122	73.8	29.9	6.36	89.2	ND (0.2)
	06-Dec-07	---	-11.7	-98.6	96.5	258	0.345	ND (0.2)	139	75.7	30.4	6.62	79.4	ND (0.2)
	02-Apr-08	---	---	---	92.5	309	ND (1.0)	ND (1.0)	137	84.7	31.4	5.58	108	0.467
	18-Jun-08	672	-13.2	-102.0	89.4	248	ND (1.0)	ND (1.0)	132	43.3	31.1	6.95	93.9	ND (0.2)
	17-Sep-08	640	---	---	91.4	256	ND (0.5)	ND (0.5)	132	83.4	31.2	6.48	78.0	ND (0.2)
	04-Dec-08	649	-11.9	-97.0	97.4	260	ND (1.0)	ND (1.0)	135	81.7	30.0	5.95	114	0.262
	21-Jan-09	652	-12	-96.7	91.5	253	ND (0.5)	ND (0.5)	134	79.2	27.8	6.01	91.7	ND (0.2)
	09-Apr-09	643	-12.4	-97.8	92.7	250	ND (1.0)	ND (0.5)	138	79.6	28.8	5.44	97.0	ND (0.2)

NOTES:

FD = field duplicate sample
ND =parameter not detected at the listed reporting limit
J = concentration or reporting limit estimated by laboratory or data validation
R = result exceeded analytical criteria for precision and accuracy; should not be used for project decisionmaking
--- = data not collected or available

General chemistry results in milligrams per liter (mg/L), except Oxygen-18 and Deuterium, which are expressed as differences from global standards in parts per thousand.

Alkalinity (total) reported as calcium carbonate. Nitrate reported as Nitrogen (N).