Topock Project Executive Abstract

Document Title: Performance Monitoring Report for Fourth Quarter 2008 and Annual Performance Evaluation, February 2008 through January 2009

Submitting Agency: DTSC

Final Document? ☒ Yes ☐ No

Date of Document: 3/13/2009

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 annual report documents the monitoring activities and performance evaluation of the Interim Measure (IM) groundwater extraction 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 both the fourth quarter and 2008 reporting periods. 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 fourth quarter (November and December 2008 and January 2009) as well as for all twelve months in the 2008 reporting period (February 2008 through January 2009). Hexavalent Chromium (Cr(VI)) concentrations observed in the floodplain monitoring wells are either generally stable or decreasing. The average pumping rate for the IM extraction system was 127.6 gallons per minute and an estimated 78 kilograms (or 172 pounds) of chromium were removed during this quarter.

Written by: PG&E

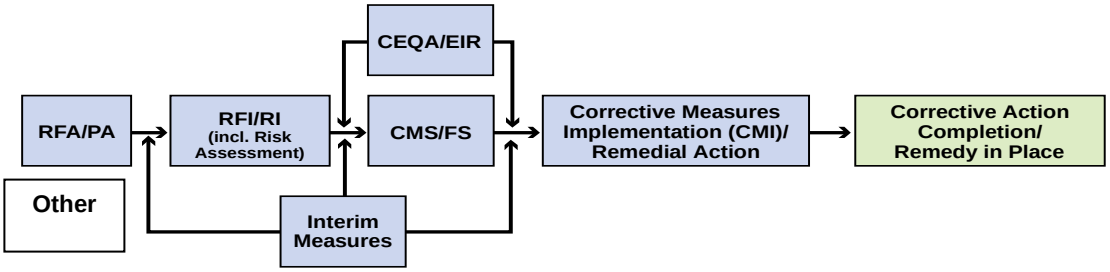
Recommendations:
Performance monitoring and evaluation of the IM hydraulic containment system will continue in accordance with the Performance Monitoring Plan and as directed by the DTSC. This report is for information only.

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

Pacific Gas and Electric Company

Yvonne J. Meeks
Topock Project Manager
Chromium Remediation Project Office
Gas Transmission & Distribution

6588 Ontario Road
San Luis Obispo, CA 93405

Mailing Address
4325 South Higuera Street
San Luis Obispo, CA 93401

805.546.5243
Internal: 664.5243
Fax:: 805.546.5232
E-Mail: YJM1@pge.com

March 13, 2009

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

Subject: Fourth Quarter and 2008 Annual Performance Monitoring Evaluation
Interim Measures Performance Monitoring Program
PG&E Topock Compressor Station, Needles, California

Dear Mr. Yue:

Enclosed is the Performance Monitoring Report for Fourth Quarter 2008 and Annual Performance Evaluation, February 2008 through January 2009, for PG&E's Interim Measures (IM) performance monitoring program for the Topock project. This report presents the Fourth Quarter 2008 (November 2008 through January 2009) performance monitoring results for the IM groundwater extraction system and provides the annual performance evaluation for the 2008 reporting period. The quarterly and annual performance evaluation report is prepared and submitted in conformance with the IM requirements described in Enclosure A of DTSC's letter 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 beginning in Second Quarter 2008.

Please contact me at (805) 234-2257 if you have any questions on the performance monitoring report.

Sincerely,

Yvonne Meeks

Enclosure
cc: Chris Guerre/DTSC
Karen Baker/DTSC

Performance Monitoring Report for Fourth Quarter 2008 and Annual Performance Evaluation, February 2008 through January 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

March 13, 2009

CH2MHILL
155 Grand Ave. Ste. 1000
Oakland, CA 94612

Performance Monitoring Report for Fourth Quarter 2008 and Annual Performance Evaluation, February 2008 through January 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

March 13, 2009

This report was prepared under the supervision of a California Certified Engineering Geologist

Paul Bertucci, C.E.G. No. 1977
Project Hydrogeologist

Jay Piper
CH2M HILL Project Manager

Contents

Tables

Figures

Appendices

Acronyms and Abbreviations

µg/L	micrograms per liter (equivalent to parts per billion [ppb])
Cr(T)	total chromium
Cr(VI)	hexavalent chromium
DTSC	Department of Toxic Substances Control
gpm	gallons per minute
IM	Interim Measure
IM No. 3	Interim Measure Number 3
mg/L	milligrams per liter
ORP	oxidation reduction potential
PG&E	Pacific Gas and Electric Company
PMP	Performance Monitoring Program
TDS	total dissolved solids
USBR	United States Bureau of Reclamation

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 the report.)

In a letter dated February 14, 2005, the California Department of Toxic of 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 2008 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, 2008a-b).

This combined quarterly and annual report has been prepared in compliance with DTSC's requirements and documents the monitoring activities and performance evaluation of the IM groundwater extraction system. The fourth quarterly reporting period covers monitoring activities from November 1, 2008 through January 31, 2009, while the annual reporting period covers monitoring activities from February 1, 2008 through January 31, 2009.

1.1 Interim Measures Performance Monitoring Program

Figure 1-2 shows the locations of wells used for IM extraction, performance monitoring, and hydraulic gradient measurements. The performance monitoring wells that were in service/active as of January 2009 are defined as:

- **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); and MW-45-95, MW-46-175, and MW-49-135. Additionally, three pilot test wells installed on 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 on the floodplain approximately 450 feet east of extraction well TW-3D. 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-April 2008. These wells are not formally part of the PMP, but some of the new wells have been used for collecting groundwater elevation data for evaluating the hydraulic gradient on the Arizona side of the river (CH2M HILL, 2008d).

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.

1.2 Report Organization

This combined quarterly monitoring and annual performance evaluation report presents:

- The hydraulic and chemical performance monitoring results and extraction system operation data for the fourth quarter reporting period, November 2008 through January 2009 (Section 2.0).
- Operations data for the IM extraction system for the 2008 annual reporting period (Section 3.0).
- Analysis and evaluation of the IM capture zone for the annual reporting period (Section 4.0).

- Evaluation of groundwater quality data trends and geochemistry in the IM extraction area (Section 5.0).
- Conclusions and status of IM operations and performance monitoring (Section 6.0).
- References used during the preparation of this report (Section 7.0).

2.0 Quarterly Performance Evaluation for November 2008 through January 2009

2.1 Extraction System Operations

From November 1, 2008 to January 31, 2009 (considered fourth quarter 2008), 16,900,835 gallons of groundwater were extracted and treated by the IM No. 3 system. This resulted in removal of an estimated 172 pounds (78 kilograms) of total chromium (Cr[T]) from the aquifer during the fourth quarter 2008 reporting period. Table 2-1 summarizes the pumping information during the reporting period. (All tables are located at the end of the report.) The average pumping rate for the IM system during fourth quarter 2008, including extraction system downtime, was 127.6 gallons per minute (gpm). The average monthly pumping rates were 131.7 gpm (November 2008), 125.3 gpm (December 2008), and 125.8 gpm (January 2009) during the quarterly reporting period.

During the quarter, extraction wells TW-3D and PE-1 provided primary service, operating at a target combined pumping rate of 135 gpm, excluding periods of planned and unplanned downtime. The operational run-time percentage for the IM extraction system was 94.7 percent during the reporting period. An operations log for the extraction system for fourth quarter 2008, including 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. Four containers of solids from the IM No. 3 facility were disposed of at the Kettleman Hills Chemical Waste Management facility during fourth quarter 2008. Daily inspections included general facility inspections, flow measurements, and site security monitoring. Daily logs with documentation of inspections are maintained onsite.

Table 2-2 summarizes the chromium and total dissolved solids (TDS) analytical results of groundwater samples collected from extraction wells from January 2009 and previous months. 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.

2.2 Hexavalent Chromium Distribution and Trends in Floodplain Area

During the fourth quarter reporting period, groundwater monitoring wells in the performance monitoring area were monitored for Cr(VI), Cr(T), and field water quality parameters in November 2008 (monthly event; five PMP wells sampled), December 2008 (quarterly event; 20 PMP wells sampled), and January 2009 (monthly event; five PMP wells sampled). The sampling frequencies for the site groundwater monitoring wells were

updated by DTSC in a letter dated September 28, 2008 (DTSC, 2007b). Refer to PG&E's *Quarterly Performance Monitoring Report and Evaluation, August through October 2008, PG&E Topock Compressor Station, Needles, California* (CH2M HILL, 2008d) for description of the updated sampling frequencies and the recent groundwater monitoring activities at the site.

Figure 2-1 shows, in plan view, the October 2008 Cr(VI) sampling results for wells in the upper, middle, and lower depth intervals of the Alluvial Aquifer. The Cr(VI) concentration contours of 20 and 50 µg/L are shown in Figure 2-1 in accordance with DTSC's performance monitoring directive (DTSC, 2005). Also shown in Figure 2-1 are the Cr(VI) concentration contours, based on October 2008 sampling, for the aquifer depth intervals and floodplain cross-section A (cross-section locations shown in Figure 1-2). Figure 2-2a presents the October 2008 Cr(VI) results on cross-section B, oriented parallel to the Colorado River. The majority of the wells shown on cross-section B were additionally sampled in December 2008 and January 2009, and these Fourth Quarter 2008 Cr(VI) results are shown in Figure 2-2b.

Table B-1 in Appendix B presents the groundwater sampling results for Cr(VI) and Cr(T) for monitoring wells in the floodplain area from February 2008 through January 2009. Table B-2 presents the chromium sampling data for the other wells monitored in the PMP area from February 2008 through January 2009. Hexavalent chromium concentration trend graphs for floodplain well clusters that include monitoring wells with consistent chromium detections are presented in Figures B-1 through B-6 in Appendix B. Section 5.1 of this report provides an evaluation of the Cr(VI) trends observed during performance monitoring in the floodplain area.

2.3 Other Water Quality Data for Floodplain Wells

Common water quality parameters (temperature, pH, oxidation-reduction potential [ORP], dissolved oxygen, and specific conductance) were measured in the field during well purging and groundwater sampling, as described in the *Topock Program Sampling, Analysis, and Field Procedures Manual, Revision 1, PG&E Topock Compressor Station* (CH2M HILL, 2005b). The field water quality data measured from February 2008 to present are presented in Tables B-1 and B-2 in Appendix B. Table B-1 also presents the groundwater elevations collected during the same period.

Table C-1 in Appendix C presents a summary of groundwater results for Cr(VI) and selected indicator parameters for wells in the PMP area from February 2008 through January 2009. Table C-2 in Appendix C presents the results of the general chemistry and stable isotope analyses for 14 selected monitoring wells in the performance monitoring area and two surface water (river) sampling locations during monitoring events from February 2008 through January 2009. Water samples were analyzed for TDS, chloride, sulfate, nitrate, bromide, calcium, potassium, magnesium, sodium, boron, alkalinity, deuterium, and oxygen-18. The selected wells were sampled for the general chemistry parameters to monitor the effects of IM pumping on groundwater quality in the floodplain area. Section 5.2 of this report provides an evaluation of the general chemistry groundwater data for the floodplain area.

2.4 Hydraulic Gradients and River Levels During Quarterly Period

During the reporting period, water levels were recorded at intervals of 30 minutes with pressure transducers in 53 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 1-2 and are listed in Section 1.1.

Daily average groundwater and river elevations have been calculated from the pressure transducer data for the quarterly reporting period (November 2008 through January 2009) and are summarized in Table D-1 in Appendix D. Reported groundwater elevations (or hydraulic heads) are adjusted for temperature and for salinity differences between wells (i.e., adjusted to a common freshwater equivalent), as described in the Performance Monitoring Plan. Groundwater elevation hydrographs for the PMP transducer wells during the 2008 reporting period are included in Appendix D. The elevation of the Colorado River measured at the I-3 gauge station (Figure 1-2) is also shown on the hydrographs.

Average quarterly groundwater elevations (November 2008 through January 2009, inclusive) for the shallow, mid-depth, and deep wells are presented and contoured in plan view in Figures 2-3 through 2-5. Average groundwater elevations for wells on floodplain cross-section A are presented and contoured in Figure 2-6. Note that several monitoring wells are significantly deeper than other wells in the lower depth interval. Due to vertical gradients present at the Topock site, water levels in deeper wells tend to be higher than water levels in shallower wells. Consequently, some of the wells with screen intervals significantly deeper than most of the lower interval wells exhibit water levels that are not contoured in the plan view in Figure 2-5.

Deep-zone water levels shown in Figure 2-5 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 would also be towards 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 fourth quarter 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 2-3 presents the average monthly hydraulic gradients that were measured between the gradient well pairs in November 2008, December 2008, and January 2009. For the northern (MW-31-135/MW-33-150) and southern (MW-45-95/ MW-27-85) well pairs, gradients were landward at magnitudes from 1.8 to 4.1 times, respectively, the target gradient of 0.001 feet per foot. For the central well pair (MW-45-95/MW-34-100), the

measured landward gradients ranged from 0.0093 to 0.0104 feet per foot (more than 10 times the target gradient) during the reporting period.

Figure 2-7 presents graphs of the hydraulic gradients and monthly average pumping rates and river levels for the quarterly period. While river levels were at their lowest stage of the year during the fourth quarter reporting period, strong landward gradients were measured each month.

2.5 Projected River Levels During the Next Quarter

Colorado River stage near the Topock Compressor Station is measured at the I-3 location and is directly influenced by releases from Davis Dam and, to a lesser degree, from Lake Havasu elevations, both of which are controlled by the United States Bureau of Reclamation (USBR). Total releases from Davis Dam follow a predictable annual cycle, with largest monthly releases typically in spring and early summer and smallest monthly releases in late fall/winter (November and December). Superimposed on this annual cycle is a diurnal cycle determined primarily by daily fluctuations in electric power demand. Releases within a given 24-hour period often fluctuate over a wider range of flows than that of monthly average flows over an entire year.

The corresponding 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. Following Davis Dam releases, 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.

Figure 2-8 shows 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 very good estimate of the actual levels at I-3 over a wide range of river levels. These data are summarized in Table 2-4. The future projections shown on this graph are based on USBR long-range projections of Davis Dam releases and Lake Havasu levels. There is more uncertainty in these projections at longer times in the future, since water demand is based on climatic factors.

Current USBR projections (Table 2-4) show that the average Davis Dam release for February 2009 (10,800 cubic feet per second) will be greater than in January 2009 (10,644 cubic feet per second). Based on February 2009 USBR projections, it is anticipated that the Colorado River level at the I-3 gage location in February 2009 will be approximately 0.18 foot higher compared to levels in January 2009. Current projections show that the water levels will increase during the next quarterly reporting period and into the summer months, followed by a decline during the fall (Figure 2-8).

2.6 Quarterly Performance Evaluation

The groundwater elevation and hydraulic gradient data from November and December 2008 and January 2009 performance monitoring indicate that the minimum landward gradient target of 0.001 feet/foot was exceeded each month during the quarterly reporting period. The landward gradients during fourth quarter 2008 were 1.8 to 10.4 times the

required minimum magnitude at the gradient control well pairs. The current gradient well pairs are adequate to define the capture of the plume while pumping from extraction wells TW-3D and PE-1.

A total of 16,900,835 gallons of groundwater was extracted between November 2008 and January 2009. An estimated 172 pounds (78 kilograms) of chromium were removed and treated by the IM system during this quarter. The average pumping rate for the IM extraction system during fourth quarter 2008, including system downtime, was 127.6 gpm.

A review of the groundwater gradient maps for fourth quarter 2008 (Figures 2-3, 2-4, 2-5) shows that all floodplain monitoring wells where Cr(VI**)** was detected at greater than 20 µg/L are within the IM capture zone of the pumping well(s) during the reporting period. That is, the inferred groundwater flow lines from all floodplain wells with Cr(VI) greater than 20 µg/L are oriented towards the TW-3D and PE-1 extraction wells.

Overall, the Cr(VI) concentrations observed in the floodplain monitoring wells are either stable or decreasing. The wells that are monitored in the IM pumping area (e.g., MW-34-100, MW-36-100, MW-39-70, MW-39-80, and MW-39-100) continue to show overall declining Cr(VI) concentrations relative to prior 2007 and 2006 monitoring (see Appendix B graphs). Presentation and evaluation of the Cr(VI) trends observed in the performance monitoring area during the 2008 reporting period are discussed in Section 5.1.

Based on the hydraulic and chemical performance monitoring data and evaluation presented in this report, the IM performance standard has been met for the fourth quarter (November 2008 through January 2009) reporting period. Performance monitoring and evaluation of the IM groundwater extraction system will continue in accordance with the Performance Monitoring Plan and as directed by the DTSC.

3.0 Extraction System Operations for Annual Reporting Period

3.1 Extraction Facilities and Operations

Pumping data for the IM No. 3 groundwater extraction system for the period of February 1, 2008 through January 31, 2009 are presented in Table 3-1. A total of 66,922,062 gallons of groundwater was extracted during February 2008 through January 2009. Approximately 739 pounds (335 kilograms) of Cr(T) were removed from the aquifer by pumping over the 2008 annual reporting period. The total mass of Cr(T) removed by the IM No. 2 and IM No. 3 extraction systems during IM pumping from March 2004 through January 31, 2009 is approximately 5,417 pounds (2,457 kilograms). The average annual pumping rate during the 2008 reporting period was 127.7 gpm while pumping from extraction wells TW-3D and PE-1.

Figure 3-1 summarizes the monthly pumping rates, cumulative volumes extracted, and the percent of time that the extraction system was in operation during the 2008 reporting period. This figure shows that pumping rates were very consistent month to month, which is illustrated by the consistently high percentage of uptime for the IM extraction and treatment facilities throughout the year. The decrease in uptime during April 2008 was due to the planned annual treatment plant maintenance event.

Extraction wells TW-3D and PE-1 operated throughout the annual reporting period at the target pumping rate of 135 gpm, excluding periods of planned and unplanned downtime. During the annual reporting period, extraction wells TW-2D and TW-2S were only operated for short-term support of the extraction system or field operations and for periodic groundwater sampling.

3.2 Extracted Groundwater Quality and Trends

Extraction well TW-3D was brought into service in late December 2005 and has been operated continuously for the IM. Groundwater extraction at well PE-1 on the floodplain began in January 25, 2006. The locations of the active extraction wells TW-3D and PE-1 are shown on Figure 1-1. Table 3-2 presents the analytical results for Cr(VI), dissolved Cr(T), and TDS for extraction wells TW-3D and PE-1 during the 2008 reporting period.

The Cr(VI) and TDS concentration trends for TW-3D and PE-1 are plotted in Figure 3-2. During the 2008 reporting period, Cr(VI) concentrations in TW-3D have gradually declined from 1,760 µg/L (February 2008) to 1,570 µg/L (January 2009). TDS concentrations in TW-3D for this period have remained relatively stable, averaging about 5,300 milligrams per liter (mg/L).

The Cr(VI) concentrations in the extracted groundwater at well PE-1, located on the floodplain, have ranged from 42.8 to 16.0 µg/L during the reporting period, as shown in Table 3-2. TDS concentrations in PE-1 for this period have remained relatively stable, averaging about 4,000 mg/L.

4.0 Capture Zone Analysis for Annual Reporting Period

4.1 Monthly Average Gradients

Table 4-1 presents the hydraulic gradients measured between the selected gradient control well pairs during the period February 2008 through January 2009. During the 12-month reporting period, the IM target landward gradient of 0.001 feet/foot was met each month at all gradient control well pairs.

Figure 4-1 summarizes the monthly measured gradients, and the river stage and average pumping rates during 2008 IM operations. During the annual reporting period, the average daily river levels ranged from a high of 457.79 feet above mean sea level (April 2008) to a low of 451.71 feet above mean sea level (December 2008). Strong landward gradients were measured each month, even during the lower river stages in November 2008 through January 2009. While exceeding the performance standard each month, the northern well pair (MW-31-135/MW-33-150) had the lowest measured gradients because it is not aligned along the gradient generated by pumping. The gradient measurements are therefore underestimates of the true gradient.

During the 2008 reporting period, the landward gradients measured at the central and southern well pairs ranged from 0.018 to 0.0126 feet/foot, as shown in Table 4-1. These consistently strong landward gradients were maintained even during the lower river stages in November 2008 through January 2009.

In the time period September 15 through September 17, 2008, the IM No. 3 extraction well system was shut down for monthly maintenance. During this time the water levels in seven monitoring wells were collected at 5-minute intervals and were compared to I-3 river data and barometric data. Deconvolution hydraulic monitoring data and interpretation for the system shut down can be found in the *Quarterly Performance Monitoring Report and Evaluation, August through October 2008, PG&E Topock Compressor Station, Needles, California* (CH2M HILL, 2008d).

4.2 Annual Average Gradients

Groundwater contour maps presenting the annual averages of the 2008 measured hydraulic data in the upper, middle, and lower depth aquifer intervals are shown in Figures 4-2 through 4-4. In Figure 4-5, the annual average data are presented in floodplain Cross-section A. The October 2008 Cr(VI) contours are also shown on the annual average gradient maps. Table D-2 in Appendix D presents a listing of the annual average, annual average minimum, and maximum groundwater elevations for the wells used for the 2008 performance monitoring evaluation.

The net annual landward gradients illustrated on the aquifer interval maps are strong and comparable to the gradient maps prepared for the fourth quarter monitoring data. A review of the annual average groundwater level contours on these figures shows that all floodplain monitoring wells where Cr(VI) was detected at greater than 20 μg/L were within the capture zone of the IM extraction system.

4.3 Analysis and Evaluation of Capture Zone

Two graphical methods were presented in the 2006 annual performance evaluation report to illustrate the capture zone produced by IM pumping (CH2M HILL, 2007). The methodology and results of the capture zone evaluations for 2008 are summarized below.

4.3.1 Well Group Gradient Averaging

The temporal variation in magnitude and direction of horizontal hydraulic gradients in the lower depth aquifer interval was assessed using quarterly average water levels and triangulation with linear interpretation for two well groupings (MW-31-135/MW-33-150/ MW-34-100 and MW-45-95/MW-34-100/MW-27-85) in the IM performance area. Figure 4-6 shows the two well groupings or "triads" and the calculated average gradients for the second, third and fourth quarter monitoring periods (data not available for the new well pairs in first quarter 2008).

This analysis shows that strong landward gradients were achieved during the 2008 monitoring periods and that there was minimal variation in the direction of the landward gradients during each quarter. These gradients are not the same as those calculated between the gradient control well pairs (Table 4-1) because they are calculated net gradients within each well triad. Stronger landward gradients were calculated using the triad method than those measured for the northern well pair MW-31-135/MW-33-150 (Table 4-1) due to a more optimally-aligned flow direction.

4.3.2 Particle Track Analysis

For the 2006 performance evaluation, particle tracking was conducted to calculate the direction and distance that groundwater would be likely to flow from selected starting points in the floodplain under the dual-well (TW-3D and PE-1) IM pumping system. The methods, input parameters, and data used for this analysis were described in the 2006 annual IM performance evaluation report (CH2M HILL, 2007) and are summarized below.

Figure 4-7 presents the results of the particle track analysis conducted for the 2006 capture zone evaluation. During 2006 IM operations, TW-3D and PE-1 were pumping at individual annual average rates of 97.5 and 34.3 gpm, respectively. During the 2008 reporting period, TW-3D and PE-1 were pumping at individual annual average rates of 99.01 and 28.19 gpm, respectively. Because the pumping locations and conditions were essentially identical, and the gradients for the lower interval were comparable for the two annual periods, an updated particle track analysis for 2008 was not conducted. For the current capture zone evaluation displayed in Figure 4-7, the particle tracking results from 2006 are shown with the Cr(VI) contours in the lower interval from October 2008 sampling.

The particle tracks shown in Figure 4-7 represent the movement of a groundwater molecule from selected deep floodplain wells based on 2-week average gradients during the 2006 reporting period. Tick marks, represented by small brown rectangles along the flow paths, mark each 10 days of movement. Based on the measured heads and model estimates of hydraulic properties, the model results showed that particles starting at each of the four starting points reached an extraction well within the year. In the case of groundwater in the vicinity of MW-34, the estimated travel time to PE-1 at the 2006 extraction rate was about 1 month. The difference in particle velocity at different locations is a function of differences in gradient and hydraulic conductivity.

The particle starting locations used for this analysis were established near MW-34, MW-27, MW-44, and MW-46. The groundwater levels from a set of 13 wells completed in the lower depth interval of the aquifer were used to calculate average gradients for each 2-week interval throughout the 2006 reporting period. Wells used in this analysis included MW-20-130, MW-27-85, MW-28-90, MW-31-135, MW-33-150, MW-34-100, MW-36-100, MW-39-100, MW 42-65, MW-43-90, MW-45-95, MW-49-135, and TW-2D. A contouring program (Surfer 8 by Golden Software) was used to interpolate the water levels between the wells onto a grid computed by kriging. Grid spacing was 17 feet by 15 feet.

The interpolated water-level grids produced by Surfer 8 were used as input to a particle tracking program (FEMPATH-X, which is a part of the MicroFEM modeling package). The program was run in transient mode with 2-week time steps. The hydraulic conductivity distribution that is currently used in Layer 4 (the lower fluvial layer) of the Topock groundwater flow model, combined with the interpolated measured groundwater levels, was used to calculate the rate and direction of particle movement at any location. For this analysis, it was assumed that there was no vertical flow and all particles moved horizontally through the lower depth interval of the aquifer. An effective transport porosity of 0.12 (12 percent) was used in these calculations. This effective transport porosity value was calculated based on breakthrough of low TDS water at the observation wells near the IW-2 injection well.

It should be recognized that the particle tracking analysis makes no use of the groundwater model to simulate gradients. The gradients are based on measured water levels in the wells (2006 monitoring period). The analysis uses the hydraulic conductivity values from the model, which are considered the most accurate estimates of the hydraulic conductivity available but represent an average for hydraulic conductivity for each model node. Localized groundwater travel times may differ from the average travel times due to the presence of relatively small or thin zones of higher or lower hydraulic conductivity that are not represented in the average values assigned to each model node.

5.0 Evaluation of Groundwater Quality Data

5.1 Cr(VI) Distribution and Trends for 2008 Reporting Period

Figure 2-1 presents the Cr(VI) concentration results in floodplain wells in the upper, middle, and lower depth intervals of the Alluvial Aquifer based on the most recent comprehensive groundwater monitoring event in October 2008. The positions of the 50 µg/L and 20 µg/L Cr(VI) concentration contours have remained consistent or decreased slightly overall for the period October 2007 through October 2008 (see prior 2007 annual and 2008 quarterly PMP reports (CH2M HILL, 2008a-d). Generally Cr(VI) concentrations have also decreased in many wells within the groundwater plume over the same time period. In the mid-depth interval, Cr(VI) concentrations decreased in MW-39-70 from 101 µg/L in December 2006 to non-detect or less than 1.0 µg/L in October 2008, as shown in Table B-1 in Appendix B. In the lower depth interval, Cr(VI) concentrations in samples from MW-39-80 and MW-39-100 decreased approximately 27 µg/L and 450 µg/L, respectively, over the reporting period, as shown in Table B-1 in Appendix B. Wells showing marked decreases in concentration are generally in the floodplain area where IM pumping is removing chromium groundwater.

Figure 5-1 presents Cr(VI) trend plots, April 2005 through January 2009, for selected wells in the groundwater plume in the floodplain. Concentration graphs for additional floodplain wells are provided in Appendix B. Monitoring wells showing declining Cr(VI) concentrations during the 2008 reporting period include MW-36-090, MW-36-100, MW-39-80, MW-39-100 and MW-44-115.

The concentration trend for MW-34-100, as shown in Figure 5-1, has shown both short-term declines and increases in concentrations since PE-1 pumping commenced. However, since June 2006, concentrations at this well have shown a general downward trend. The Cr(VI) result from May 6, 2008 sampling of MW-34-100 (234 µg/L) is the lowest concentration measured at this well since May 2005. Concentrations have slightly increased during fourth quarter sampling, as shown in Figure 5-1. 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, respectively). The concentration trend for well MW-44-115 has been overall downward since July 2006, as shown in Figure 5-1. Sampling data from well MW-44-125 show generally stable concentrations since October 2006. Concentrations in well MW-46-175 were generally stable from October 2006 through July 2008 at which point a gradual increase in Cr(VI) concentrations can be seen. The MW-44 and MW-46 well clusters are within the hydraulic capture of IM pumping, as shown in Figures 2-5 and 4-4.

The Cr(VI) concentrations at MW-36-100 (deep well near PE-1) have consistently decreased during December 2006 through October 2008, as shown in Figure 5-1.

5.2 Groundwater Geochemistry in IM Extraction Area

5.2.1 Redox Evaluation

Figure 5-2 shows the mean concentrations and distributions of Cr(VI), ORP, and nitrate from February 2008 through January 2009. Wells with the strongest reducing conditions (ORP values less than -90 millivolts) are shaded dark blue. In wells where ORP is less than -90 millivolts, both Cr(VI) and nitrate are generally non-detect because they are not geochemically stable under reducing conditions. Shaded contour lines that represent the approximate margin of the zone of strong reducing conditions are shown for each depth interval in Figure 5-2. On the landward side of these lines, reducing conditions are not generally strong enough to preclude the presence of Cr(VI).

Reducing conditions are prevalent throughout the shallow and mid-depth floodplain wells. Most of these wells are screened in fluvial sediments. Wells screened in alluvial deposits generally show non-reducing conditions in most areas of the site. The exception is in a few deep alluvial wells (MW-49 cluster, MW-41D, and OW-3D) that show reducing conditions. Alluvial materials in this aquifer generally contain low amounts of organic carbon and are considerably older than the fluvial deposits. Fluvial deposits typically contain more organic carbon at the time of deposition than alluvial deposits, and the shallow fluvial wells in the floodplain have measurable dissolved organic carbon. Organic carbon supports the growth of soil microbes that consume oxygen and produce the reducing conditions. Over geologic time scales (tens and hundreds of thousands of years), organic carbon that is present at deposition can be gradually depleted until not enough remains to support a reducing environment. Microbial communities in geologically-recent floodplain deposits thrive off the still-present organic carbon and act to catalyze the reduction of Cr(VI) to trivalent chromium, which is insoluble and consequently removed from groundwater. Older (deeper) fluvial deposits with depleted organic carbon provide less support for the microbial communities, and deeper groundwater in those areas is less reducing as a result. The very deepest and oldest groundwater may lose oxygen and become more reducing as dissolved oxygen slowly reacts with iron and other minerals in the aquifer over long periods of time. As mentioned above, reducing conditions are observed in several deep alluvial wells and in wells completed in bedrock at the site.

In Figure 5-2, the upper zone contour line defining the edge of reducing groundwater is inferred from middle zone wells. The shallow wells from the MW-30, -36, and -39 clusters were removed from the PMP in 2008 and, as a result, those data are not available to define the line as in past years. However, the medium-depth wells in these clusters still show strongly negative ORP and the presence of dissolved manganese and dissolved iron, and the shallow wells would be expected to have the same properties. The contour line of reducing groundwater was drawn with this assumption in mind. The wells to the east of the line are non-detect for nitrate and Cr(VI). One exception to this pattern is MW-29, which has an ORP of -155 millivolts but has a Cr(VI) detection of 0.3 µg/L, slightly above the reporting limit of 0.2 µg/L. This is based on a single sample result of 0.38 J (September 30, 2008), reported as an estimated value due to sample matrix issues. The other two samples from MW-29 collected in 2008 were below reporting limit.

Most mid-depth wells east of the MW-39 cluster had an average ORP of close to or less than -90 millivolts and non-detect concentrations of Cr(VI). One exception is MW-27-060, which has an ORP of -50.7 millivolts and a Cr(VI) concentration of 0.2 µg/L (based on one detection of 0.32 µg/L and a non-detect of <0.2 µg/L). The limits of reducing conditions are further east in deep wells on the floodplain than the shallow and mid-depth wells. Wells east of the deep MW-36 cluster wells that have detectable Cr(VI) are MW-34-100, MW-44-115, MW-44-125 MW-46-175, and MW-46-205 and, with the exception of MW-46-175, all have ORP values greater than -90 millivolts (i.e., less negative values or positive values).

TDS is variable within each depth interval. The two natural sources of salts in floodplain wells appear to be shallow sediments where salts have been concentrated through evapotranspiration and deep materials containing older groundwater that has picked up salts from contact with the aquifer materials over long periods of time. Salts exuded from salt cedar trees may also contribute high salinity in shallow floodplain groundwater near salt cedar thickets.

Figure 5-3 shows the average Cr(VI) concentrations and geochemical indicator parameters, including TDS, along the west-to-east floodplain Cross-section A. As illustrated on Figure 5-2, the sampling locations with ORP less than -90 millivolts are non-detect for Cr(VI) and nitrate. Note also that TDS concentrations are highest in the shallow groundwater near MW-30-30 and higher in the deepest screened intervals in the other wells in this cross-section. Historic aerial photographs show a shallow, landlocked pool present on the sandbar near the location of the MW-30 cluster, which could have resulted in a localized concentration of salts through evaporation.

Groundwater quality data for performance monitoring wells from February 2005 through January 2009 are presented in Appendix C. Table C-1 shows groundwater indicator parameters and selected general chemistry results for wells near IM pumping. Table C-2 presents chemical performance monitoring results. Figure C-2 presents time-series plots of Cr(VI) and ORP in wells along floodplain cross-section A. These figures illustrate further the influence of IM pumping on nearby floodplain wells, with Cr(VI) values decreasing in several wells since the start of extraction. Specific conductance may be influenced by infiltration of river water (which would tend to decrease the value) or by the downward movement of more saline groundwater (causing an increase). Gradients induced by pumping and changes in river levels are likely related factors.

5.2.2 General Chemistry Evaluation

There were 12 floodplain wells sampled for chemical performance monitoring parameters over the period of March 2004 through December 2008. The majority of the parameters in these wells remained stable through the reporting period (Table C-1). Shallow depth wells exhibit both increases and decreases in some of these same parameters over the reporting period, but in these cases, it is interpreted as natural variation because some values were similar to those measured in previous years. Little change was evident in the river samples R-27 and R-28.

5.2.3 Stable Isotope Evaluation

Analysis of stable isotope data may provide some insight to the source water for certain site wells but does not appear to provide a reliable method for distinguishing wells that may be affected by the discharge of cooling water from some other wells that are clearly not so affected.

Figure 5-4 shows the results of stable isotopes of oxygen and deuterium in floodplain wells using data collected during the annual reporting period. This same plot is provided with wells within each category identified in Figure C-1 (Appendix C). The points that plot to the upper right in this plot are considered heavier in isotopic signature (i.e., enriched in heavy isotopes), while the points that plot to the lower left are considered lighter in isotopic signature. In this plot, it is apparent that the lighter signatures are dominated by river samples (with some wells showing similar signature), whereas the heaviest signatures are found in selected floodplain wells which likely contain higher percentages of water that has flowed from the upland areas.

6.0 Conclusions and Status of IM Operations

6.1 2008 Performance Evaluation

In July 2005, the IM No. 3 treatment facilities were commissioned, and the current IM groundwater extraction system was established. As of March 2009, the IM has operated full time for 5 years (approximately 16 months for IM No. 2 and 44 months for IM No. 3) and has been successful in meeting the IM objectives and performance criteria. This section summarizes the conclusions of IM operations and performance monitoring for the 2008 reporting period.

6.1.1 Attainment of Performance Standard

Throughout 2008, the IM extraction system (combined wells TW-3D and PE-1) operated at the target pumping rate of 135 gpm, excluding periods of planned and unplanned downtime. The operational run-time percentage for the extraction system was over 94 percent during the 2008 reporting period. The average pumping rate for the IM extraction system, including downtime, during the annual period was 127.7 gpm. The results and conclusions of the 2008 performance evaluation include:

- A total of 66,922,062 gallons of groundwater was extracted and treated at the IM No. 3 system during the annual reporting period. The IM system removed approximately 739 pounds (335 kilograms) of chromium from the aquifer during the reporting period.
- The IM pumping rate was sufficient to maintain the minimum landward gradient throughout the 2008 annual reporting period. Hydraulic gradient monitoring indicated that landward gradients exceeded the minimum gradient target of 0.001 feet/foot during each month of the reporting period. The strong landward gradients were maintained even during the period of lower river stages in November 2008 through January 2009.
- The landward gradients measured during 2008 were up to 12.6 times greater than the required minimum magnitude (central and southern well pairs). Gradients measured in the northern well pair were lower but still well above the target each month.
- The current gradient well pairs are adequate to define the capture of the plume while pumping from extraction wells TW-3D and PE-1.
- The hydraulic gradient monitoring showed that all floodplain monitoring wells where Cr(VI) was detected at greater than 20 µg/L were within the capture zone of the IM extraction system.

6.1.2 Cr(VI) Distribution and Trends

The key conclusions on Cr(VI) distribution and trends observed in the IM performance monitoring area during 2008 include:

- Overall, the groundwater Cr(VI) concentrations in the floodplain are stable or decreasing. The ongoing monitoring has shown marked decreases in Cr(VI) concentration in the floodplain areas where IM pumping exerts a strong influence on hydraulic gradients (e.g., well clusters MW-36, MW-39, and MW-44).
- Based on comprehensive groundwater sampling events (conducted October 2006 through October 2008), the positions of the 50 µg/L and 20 µg/L Cr(VI) concentration contours have remained consistent or slightly smaller overall in the performance monitoring area. However, the Cr(VI) concentrations have decreased in many wells within the groundwater plume over this monitoring period.
- The concentration trend for MW-34-100 has shown both short-term declines and increases in concentrations since PE-1 pumping commenced in January 2006. Since June 2006, concentrations at this well have shown a general downward trend with an increase in Fourth Quarter 2008 samples. 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.
- The distribution of Cr(VI) in the performance monitoring area is significantly affected by the redox conditions in the aquifer. Organic-rich fluvial sediments in the floodplain support a broad area of reducing conditions that convert Cr(VI) to trivalent chromium.
- The groundwater ORP and stable isotopes monitoring data confirm that continued IM extraction is drawing more oxidizing river-influenced groundwater into the performance monitoring area.

6.2 Status of Operations and Monitoring

6.2.1 Extraction System Operations

Per DTSC direction, PG&E will continue to operate both TW-3D and PE-1 at a target combined pumping rate of 135 gpm, except for periods of planned and unplanned downtime. Treated groundwater will be discharged into the IM No. 3 injection wells in accordance with Waste Discharge Requirements Order No. R7-2006-0060. Saline water generated as a byproduct of the reverse osmosis process will continue to be transported offsite for treatment and disposal.

PG&E will balance the pumping rates between TW-3D and PE-1 to maintain the target pumping rate and maintain appropriate hydraulic gradients across the Alluvial Aquifer. If, at any time, hydraulic data indicate that PE-1 pumping has the potential to draw higher concentrations of chromium away from the capture zone of TW-3D, PG&E will request authorization from DTSC to increase the pumping rate at TW-3D and decrease the rate at PE-1. TW-2D will serve as a backup extraction well to TW-3D and PE-1.

Current USBR projections show that the river levels will increase during the next quarterly reporting period (February through April 2009) and into the summer months, followed by a decline during the fall. The lowest river levels during the upcoming IM operations year are expected to occur in December 2009-January 2010. By May-June 2009, the average monthly

river elevations are projected to reach their maximum level of the year, as shown in Figure 2-8.

6.2.2 Performance Monitoring Program

The extraction and groundwater monitoring wells in the PMP are described in Section 1.1 of this report and the specific monitoring activities are summarized in Sections 2.2 (chromium sampling), Section 2.3 (general chemistry sampling), and Section 2.4 (hydraulic gradient monitoring). Appendix E contains updated listings of the extraction and monitoring wells in the PMP area that are currently used for IM hydraulic monitoring, as well as groundwater sampling information for the wells used for chromium, geochemical, and general chemistry performance monitoring.

An additional component of the PMP involves the IM Contingency Plan for monitoring and reporting Cr(VI) results in the floodplain performance monitoring area. The original IM Contingency Plan was approved by DTSC as part of the IM performance requirements (DTSC, 2005). In a letter dated July 14, 2008 DTSC approved updated IM Contingency Plan trigger levels. Current IM Contingency Plan trigger levels are included in Table E-3 of Appendix E. IM Contingency Plan trigger levels will be evaluated again in 2009.

The PMP monitoring, evaluation, and reporting activities for the 2009 operations period will continue as described in the Performance Monitoring Plan and as directed by the DTSC. In accordance with DTSC's recent approval (DTSC, 2007a), the next IM Performance Monitoring Report will present IM operations and performance monitoring data from February 1, 2009 through April 30, 2009 (first quarter 2009 reporting period). The next quarterly performance monitoring report will be submitted on May 30, 2009.

7.0 References

California Department of Toxic Substances Control (DTSC). 2005. Letter to PG&E: "Criteria for Evaluating Performance Requirements of Interim Measure to Hydraulic Control of Chromium Plume in Floodplain." February 14.

_____. 2007a. Letter to PG&E. "Approval of Updates and Modifications to the Interim Measures Performance Monitoring Program, Pacific Gas & Electric Company, Topock Compressor Station." October 12.

_____. 2007b. Letter to PG&E. "Conditional Approval of Updates and Modifications to the Groundwater and Surface Water Monitoring Program, Pacific Gas & Electric Company, Topock Compressor Station." September 28.

_____. 2008a. Letter. "Modifications to Hydraulic Data Collection for the Interim Measures Performance Monitoring Program at Pacific Gas and Electric Company (PG&E), Topock Compressor Station, Needles, California." July 14.

_____. 2008b. Letter. "Modifications to Chemical Performance Monitoring and Contingency Plan for the Floodplain Interim Measures Performance Monitoring Program at Pacific Gas and Electric Company (PG&E), Topock Compressor Station, Needles, California." July 17.

CH2M HILL. 2005a. *Draft Performance Monitoring Plan for Interim Measures in the Floodplain Area. PG&E Topock Compressor Station, Needles, California.* April 15.

_____. 2005b. *Topock Program Sampling, Analysis, and Field Procedures Manual, Revision 1, PG&E Topock Compressor Station.* March 31.

_____. 2006. *Performance Monitoring Report for Fourth Quarter 2005 and Annual Performance Evaluation, February 2005 through January 2006. PG&E Topock Compressor Station, Needles, California.* March 16.

_____. 2007. *Performance Monitoring Report for Fourth Quarter 2006 and Annual Performance Evaluation, February 2006 through January 2007, PG&E Topock Compressor Station, Needles, California.* April 6.

_____. 2008a. *Performance Monitoring Report for Fourth Quarter 2007 and Annual Performance Evaluation, February 2007 through January 2008, PG&E Topock Compressor Station, Needles, California.* March 14.

_____. 2008b. *Quarterly Performance Monitoring Report and Evaluation, February through April 2008, PG&E Topock Compressor Station, Needles, California.* May 30.

_____. 2008c. *Quarterly Performance Monitoring Report and Evaluation, May through July 2008, PG&E Topock Compressor Station, Needles, California.* August 29.

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

Tables

TABLE 2-1

Pumping Rate and Extracted Volume for IM System November 2008 through January 2009

Performance Monitoring Report for Fourth Quarter 2008
and Annual Performance Evaluation, February 2008 through January 2009
PG&E Topock Compressor Station, Needles,California

Extraction Well ID	November 2008		December 2008		January 2009		Fourth Quarter 2008		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	0.00	0	0.09	3,833	0.00	0	0.03	3,833	53,090,683
TW-03D	103.90	4,488,525	99.66	4,448,815	101.16	4,515,589	101.57	13,452,929	160,898,236
PE-01	27.81	1,201,260	25.59	1,142,311	24.65	1,100,502	26.02	3,444,073	49,712,315
TOTAL	**131.7**	**5,689,785**	**125.3**	**5,594,959**	**125.8**	**5,616,091**	**127.6**	**16,900,835**	264,702,013
							Volume Pumped from the MW-20 Well Cluster		1,527,724
							Total Volume Pumped (gal)		266,229,737
							Total Volume Pumped (ac-ft)		817.0

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 2-2

Analytical Results for Extraction Wells, August 2008 through January 2009

Performance Monitoring Report for Fourth Quarter 2008
and Annual Performance Evaluation, February 2008 through January 2009
PG&E Topock Compressor Station, Needles,California

Well ID	Sample Date	Dissolved Total Chromium µg/L	Hexavalent Chromium µg/L	Total Dissolved Solids mg/L
TW-3D	06-Aug-08	1450	1440	5270
TW-3D	04-Sep-08	1380	1490	5250
TW-3D	01-Oct-08	1300	1460	5640
TW-3D	04-Dec-08	1360	1570	5430
TW-3D	09-Jan-09	1300	1570	5770
PE-1	06-Aug-08	27.4	28.2	4090
PE-1	04-Sep-08	28.0	29.7	3810
PE-1	01-Oct-08	27.5	27.6	3600
PE-1	04-Dec-08	32.3	28.8	3700
PE-1	09-Jan-09	27.6	33.4	3740

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

TABLE 2-3

Average Hydraulic Gradients Measured at Well Pairs, November 2008 through January 2009

Performance Monitoring Report for Fourth Quarter 2008
and Annual Performance Evaluation, February 2008 through January 2009
PG&E Topock Compressor Station, Needles,California

Well Pair [a]	Reporting Period	Mean landward Hydraulic Gradient [b] (feet/foot)	Measurement Dates
NorthernGradient Pair	November	0.0023	November 1 through November 30
MW-31-135 / MW-33-150	December	0.0018	December 1 through December 31
	January	0.0023	January 1 through January 31
CentralGradient Pair	November	0.0104	November 1 through November 30
MW-45-95 / MW-34-100	December	0.0093	December 1 through December 31
	January	0.0103	January 1 through January 31
SouthernGradient Pair	November	0.0041	November 1 through November 30
MW-45-95 / MW-27-85	December	0.0028	December 1 through December 31
	January	0.0032	January 1 through January 31

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 2-4

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

Performance Monitoring Report for Fourth Quarter 2008
and Annual Performance Evaluation, February 2008 through January 2009
PG&E Topock Compressor Station, Needles,California

	Davis Dam Release			Colorado River Elevation at I-3		
Month	Projected (cfs)	Actual (cfs)	Difference (cfs)	Predicted (ft AMSL)	Actual (ft AMSL)	Difference (feet)
January 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	453.6	454.02	0.4
February 2009	10,800			454.2		

NOTES:

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

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

3) 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 differences between USBR projections and actual dam releases/Havasu reservoir levels, rather than the multiple regression error.

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

TABLE 3-1

Summary of Pumping Rate and Extracted Volume for 2008 Reporting Period

Performance Monitoring Report for Fourth Quarter 2008
and Annual Performance Evaluation, February 2008 through January 2009
PG&E Topock Compressor Station, Needles,California

Reporting Period	Target Pump Rate[a] (gpm)	Actual Monthly Pump Rate (gpm)	Individual Extraction Well Operations				Total Volume (gallons)
			TW-2S (gallons)	TW-2D (gallons)	TW-3D (gallons)	PE-1 (gallons)	
Feb-08	135	133.4	0	0	4,263,341	1,306,246	5,569,588
Mar-08	135	124.4	0	0	4,215,795	1,335,196	5,550,990
Apr-08	135	103.0	0	0	3,395,408	1,055,054	4,450,463
May-08	135	129.5	0	0	4,447,202	1,331,581	5,778,784
Jun-08	135	132.4	0	1,067	4,363,823	1,354,951	5,719,841
Jul-08	135	130.1	0	0	4,489,231	1,316,769	5,806,000
Aug-08	135	132.6	0	0	4,642,757	1,274,947	5,917,704
Sep-08	135	124.8	0	6,788	4,234,061	1,151,305	5,392,153
Oct-08	135	130.7	0	20,404	4,566,617	1,248,684	5,835,705
Nov-08	135	131.7	0	0	4,488,525	1,201,260	5,689,785
Dec-08	135	125.3	0	3,833	4,448,815	1,142,311	5,594,959
Jan-09	135	125.8	0	0	4,515,589	1,100,502	5,616,091
Totals for 2008 Annual Period		**127.7**	**0**	**32,092**	**52,071,164**	**14,818,806**	**66,922,062**

Notes:

[a]The target pumping rate of 135 gpm, excluding periods of planned and unplanned downtime, was maintained by pumping from extraction wells TW-3D and PE-1 during the 2008 reporting period.
Extraction wells TW-2S and TW-2D were only used for interim service or to support field operations.

TABLE 3-2

Analytical Results from Extraction Wells for February 2008 through January 2009 Reporting Period

Performance Monitoring Report for Fourth Quarter 2008
and Annual Performance Evaluation, February 2008 through January 2009
PG&E Topock Compressor Station, Needles,California

Well ID	Sample Date	Dissolved Chromium (total) µg/L	Hexavalent Chromium µg/L	Total Dissolved Solids mg/L
TW-3D	06-Feb-08	1600	1760	5690
TW-3D	05-Mar-08	1740	1810	4730
TW-3D	02-Apr-08	2010	1550	4450
TW-3D	08-May-08	1740	1540	5320
TW-3D	04-Jun-08	1700	1460	5220
TW-3D	02-Jul-08	1780	1460	5660
TW-3D	06-Aug-08	1450	1440	5270
TW-3D	04-Sep-08	1380	1490	5250
TW-3D	01-Oct-08	1300	1460	5640
TW-3D	04-Dec-08	1360	1570	5430
TW-3D	09-Jan-09	1300	1570	5770
PE-1	06-Feb-08	44.1	42.8	4360
PE-1	05-Mar-08	40.8	39.5	4080
PE-1	02-Apr-08	37.1	29.0	4180
PE-1	08-May-08	29.3	26.4	4100
PE-1	04-Jun-08	33.4	16.0	3560
PE-1	02-Jul-08	28.7	25.7	4060
PE-1	06-Aug-08	27.4	28.2	4090
PE-1	04-Sep-08	28.0	29.7	3810
PE-1	01-Oct-08	27.5	27.6	3600
PE-1	04-Dec-08	32.3	28.8	3700
PE-1	09-Jan-09	27.6	33.4	3740

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 of Appendix B.

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

TABLE 4-1

Calculated Hydraulic Gradients for Well Pairs by Month for 2008 Reporting Period

Performance Monitoring Report for Fourth Quarter 2008
and Annual Performance Evaluation, February 2008 through January 2009
PG&E Topock Compressor Station, Needles,California

Well Pair[a]	Reporting Period 2008-2009	Mean Landward Hydraulic Gradient[b] (feet/foot)	Measurement Period 2008-2009
Northern Gradient Pair			
MW-31-135 / MW-33-150	February	0.0025	Feb-1 through Feb-28
	March	0.0023	Mar-1 through Mar-30
	April	0.0021	Apr-1 through Apr-30
	May	0.0021	May-1 through May-30
	June	0.0025	Jun-1 through Jun-28
	July	0.0024	Jul-1 through Jul-31
	August	0.0021	Aug-1 through Aug-31
	September	0.0020	Sep-1 through Sep-30
	October	0.0019	Oct-1 through Oct 31
	November	0.0023	Nov-1 through Nov-30
	December	0.0018	Dec-1 through Dec-31
	January	0.0023	Jan-1 through Jan-31
Central Gradient Pair			
MW-45-95 / MW-34-100	February	0.0124	Feb-1 through Feb-28
	March	0.0111	Mar-1 through Mar-30
	April	0.0074	Apr-1 through Apr-30
	May	0.0104	May-1 through May-31
	June	0.0126	Jun-1 through Jun-28
	July	0.0113	Jul-1 through Jul-31
	August	0.0086	Aug-1 through Aug-31
	September	0.0053	Sep-1 through Sep-30
	October	0.0039	Oct-1 through Oct-31[c]
	November	0.0104	Nov-1 through Nov-30[d]
	December	0.0093	Dec-1 through Dec-31
	January	0.0103	Jan-1 through Jan-28
Southern Gradient Pair			
MW-45-95 / MW-27-85	February	0.0050	Feb-1 through Feb-28
	March	0.0045	Mar-1 through Mar-31
	April	0.0032	Apr-1 through Apr-30
	May	0.0019	May-1 through May-31
	June	0.0047	Jun-1 through Jun-28
	July	0.0042	Jul-1 through Jul-31
	August	0.0030	Aug-1 through Aug-31
	September	0.0018	Sep-1 through Sep-30
	October	0.0019	Oct-1 through Oct-31[c]
	November	0.0041	Nov-1 through Nov-30[d]
	December	0.0028	Dec-1 through Dec-31
	January	0.0032	Jan-1 through Jan-28

Notes:

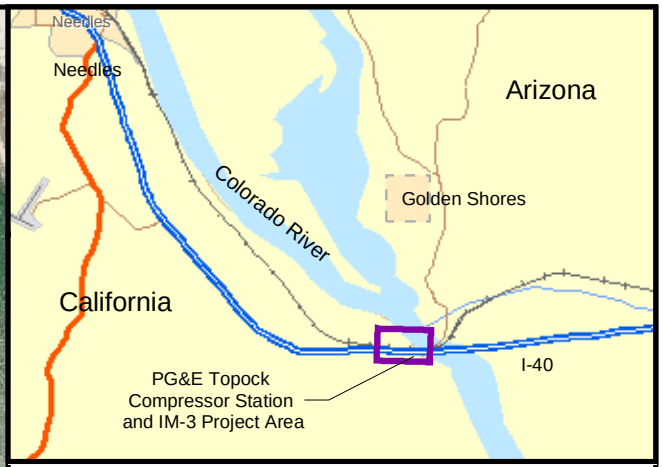
a. Refer to Figure 1-2 for location of well pairs.

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

c. Data not available October 29-31, 2008 for this well pair.

d. Data not available November 1-19, 2008 for this well pair.

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 Interim Measures No.3 (IM-3) facilities as of of January 2006. Aerial photography taken May 2005.

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

PERFORMANCE MONITORING REPORT FOR FOURTH QUARTER 2008 AND ANNUAL PREFORMANCE EVALUATION, FEBRUARY 2008 THROUGH JANUARY 2009
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

BAO \\ZINFANDEL\PROJ\PACIFICGASELECTRICCO\TOPOCKPROGRAM\GIS\MAPFILES\2009\ANNUALPERFORMANCE\IMPM_MARCH06_LOCS_IM3_FACILITIES_SHIFTED.MXD 3/3/2009 11:47:53

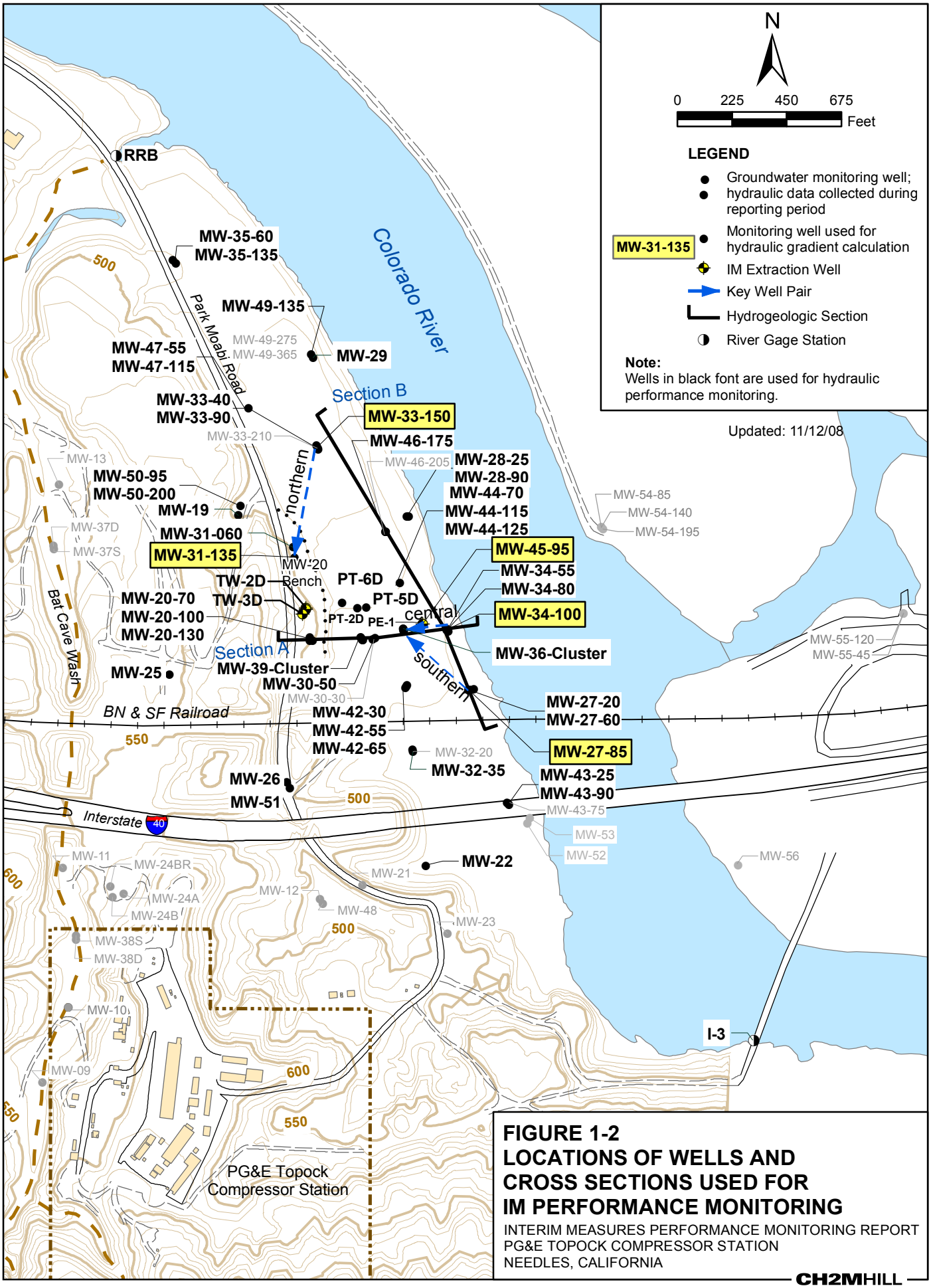
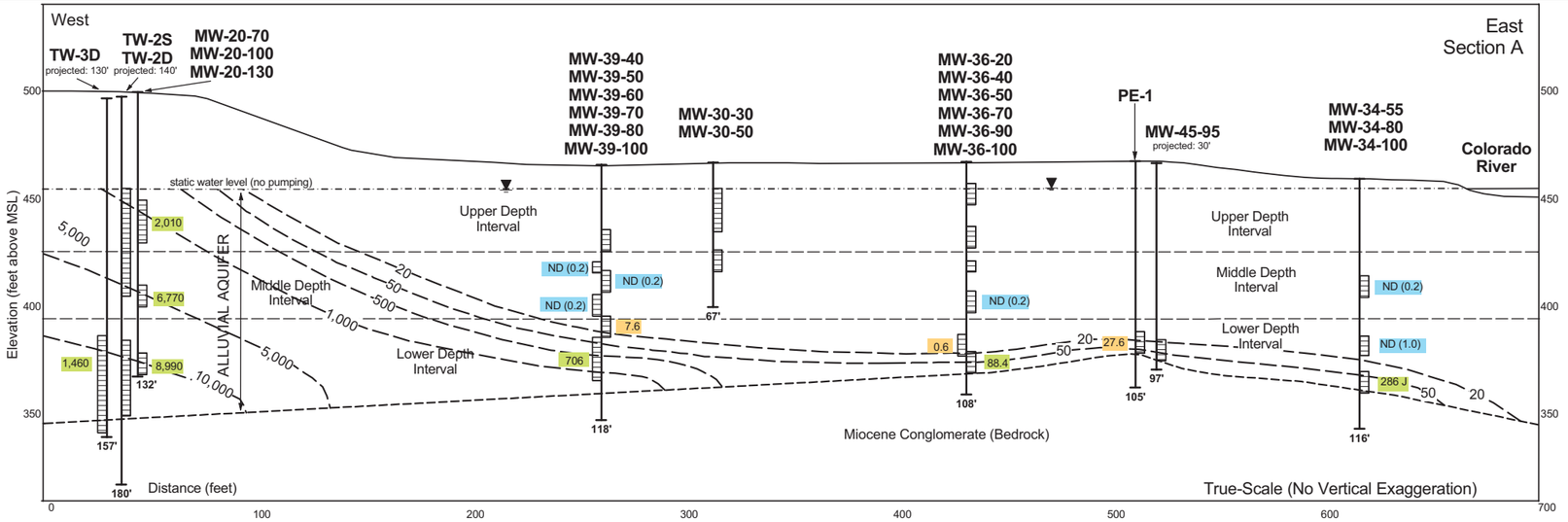


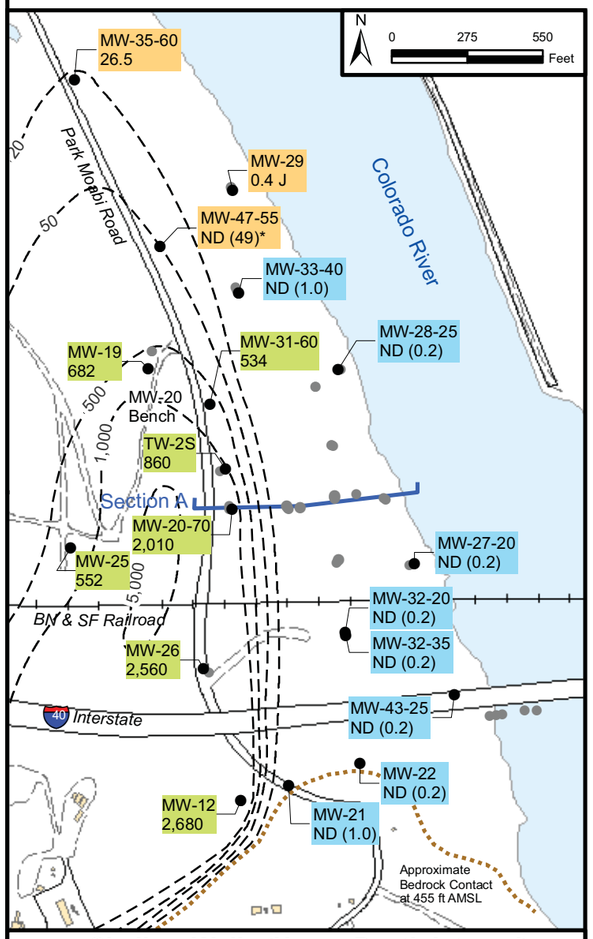
FIGURE 1-2
LOCATIONS OF WELLS AND CROSS SECTIONS USED FOR IM PERFORMANCE MONITORING

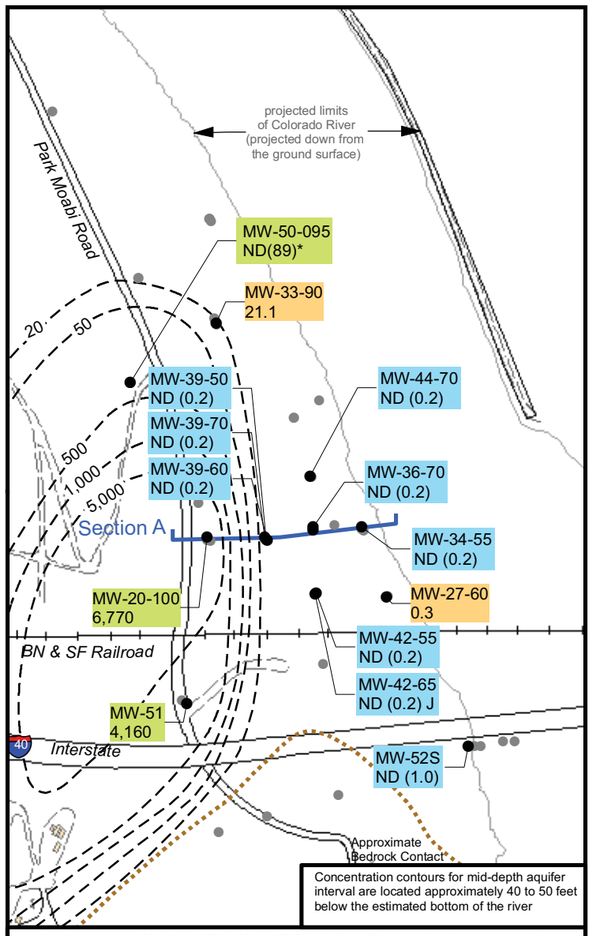
INTERIM MEASURES PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

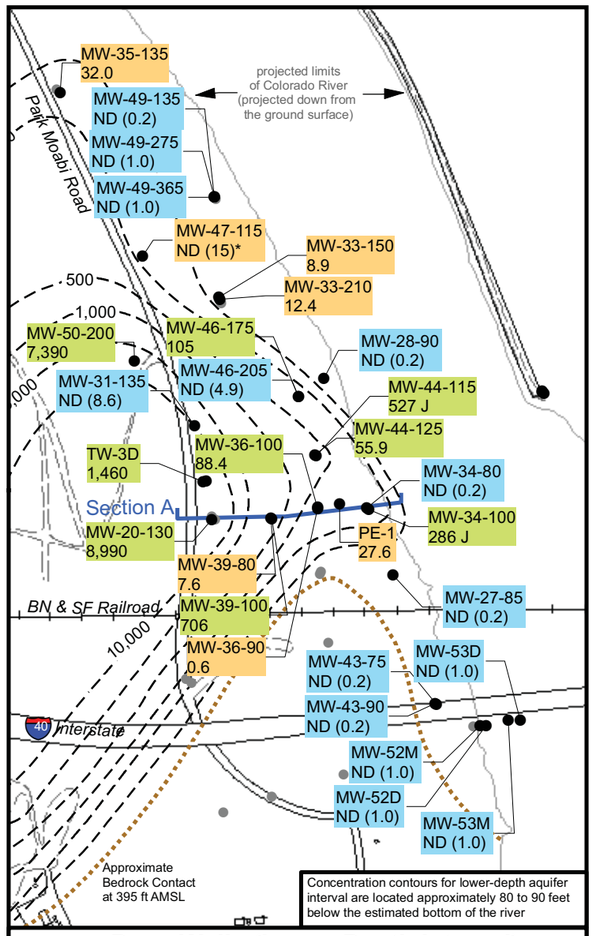
CH2MHILL

BAO \\ZINFANDEL\PROJ\PACIFICGASELECTRICCO\TOPOCKPROGRAM\GIS\MAPFILES\2008\PMP\PMP_WELLS_SECTIONS_8X11_NOV08.MXD PMP_WELLS_SECTIONS_8X11M_NOV08.PDF 11/25/2008 17:46:26









LEGEND

Results posted are maximum Cr(VI) concentrations from October 2008 groundwater sampling. 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

* = Cr(VI) has been detected at this location in prior 2008 sampling and color shading reflects prior concentrations.

— — 50 — — Inferred Cr(VI) concentration contour within aquifer depth interval based on October 2008 sampling results.

The contours depicted for October 2008 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 contour of 20 and 50 µg/L are shown in accordance with DTSC's 2005 performance monitoring directive.

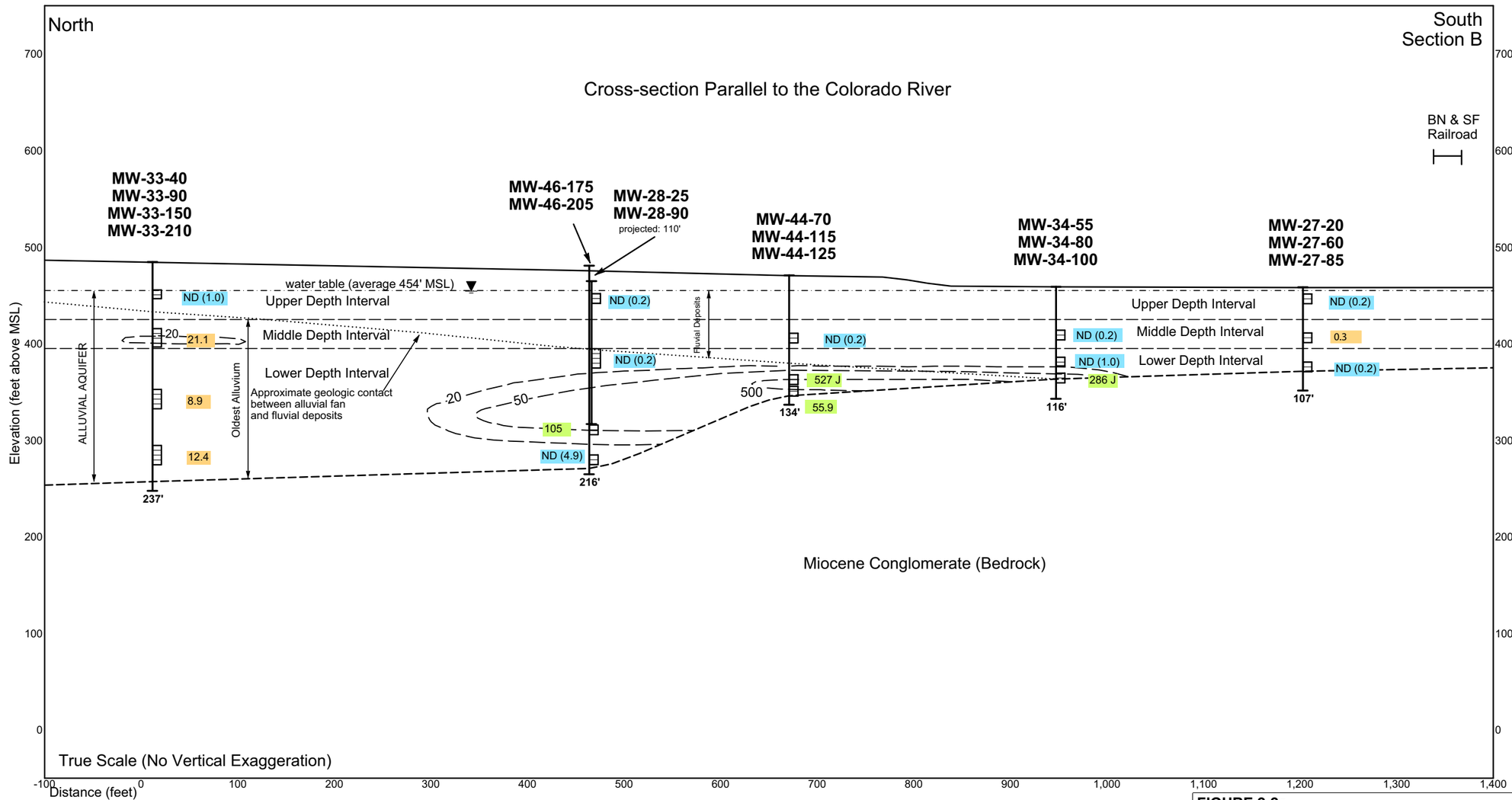
2. The locations of the Cr(VI) contours shown for depths 80-90 feet below the Colorado River (east of well cluster MW-34) are estimated based on hydrogeologic and geochemical conditions documented in site investigations. The actual locations of contours beyond well control points in this area is not certain, but are 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 2-1
MAXIMUM Cr(VI) CONCENTRATIONS IN ALLUVIAL AQUIFER, OCTOBER 2008

Performance Monitoring Report for Fourth Quarter 2008 and Annual Performance Evaluation, February 2008 through January 2009
PG&E Topock Compressor Station
Needles,California

CH2MHILL



Notes:

Results posted are maximum Cr(VI) concentrations from October 2008 groundwater sampling.

See Table B-1 in Appendix B for additional sampling data.

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 2-2a
Cr(VI) CONCENTRATIONS, FLOODPLAIN CROSS-SECTION B, OCTOBER 2008

PERFORMANCE MONITORING REPORT
FOR FOURTH QUARTER 2008 AND
ANNUAL PERFORMANCE EVALUATION,
FEBRUARY 2008 THROUGH JANUARY 2009
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

C:\DOCUMENTS AND SETTINGS\SBEVILLE\DESKTOP\GINT\TOPOCK_GINT (TEMP)\PMR_3Q_2008\FIGURE_3-2_XSECB_CR.GDW;

Cross-section Parallel to the Colorado River

North

South
Section B

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)

Upper Depth Interval
Middle Depth Interval
Lower Depth Interval

ALLUVIAL AQUIFER

Oldest Alluvium

Fluvial Deposits

Approximate geologic contact
between alluvial fan
and fluvial deposits

ND (1.0)
20
23.2
10.4
13.2
237'

ND (0.2)
ND (0.2)
20
50
192
4.3
216'

ND (0.2)
429
312
134'

500
ND (1.0)
519
116'

ND (0.2)
ND (1.0)
107'

Miocene Conglomerate (Bedrock)

True Scale (No Vertical Exaggeration)

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

Notes:

Results posted are maximum Cr(VI) concentrations from groundwater sampling events occuring between November 2008 and January 2009.

See Table B-1 in Appendix B for additional sampling data and prior results for wells on this cross-section that were not sampled in the November 2008 toJanuary 2009 reporting period.

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 2-2b
Cr(VI) CONCENTRATIONS
FLOODPLAIN CROSS-SECTION B,
NOVEMBER 2008 TO JANUARY 2009

PERFORMANCE MONITORING REPORT
FOR FOURTH QUARTER 2008 AND
ANNUAL PERFORMANCE EVALUATION,
FEBRUARY 2008 THROUGH JANUARY 2009
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

C:\DOCUMENTS AND SETTINGS\CHALL6\MY DOCUMENTS\GINT\ANNUAL\FIGURE_2-2B_XSECB_CR.GDW;

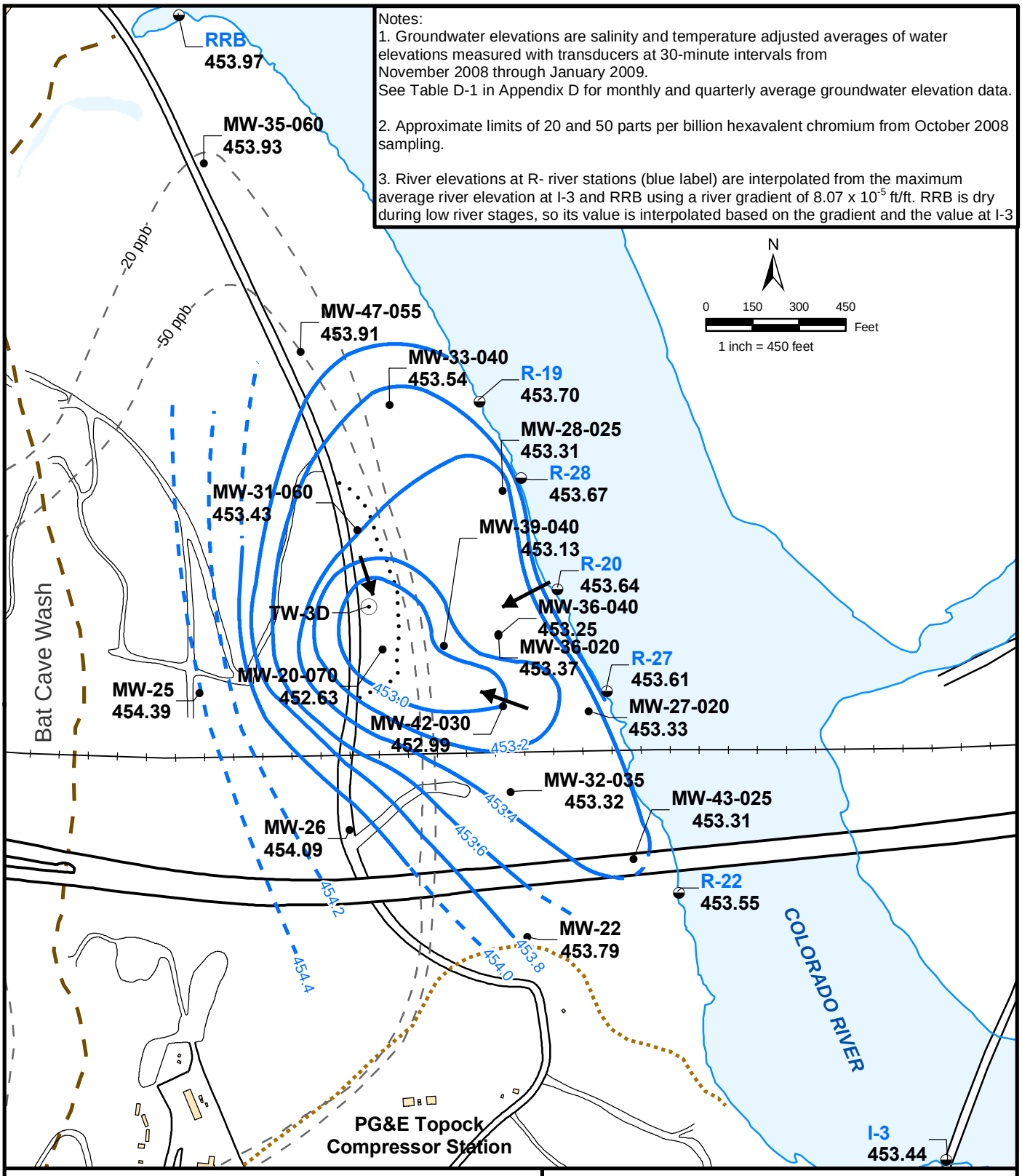


FIGURE 2-3
AVERAGE GROUNDWATER ELEVATIONS SHALLOW WELLS, NOVEMBER 2008 THROUGH JANUARY 2009

PERFORMANCE MONITORING REPORT FOR FOURTH QUARTER 2008 AND ANNUAL PREFORMANCE EVALUATION, FEBRUARY 2008 THROUGH JANUARY 2009
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

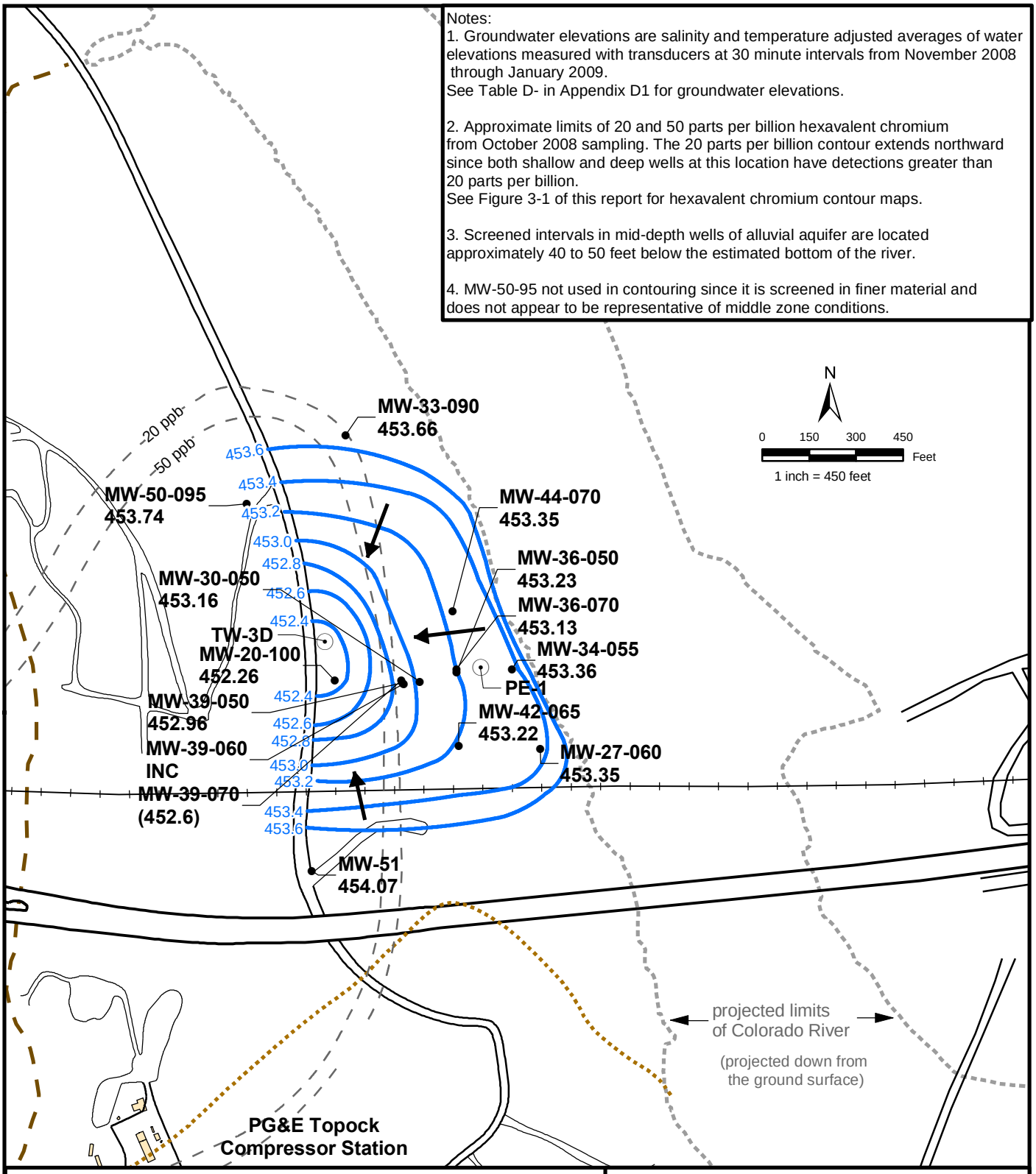


FIGURE 2-4
AVERAGE GROUNDWATER ELEVATIONS MID-DEPTH WELLS, NOVEMBER 2008 THROUGH JANUARY 2009

PERFORMANCE MONITORING REPORT FOR FOURTH QUARTER 2008 AND ANNUAL PREFORMANCE EVALUATION, FEBRUARY 2008 THROUGH JANUARY 2009
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

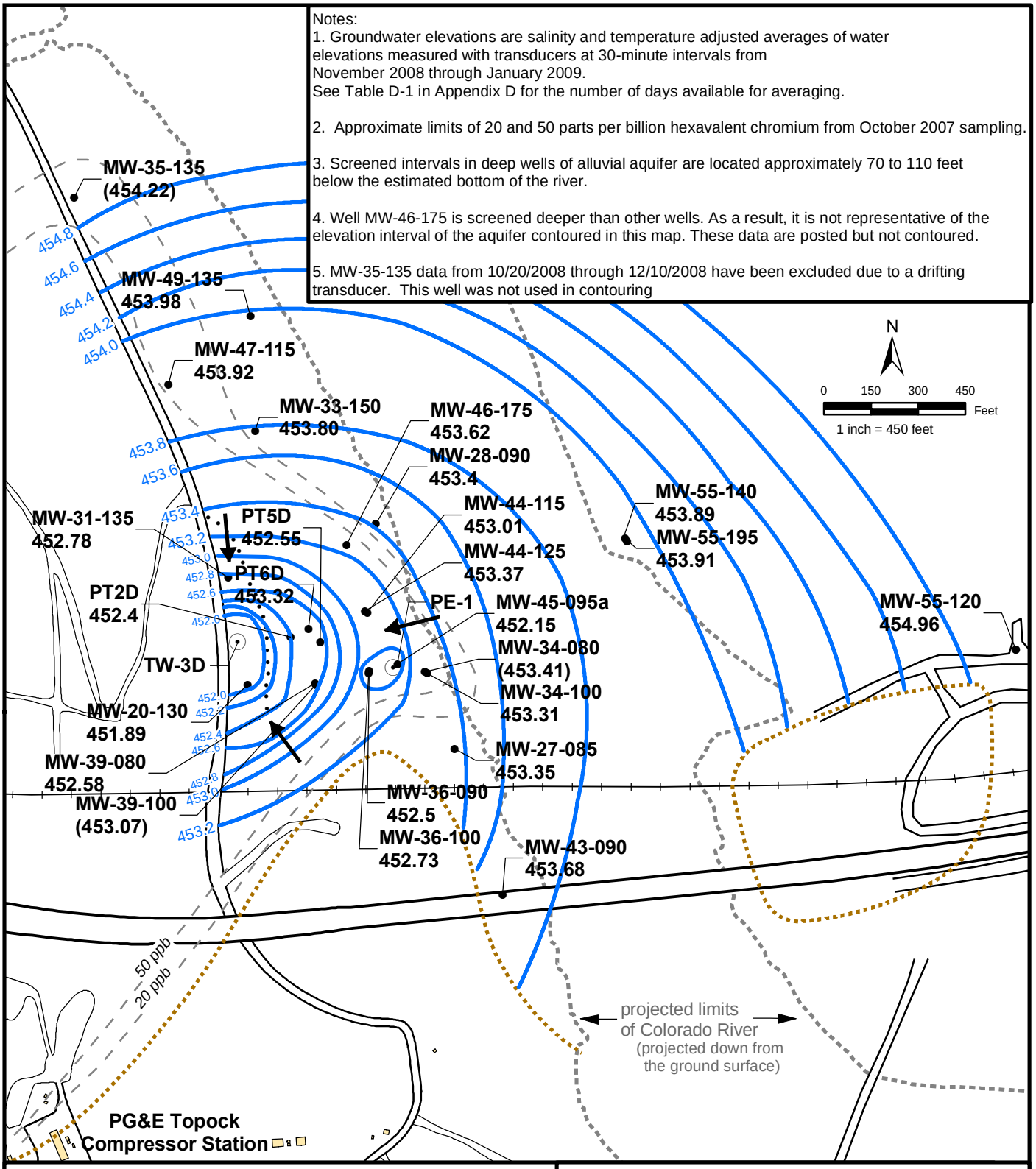


FIGURE 2-5
AVERAGE GROUNDWATER ELEVATIONS IN DEEP WELLS, NOVEMBER 2008 THROUGH JANUARY 2009

PERFORMANCE MONITORING REPORT FOR FOURTH QUARTER 2008 AND ANNUAL PREFORMANCE EVALUATION, FEBRUARY 2008 THROUGH JANUARY 2009
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

West

East
Section A

TW-2S
TW-2D
projected: 140'

TW-3D
projected: 130'

MW-20-70
MW-20-100
MW-20-130

MW-39-40
MW-39-50
MW-39-60*
MW-39-70
MW-39-80
MW-39-100

MW-30-30
MW-30-50

MW-36-20
MW-36-40
MW-36-50
MW-36-70
MW-36-90*
MW-36-100

PE-1

MW-45-95
projected:30'

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

Colorado
River

Elevation (feet above MSL)

550
500
450
400
350
300
250

452.63
452.26
451.89
132'
157'
180'
452.4
452.2
452.0
451.8
20
452.6
50
452.8
453.0
453.13
452.97
208
452.60
452.59
453.08
118'
67'
453.17
453.2
453.38
453.26
453.23
453.13
452.5
452.73
108'
Groundwater Divide
453.0
452.8
452.6
452.48
97'
105'
453.4
453.36
452.88
453.64
116'
453.64

Miocene Conglomerate (Bedrock)

True-Scale (No Vertical Exaggeration)

0 Distance (feet) 100 200 300 400 500 600 700

Notes:
Results show average groundwater elevations for November 1, 2008 through January 31, 2009 measured with transducers at 30-minute intervals.

Groundwater elevations adjusted for salinity and temperature.
Well MW-34-080*, MW-34-100*, 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
Inferred water table
well screen
455.23 Monthly average groundwater head (ft AMSL)
103 boring depth (feet)

20 Inferred hexavalent chromium contour (ppb)

453.5 Groundwater head contour

453.5 Inferred groundwater head contour

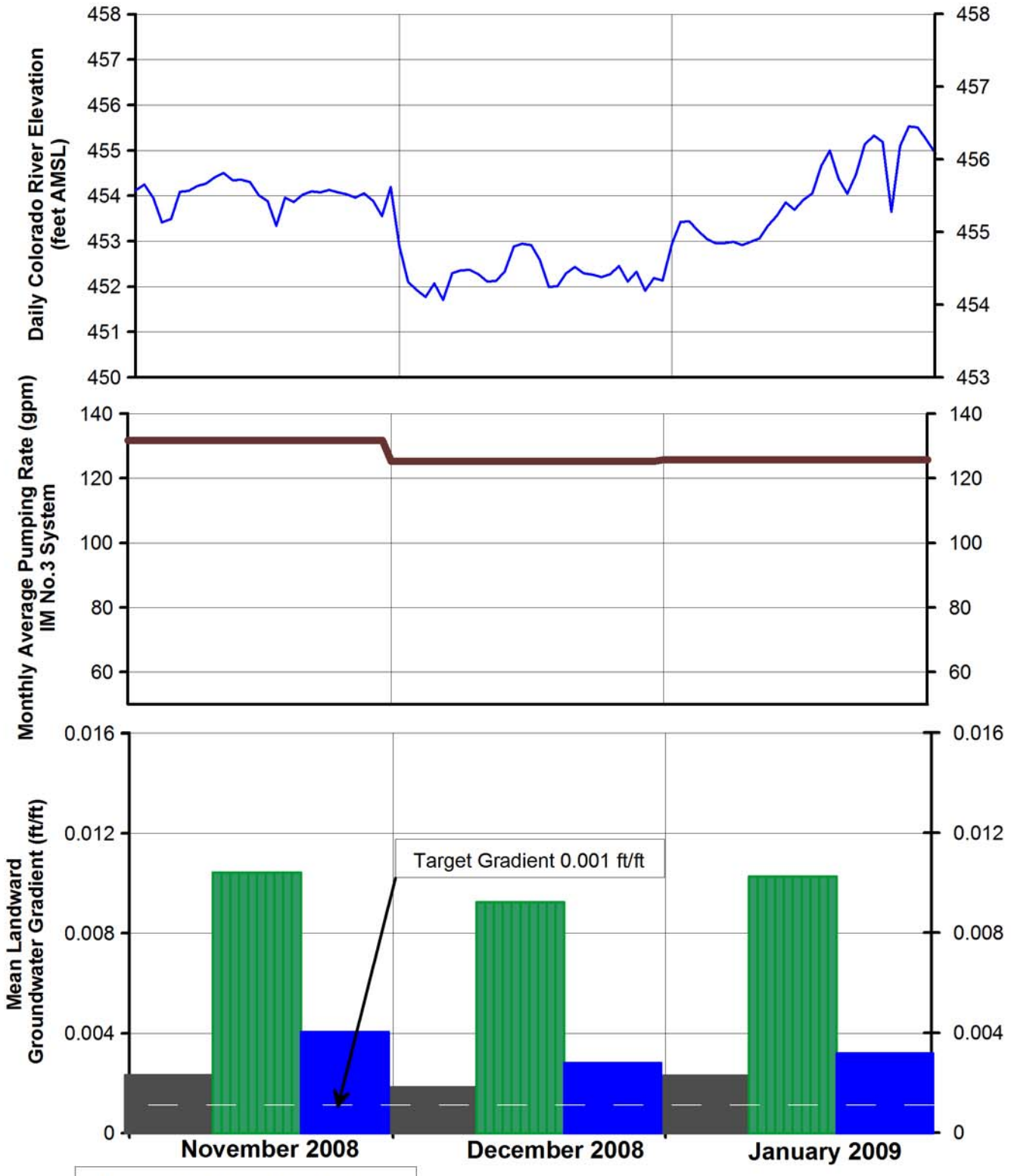
Interpreted groundwater flow direction

FIGURE 2-6
AVERAGE GROUNDWATER ELEVATIONS FOR WELLS ON FLOODPLAIN CROSS-SECTION A, NOVEMBER 2008 THROUGH JANUARY 2009

PERFORMANCE MONITORING REPORT
FOR FOURTH QUARTER 2008 AND ANNUAL PERFORMANCE EVALUATION,
FEBRUARY 2008 THROUGH JANUARY 2009
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

C:\DOCUMENTS AND SETTINGS\CHALL6\MY DOCUMENTS\GINT\ANNUAL\FIGURE_2-6_XSECA_GW.GDW;



Notes:

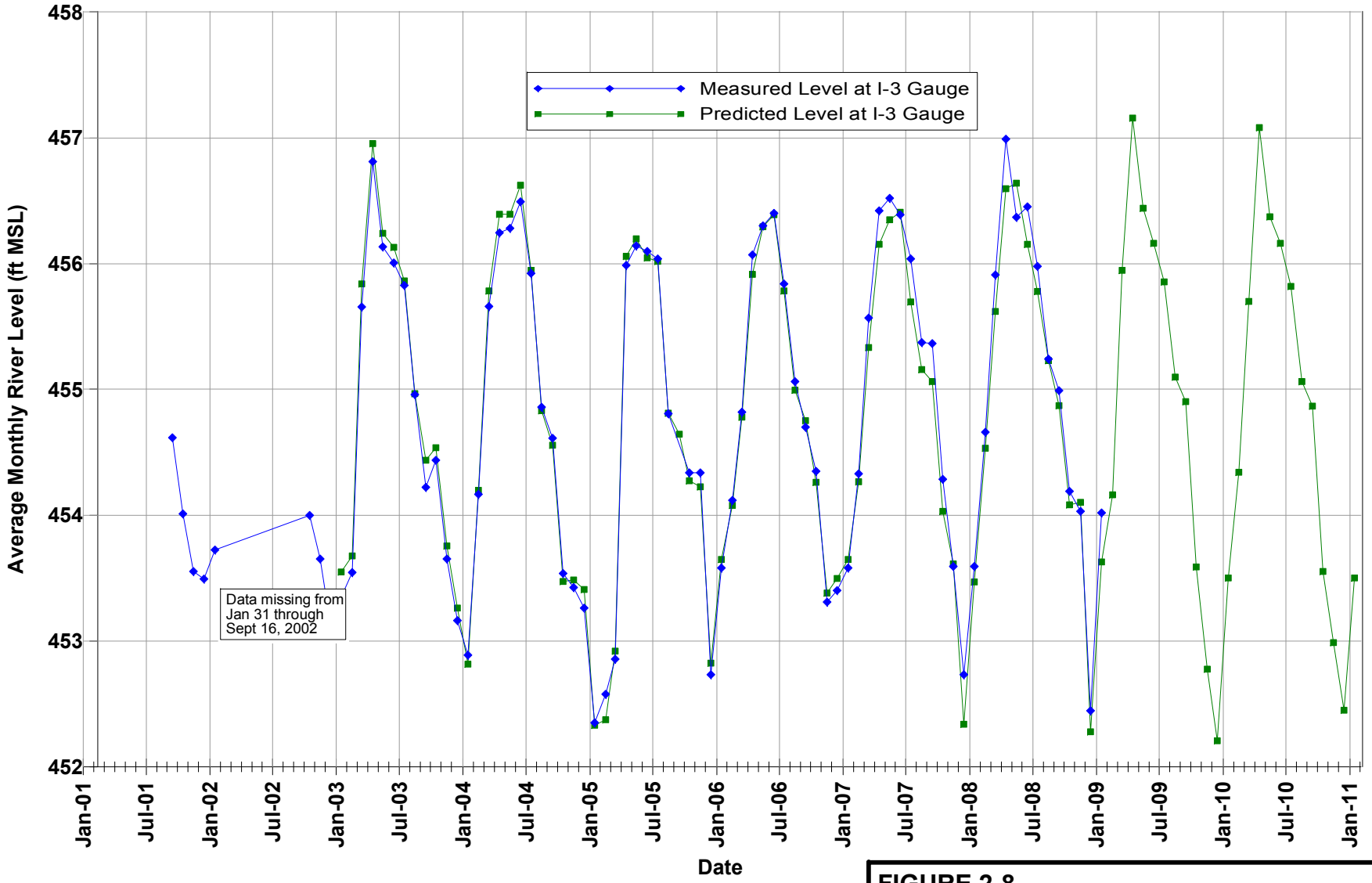
1) For IM pumping, the target landward gradient for well pairs is 0.001 feet/foot.
2) Refer to Table 2-1 and Section 2.1 for discussion of pumping data.
3) Pumping rate plotted is the combined rate of extraction wells TW-3D and PE-1 in operation each month.
4) Refer to Table 2-3 and Section 2.4 for discussion of gradient data.

FIGURE 2-7
MEASURED HYDRAULIC GRADIENTS, RIVER ELEVATION AND PUMPING RATE

Performance Monitoring Report for Fourth Quarter 2008
and Annual Performance Evaluation, February 2008 through January 2009
PG&E Topock Compressor Station, Needles,California

CH2MHILL

\\zinfandel\proj\PacificGasElectricCo\TopockProgram\Project_PMP\AnnualReports\Annual_Report_3-15-2007\PG&E_Draft\Draft_Figures\workfiles



Note:
Projected river level is calculated based on monthly averages of Davis Dam release and stage in Lake Havasu as of February 11, 2009.
Measured data through January 31, 2009.
I-3 data are unavailable from September 18 through October 4, 2006
River projections at I-3 are based upon February 2009 USBR projections.

FIGURE 2-8
PAST AND PREDICTED FUTURE RIVER LEVELS AT TOPOCK COMPRESSOR STATION
PERFORMANCE MONITORING REPORT FOR FOURTH QUARTER 2008
AND ANNUAL PERFORMANCE EVALUATION,
FEBRUARY 2008 THROUGH JANUARY 2009
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

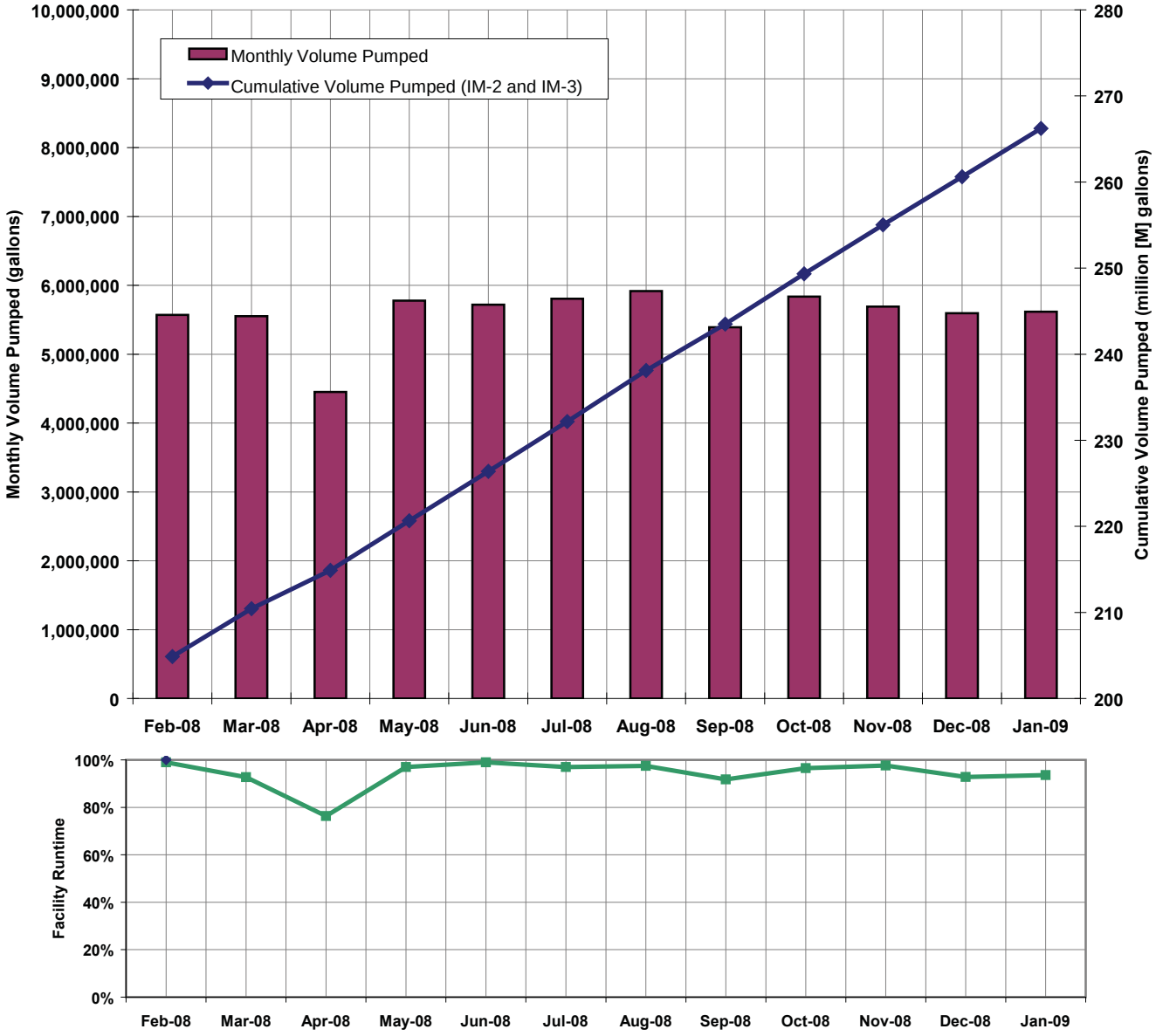
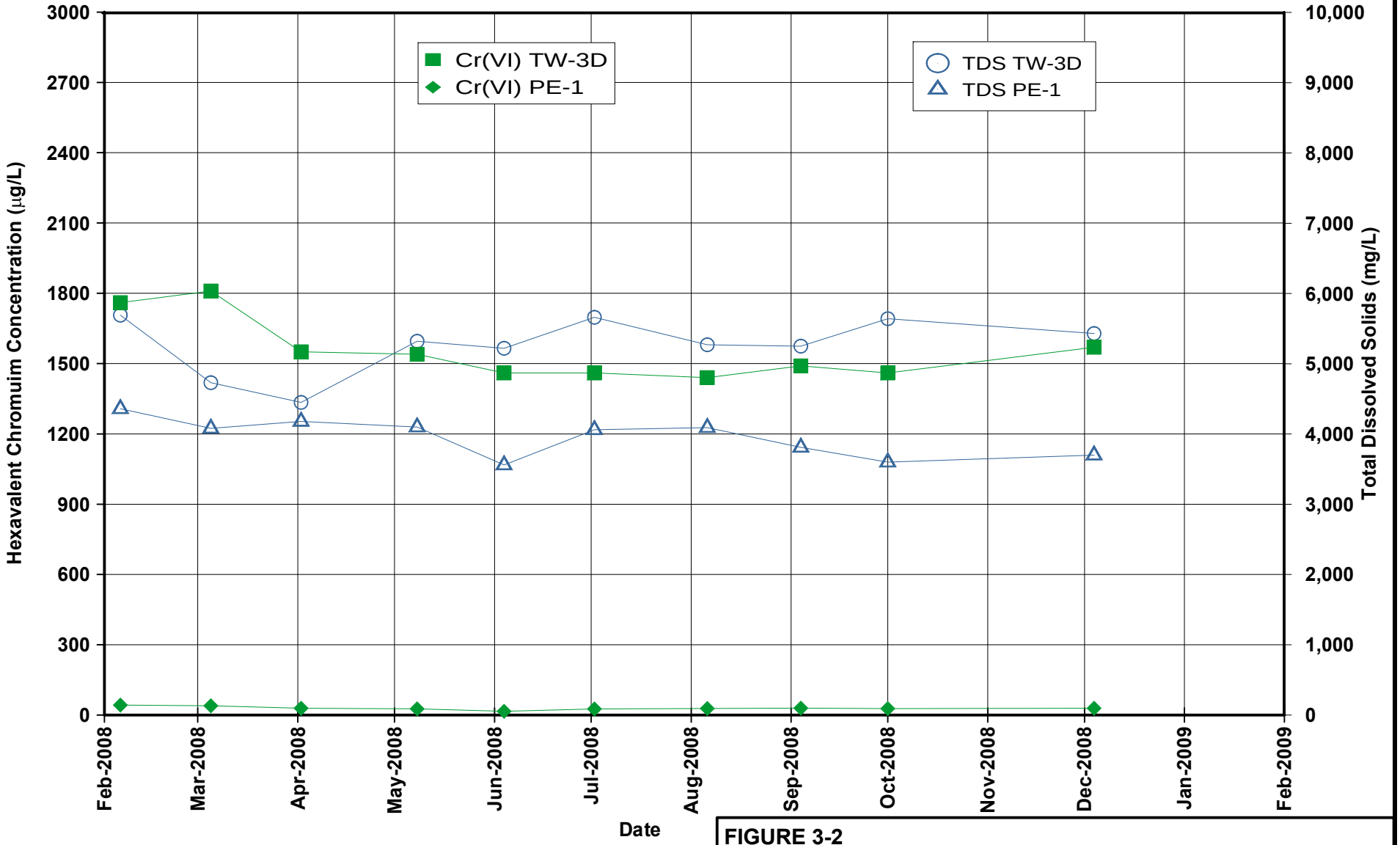


FIGURE 3-1
MONTHLY COMBINED PUMPING VOLUMES AND PERCENT UPTIME OVER 2008 REPORTING PERIOD

PERFORMANCE MONITORING REPORT FOR FOURTH QUARTER 2008
AND ANNUAL PERFORMANCE EVALUATION, FEBRUARY 2008 THROUGH JANUARY 2009
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

CH2MHILL

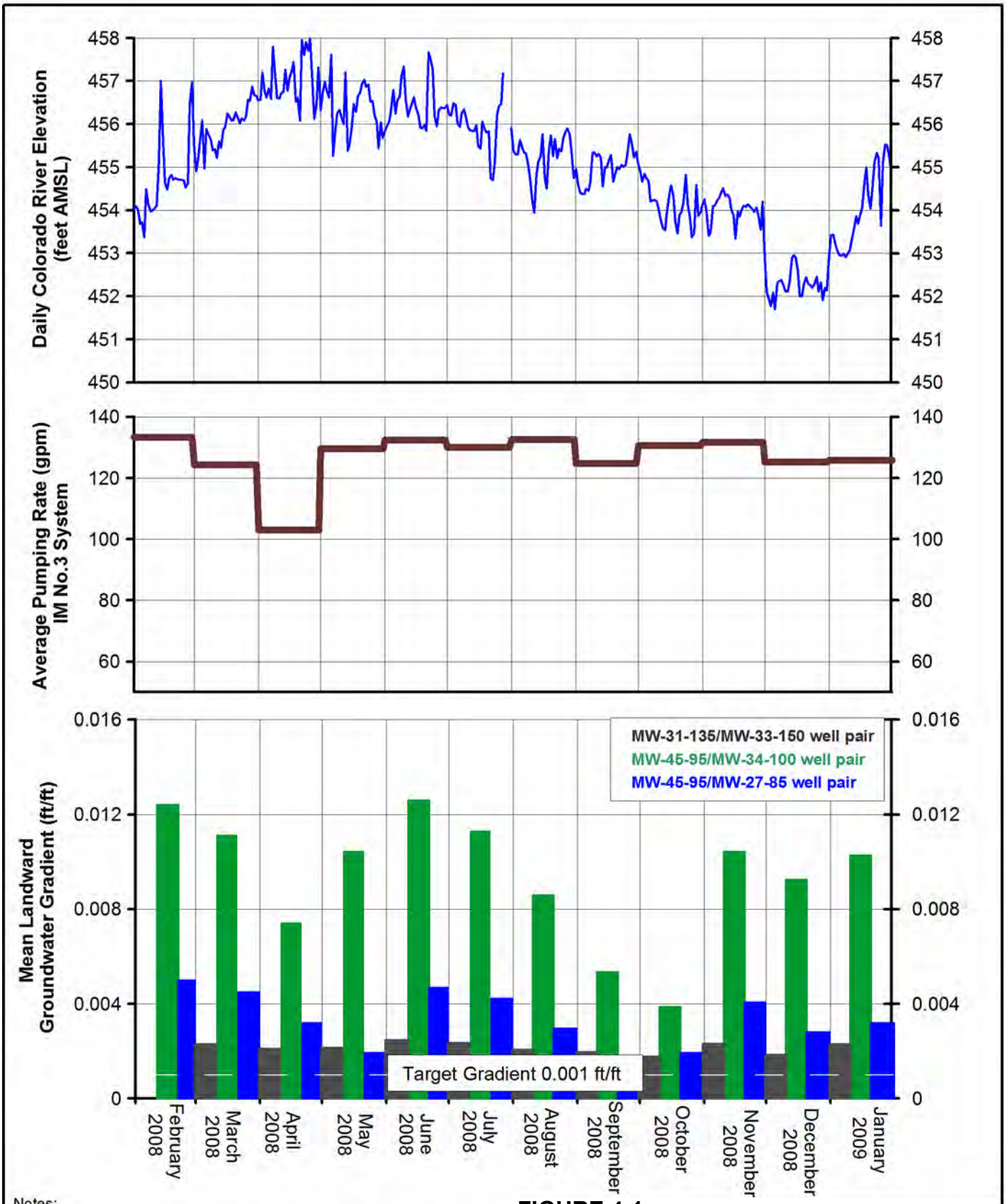
ES112008005BAO figure_3-1.ai 02-23-09 dash



Notes:
TW-3D pumping began on 20-Dec-05.
TW-3D average extraction rate during 2008 was 98.8 gpm.
PE-1 pumping began on 26-Jan-06.
PE-1 average extraction rate during 2008 was 28.1 gpm.

FIGURE 3-2
Cr(VI) AND TOTAL DISSOLVED SOLIDS CONCENTRATIONS IN EXTRACTION WELLS TW-3D AND PE-1, 2008 REPORTING PERIOD
PERFORMANCE MONITORING REPORT FOR FOURTH QUARTER 2008
AND ANNUAL PERFORMANCE EVALUATION, FEBRUARY 2008 THROUGH JANUARY 2009
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

CH2MHILL



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 3.0 for discussion of pumping data.
3) Pumping rate plotted is the combined rate of extraction wells in operation each month.
4) Refer to Table 4-1 and Section 4.0 for discussion of gradient data.

FIGURE 4-1
MEASURED HYDRAULIC GRADIENTS, RIVER ELEVATION, AND PUMPING RATE 2008 REPORTING PERIOD

PERFORMANCE MONITORING REPORT FOR FOURTH QUARTER 2008 AND ANNUAL PERFORMANCE EVALUATION, FEBRUARY 2008 THROUGH JANUARY 2009
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

CH2MHILL

\\zinfandel\proj\PacificGasElectricCo\TopockProgram\Project_PMP\PMP_Reports\Annual_Report\DraftFigures\workingfiles\Figure4-1

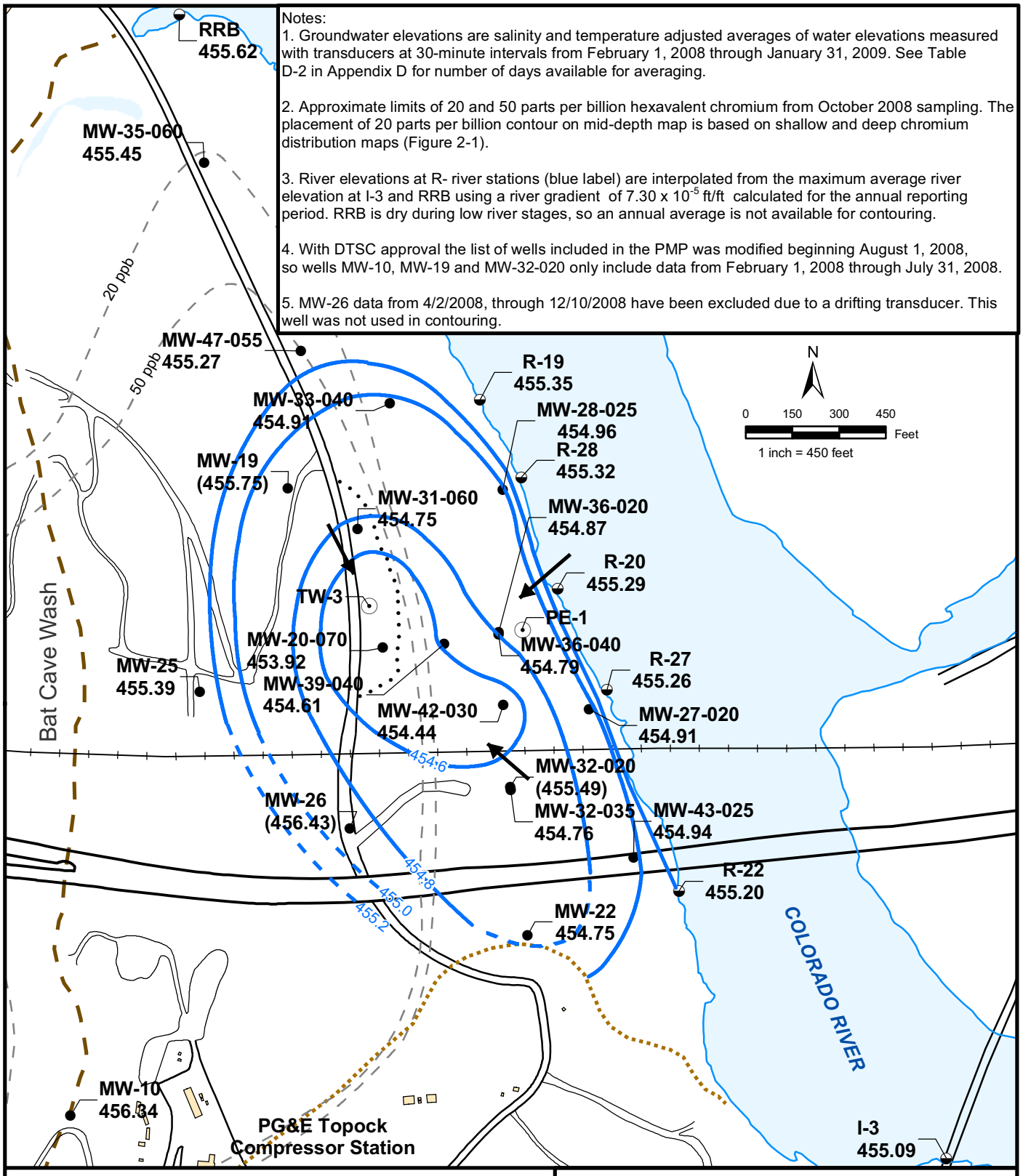


FIGURE 4-2
AVERAGE GROUNDWATER ELEVATIONS IN SHALLOW WELLS AND RIVER ELEVATIONS, 2008 REPORTING PERIOD

PERFORMANCE MONITORING REPORT FOR FOURTH QUARTER 2008 AND ANNUAL PREFORMANCE EVALUATION, FEBRUARY 2008 THROUGH JANUARY 2009
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

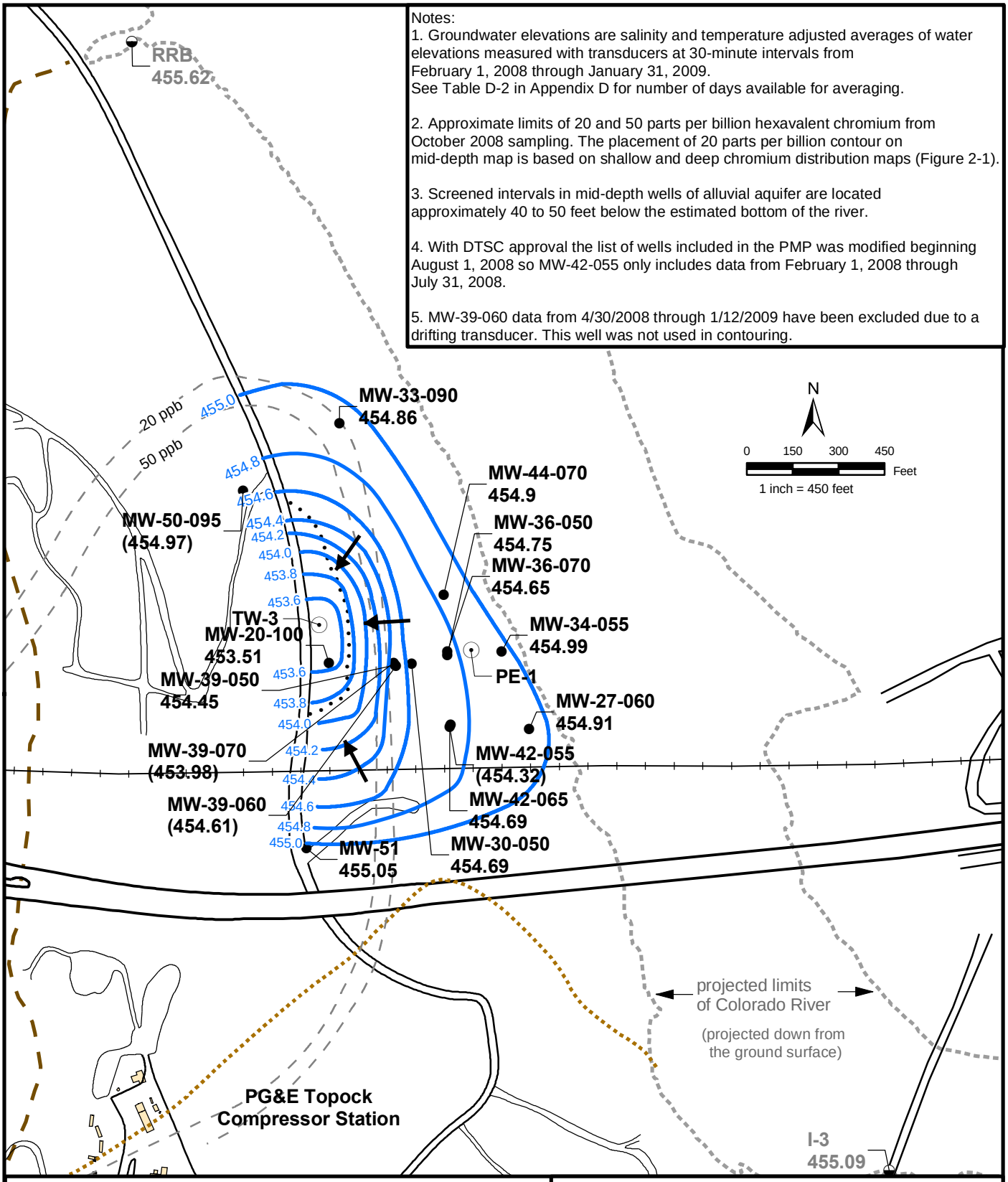


FIGURE 4-3
AVERAGE GROUNDWATER ELEVATIONS IN MID-DEPTH WELLS, 2008 REPORTING PERIOD

PERFORMANCE MONITORING REPORT FOR FOURTH QUARTER 2008 AND ANNUAL PREFORMANCE EVALUATION
FEBRUARY 2008 THROUGH JANUARY 2009
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

BAO \\ZINFANDEL\PROJ\PACIFICGASELECTRICCO\TOPOCKPROGRAM\GIS\MAPFILES\2009\ANNUALPERFORMANCE\PMR_AVERAGE_GROUNDWATER_MA_ANNUAL2008.MXD 3/3/2009 13:20:53

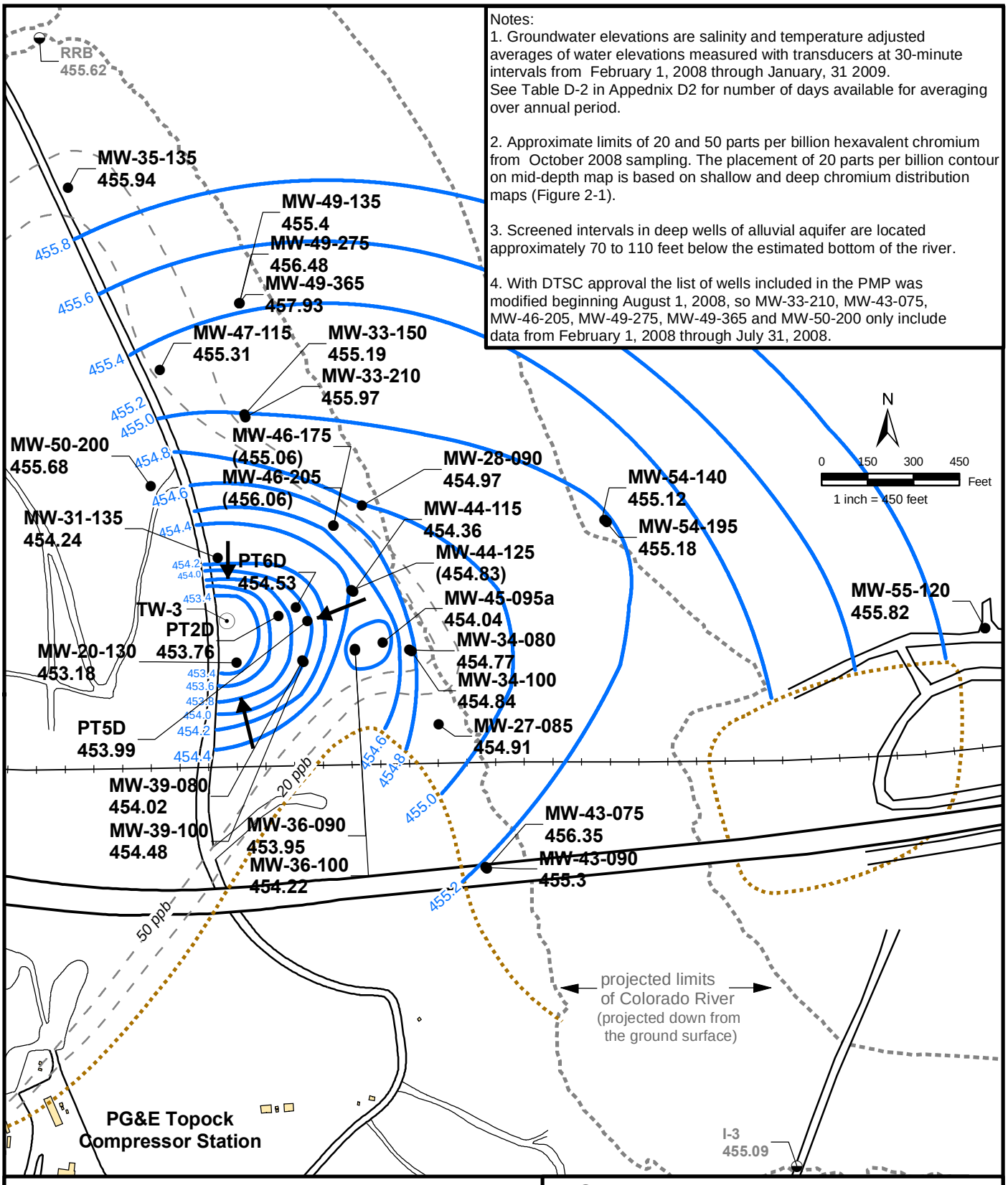
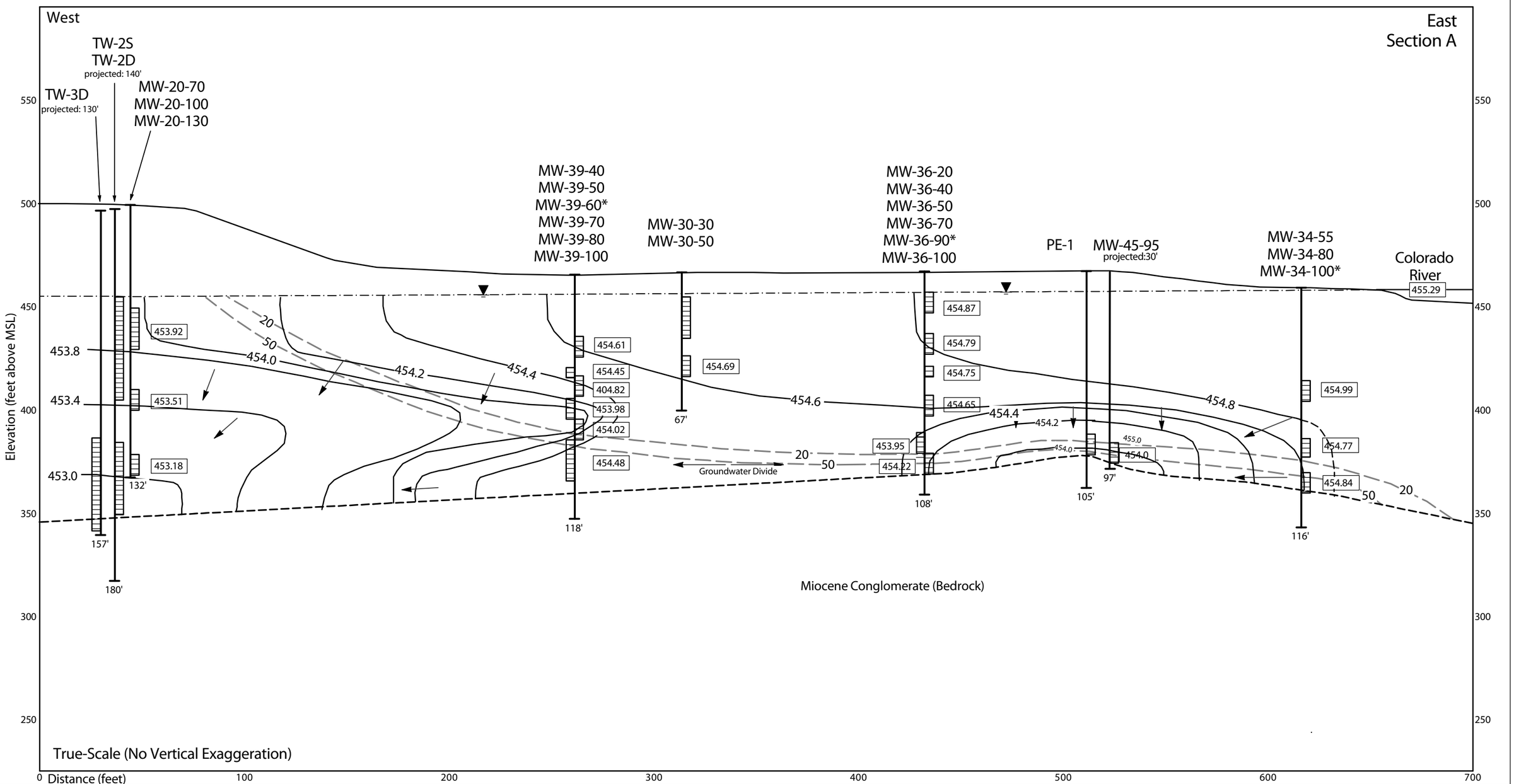


FIGURE 4-4
AVERAGE GROUNDWATER ELEVATIONS IN DEEP WELLS, 2008 REPORTING PERIOD

PERFORMANCE MONITORING REPORT FOR FOURTH QUARTER 2008 AND ANNUAL PREFORMANCE EVALUATION, FEBRUARY 2008 THROUGH JANUARY 2009
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL



Notes:
Results show average groundwater elevations for February 1, 2008 through January 31, 2009 measured with transducers at 30minute intervals.

Groundwater elevations adjusted for salinity and temperature.
Well MW-34-100*, 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
Inferred water table
well screen
455.23 Monthly average groundwater head (ft AMSL)
103 boring depth (feet)

20 Inferred hexavalent chromium contour (ppb)

453.5 Groundwater head contour

453.5 Inferred groundwater head contour

Interpreted groundwater flow direction

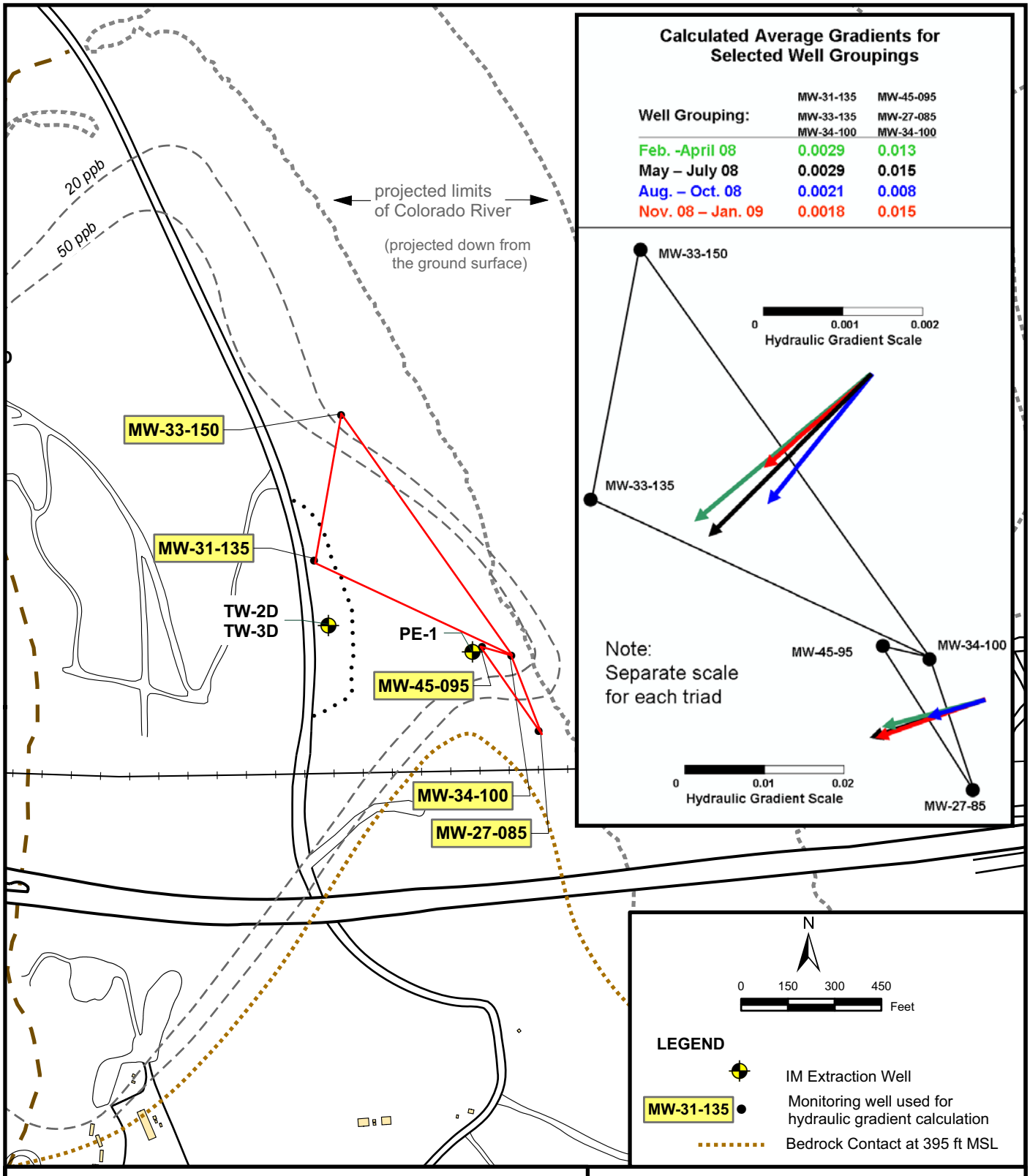
FIGURE 4-5
AVERAGE GROUNDWATER ELEVATIONS FOR WELLS ON FLOODPLAIN CROSS-SECTION A, 2008 REPORTING PERIOD

PERFORMANCE MONITORING REPORT FOR FOURTH QUARTER 2008 AND ANNUAL PERFORMANCE EVALUATION, FEBRUARY 2008 THROUGH JANUARY 2009

PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

C:\DOCUMENTS AND SETTINGS\CHALL6\MY DOCUMENTS\GINT\ANNUAL\FIGURE_4-5_XSECA_GW.GDW;



Notes:
1. Direction and magnitude of hydraulic gradient for each well triad (MW-45-095, MW-33-150, MW-31-135 and MW-45-095, MW-34-100, MW-27-085) were calculated using triangulation with linear interpretation and average head values for each quaterly reporting period.

2. Approximate limits of 20 and 50 ppb hexavalent chromium from October 2008 sampling.

3. Screened intervals in deep wells of alluvial aquifer are located approximately 80 to 90 feet
below the estimated bottom of the river

FIGURE 4-6
MAGNITUDE AND DIRECTION OF HYDRAULIC GRADIENTS IN LOWER DEPTH INTERVAL DURING ANNUAL PERIOD

PERFORMANCE MONITORING REPORT FOR FOURTH QUARTER 2008 AND ANNUAL PREFORMANCE EVALUATION, FEBRUARY 2008 THROUGH JANUARY 2009
PG&E TOPOCKCOMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

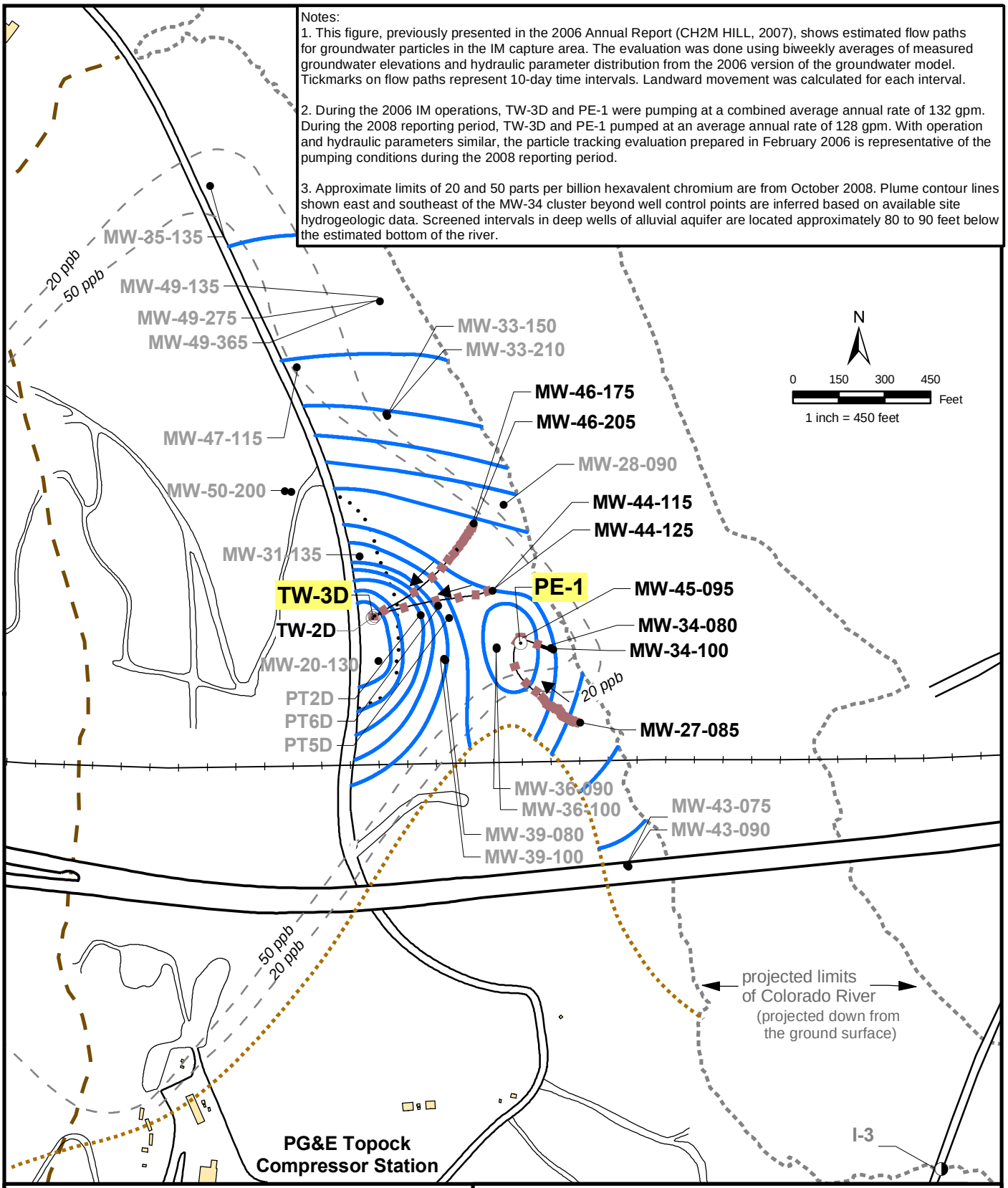
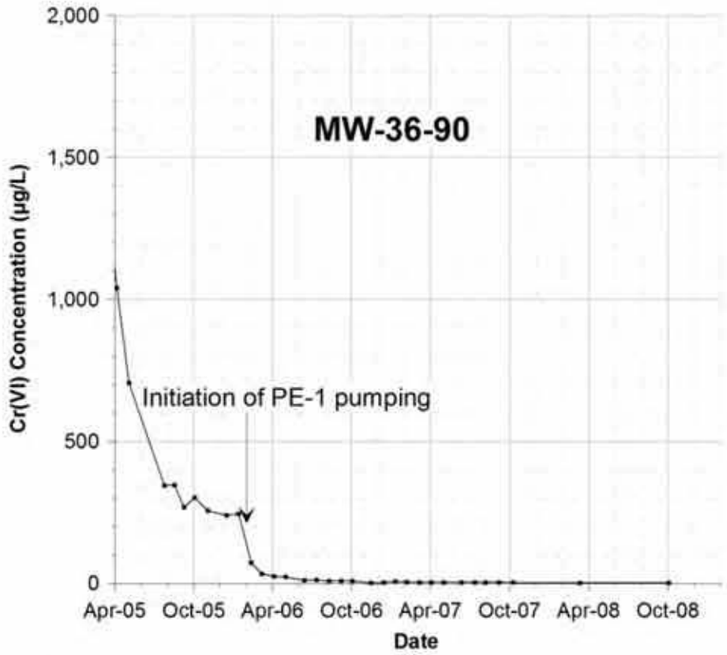
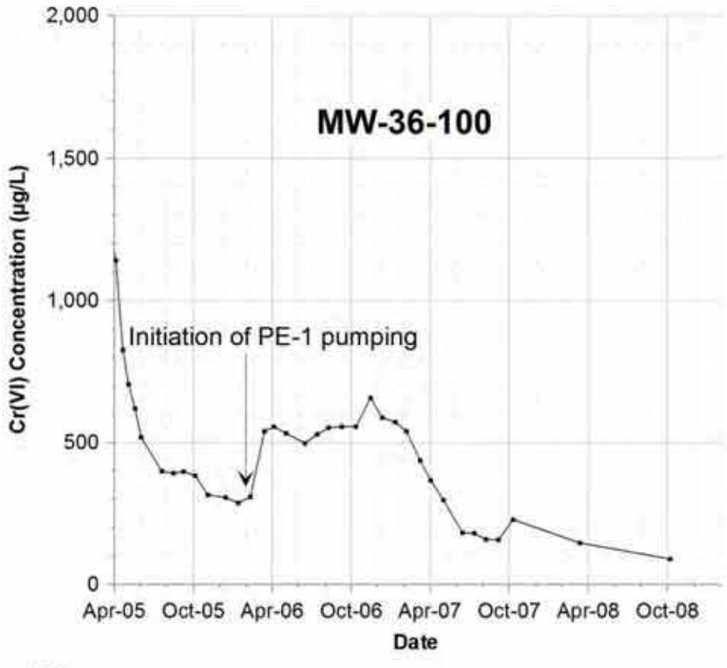


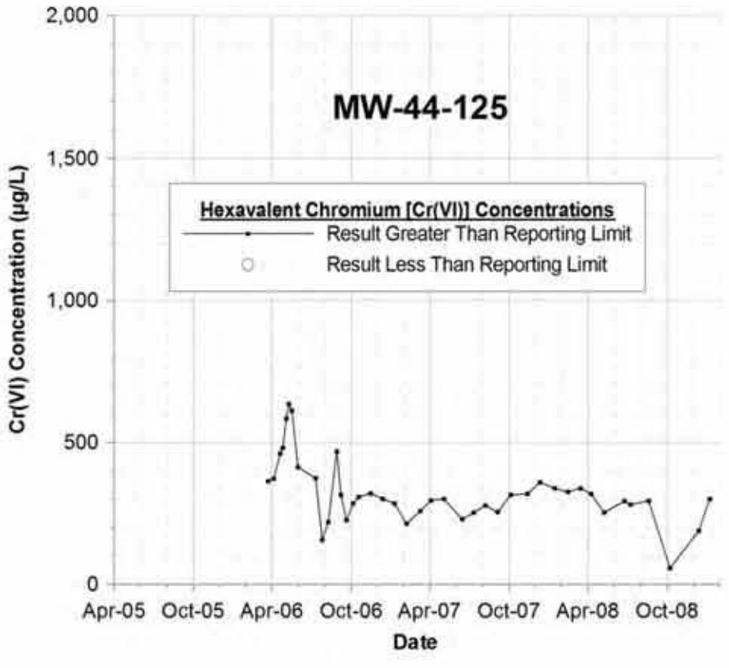
FIGURE 4-7
ESTIMATED FLOW PATHS FROM SELECTED DEEP FLOODPLAIN WELLS, 2008 INTERIM MEASURE PUMPING

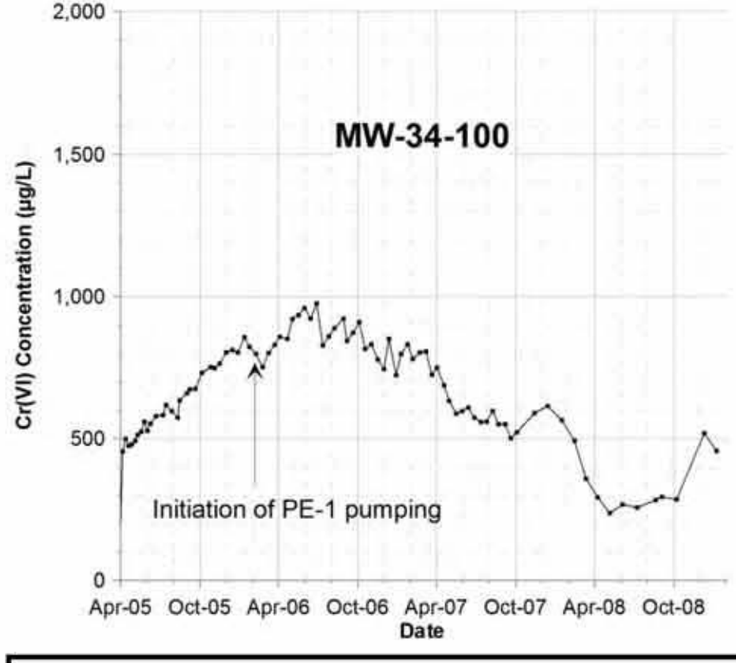
PERFORMANCE MONITORING REPORT FOR FOURTH QUARTER 2008 AND ANNUAL PREFORMANCE EVALUATION, FEBRUARY 2008 THROUGH JANUARY 2009
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL







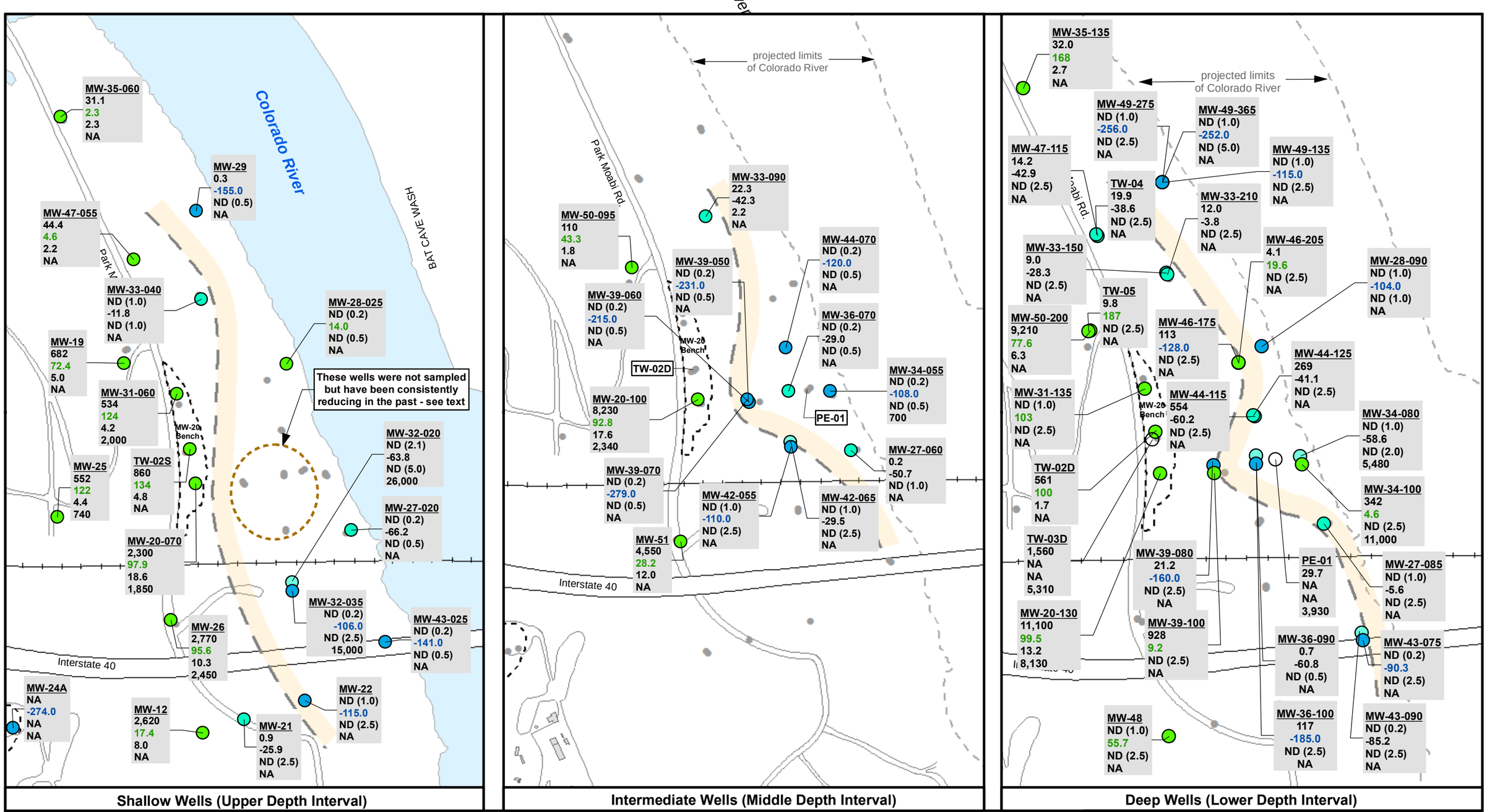


Notes
1. Cr(VI) results in micrograms per liter (µg/L), equivalent to parts per billion.
2. Results plotted are maximum concentrations from primary and duplicate samples; see Table B-1 in Appendix B for complete results.
3. MW-36 wells selected to monitor effects of PE-1 pumping on plume west of PE-1.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

FIGURE 5-1
Cr(VI) CONCENTRATION TRENDS IN SELECTED PERFORMANCE MONITORING WELLS APRIL 2005 THROUGH JANUARY 2009
PERFORMANCE MONITORING REPORT FOR FOURTH QUARTER 2008 AND ANNUAL PERFORMANCE EVALUATION, FEBRUARY 2008 THROUGH JANUARY 2009
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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



Shallow Wells (Upper Depth Interval) | **Intermediate Wells (Middle Depth Interval)** | **Deep Wells (Lower Depth Interval)**

LEGEND

- Groundwater ORP < -90 mV
- Groundwater ORP > -90 mV < 1 mV
- Groundwater ORP > 1 mV
- NA

Notes:
ND = not detected at listed reporting limit
INC = not sampled over the reporting period

MW-22
ND (1.0)
-115.0
ND (4)
NA

Average Groundwater Results From February 2008 - January 2009 Sampling
Hexavalent chromium, micrograms per liter (µg/L)
Oxidation reduction potential (ORP), millivolts (mV)
Nitrate as N, milligrams per liter (mg/L)
Total Dissolved Solids (TDS), milligrams per liter (mg/L)

ORP values less than -90mV highlighted blue. Positive ORP values highlighted green.

Approximate limit of reducing groundwater (ORP less than -90mV)

N

0 400 800 Feet

FIGURE 5-2
DISTRIBUTION OF Cr(VI) AND GEOCHEMICAL INDICATOR PARAMETERS IN FLOODPLAIN WELLS, 2008 REPORTING PERIOD
PERFORMANCE MONITORING REPORT FOR FOURTH QUARTER 2008 AND ANNUAL PREFORMANCE EVALUATION, FEBRUARY 2008 THROUGH JANUARY 2009
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

BAO \\ZINFANDEL\PROJ\PACIFICGASELECTRICCO\TOPOCKPROGRAM\GIS\MAPFILES\2009\ANNUALPERFORMANCE\PMR_CR6_GEOCHEM_FLOODPLAIN_ANNUAL2008.MXD 3/3/2009 14:16:59

West

East
Section A

TW-2S
TW-2D
projected: 140'

TW-3D
projected: 130'

MW-20
Cluster

MW-39
Cluster

MW-30-30
MW-30-50

MW-36
Cluster

PE-1

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

Colorado
River

Elevation (feet above MSL)

550
500
450
400
350
300
250

static water level (no pumping)

ALLUVIAL AQUIFER

Upper Depth Interval

Middle Depth Interval

Lower Depth Interval

Approximate contact between alluvial fan (west) and fluvial (east) deposits

2,300
97.9
18.6
1,850

8,230
92.8
17.6
2,340

11,100
99.5
13.2
8,130

132'

157'

180'

ND (0.2)
-231.0
ND (0.5)
NA

ND(0.2)
-279
ND (0.5)
NA

928
9.2
ND (2.5)
NA

118'

ND (0.2)
-215.0
ND (0.5)
NA

21.2
-160.0
ND (2.5)
NA

67'

ND (0.20)
-29.0
ND (0.5)
NA

117
-185.0
ND (2.5)
NA

0.7
-60.8
ND (0.5)
NA

108'

105'

ND (0.2)
-108.0
ND (0.5)
700

ND (1.0)
-58.6
ND (2.0)
5,480

342
4.6
ND(2.5)
11,000

116'

?

Miocene Conglomerate (Bedrock)

True Scale (No Vertical Exaggeration)

0
100
200
300
400
500
600
700

Distance (feet)

Legend

water level

well screen

boring depth (feet)

ND (1.0)
-121.0
ND (5.0)
37,000

103

Average Groundwater Results from February 2008 - January 2009

Hexavalent chromium, micrograms per liter (ug/L)
Oxidation reduction potential, millivolts (mV)
Nitrate as N, milligrams per liter (mg/L)
Total dissolved solids (mg/L)

ORP values less than -90mV highlighted blue.
Positive ORP values highlighted green.
NA = Data not available.
ND(1.0) - Analyte not detected above laboratory analytical limit.

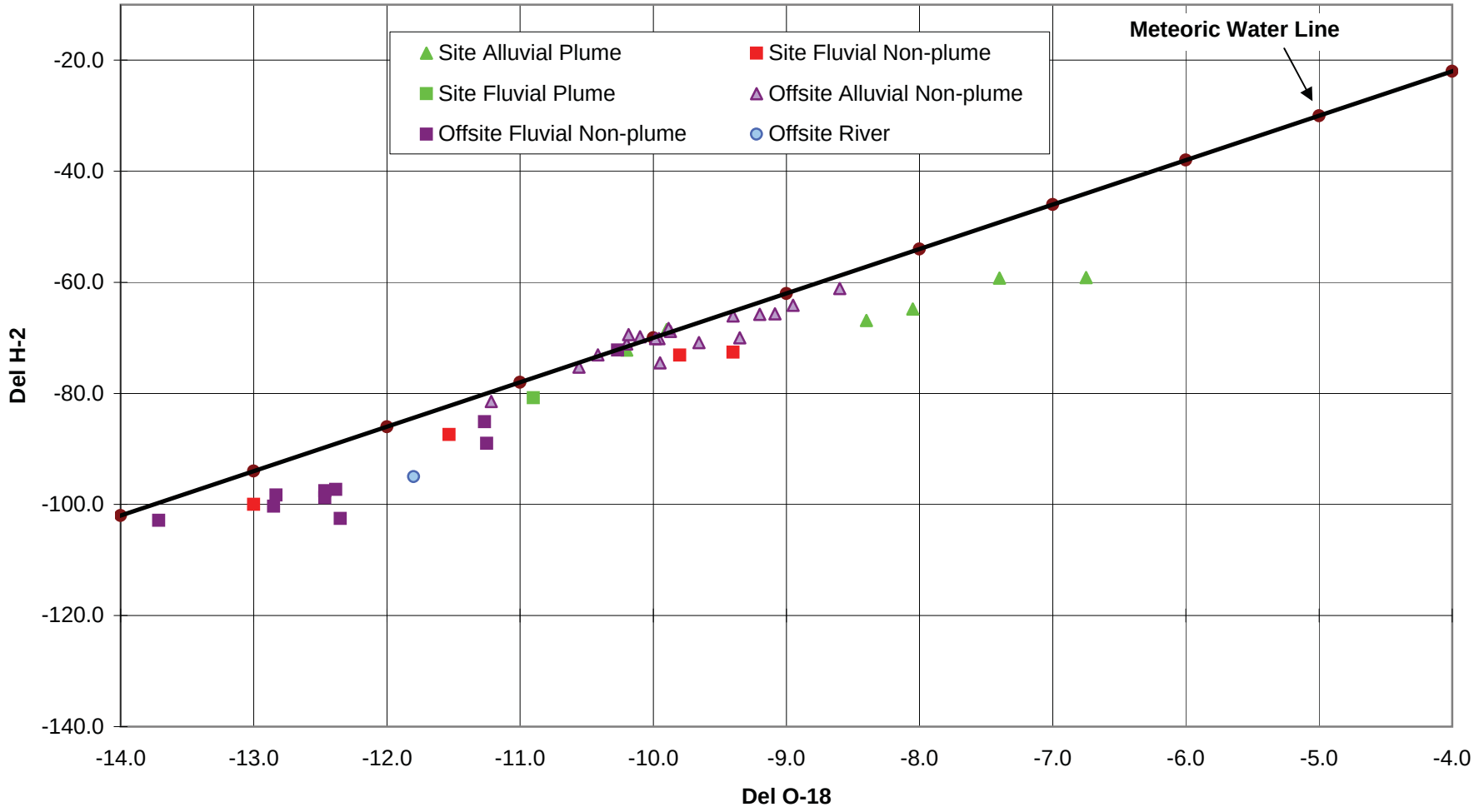
Note: Results from February 1, 2008- January 31, 2009.
Results plotted are averages from the maximum primary or duplicate sample for monitoring events during the reporting period.
ND = not detected at listed reporting limit.
See Tables B-1 and B-2 in Appendix B for complete results.

FIGURE 5-3
Cr(VI) AND GEOCHEMICAL INDICATOR PARAMETERS FLOODPLAIN CROSS-SECTION A, 2008 REPORTING PERIOD

PERFORMANCE MONITORING REPORT FOR FOURTH QUARTER 20008 AND ANNUAL PERFORMANCE EVALUATION, FEBRUARY 2008 THROUGH JANUARY 2009
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

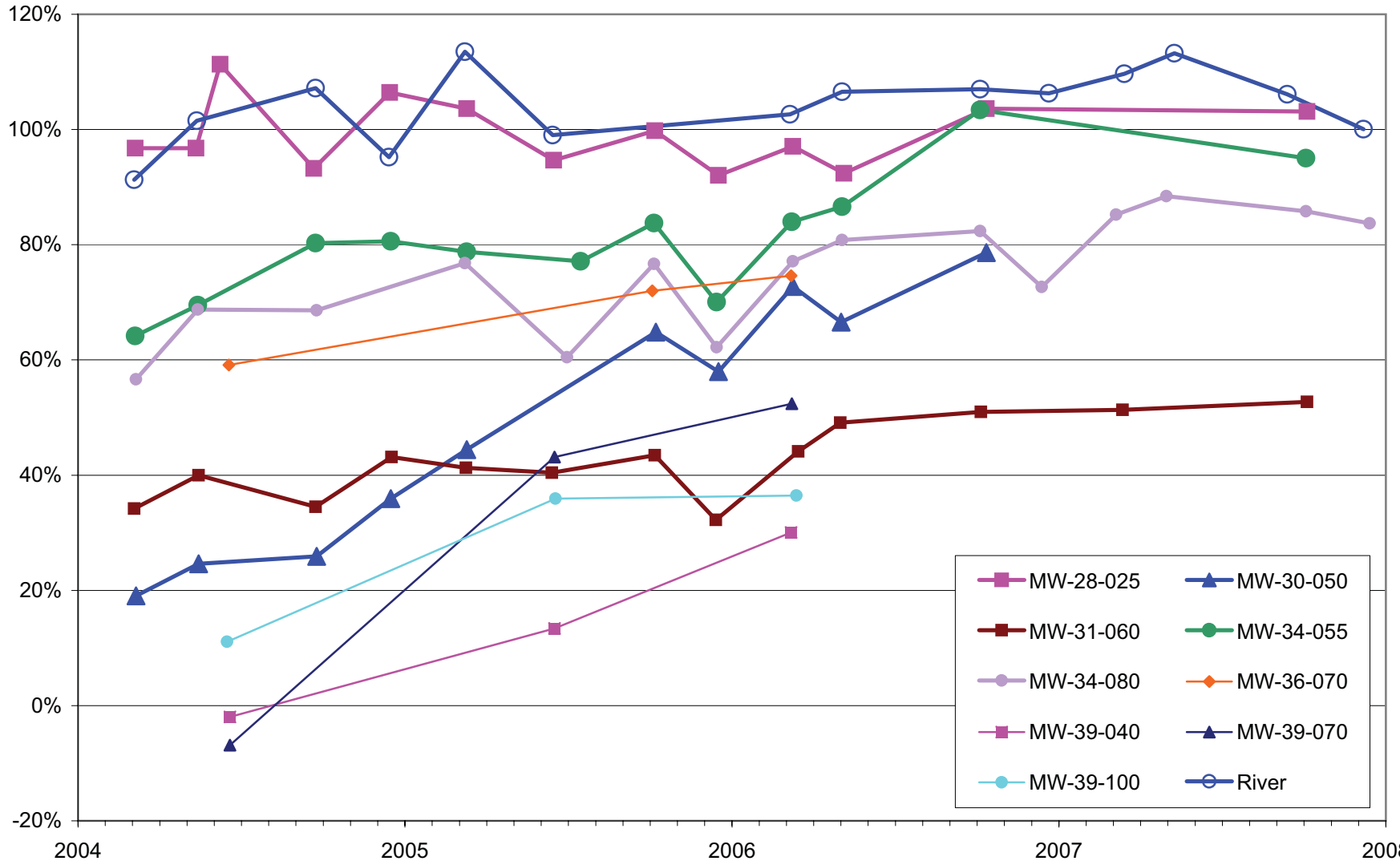
C:\DOCUMENTS AND SETTINGS\CHALL6\MY DOCUMENTS\GINT\ANNUAL\FIGS-3_X-SECA_GEOCHEM_ANNUAL_2008.GDW;



Notes:
This figure is also presented in Appendix C, Figure C-1 with each well labeled.
Values for PMP wells are averages from the 2008 reporting period.
Values for background wells are cummulative averages from all years.

FIGURE 5-4
AVERAGE STABLE ISOTOPES OF OXYGEN AND DEUTERIUM, FEBRUARY 2008 THROUGH JANUARY 2009
PERFORMANCE MONITORING REPORT FOR FOURTH QUARTER 2008 AND ANNUAL PERFORMANCE EVALUATION, FEBRUARY 2008 THROUGH JANUARY 2009
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL



Notes:
Due to a change in sampling frequency, some wells were not sampled for stable isotopes in the 2007 reporting period.

FIGURE 5-5
CALCULATED PERCENTAGE OF RIVER WATER IN SELECT FLOODPLAIN WELLS FROM STABLE ISOTOPES
PERFORMANCE MONITORING REPORT FOR FOURTH QUARTER 2008 AND ANNUAL PERFORMANCE EVALUATION, FEBRUARY 2008 THROUGH JANUARY 2009
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

ES022008003BAO topock_figure_5_5.ai 03-03-09 lho

Appendix A
Extraction System Operations Information, Fourth Quarter 2008, and Maintenance Records for 2008 Annual Reporting Period

I APPENDIX A

Extraction System Operations Log – November 2008 through January 2009 PG&E Topock Interim Measures Performance Monitoring Program

During Fourth Quarter 2008 (November 2008 through January 2009), extraction wells TW-3D and PE-1 operated at a target pump rate of at 135 gallons per minute, excluding periods of planned and unplanned downtime. The operational run time for the Interim Measures (IM) groundwater extraction system (combined or individual pumping) was over 94.7 percent during Fourth Quarter 2008.

The IM No. 3 facility treated approximately 16,900,835 gallons of extracted groundwater during Fourth Quarter 2008. The IM No. 3 facility also treated approximately 7,197 gallons of water generated from the groundwater monitoring program. The IM No. 3 facility also treated approximately 42,060 gallons of injection well backwashing/re-development water. Four containers of solids from the IM No. 3 facility were transported offsite during Fourth Quarter 2008.

Periods of planned and unplanned extraction system downtime (that together resulted in 5.3 percent of downtime during Fourth Quarter 2008) are summarized below. The times shown are in Pacific Standard Time to be consistent with other data collected (e.g., water level data) at the site.

November 2008

- **November 5, 2008 (planned):** The extraction well system was offline from 12:06 p.m. to 12:07 p.m. when the extraction well pumps were shut down temporarily to take a static water level measurement. Extraction well downtime was 1 minute.
- **November 9, 2008 (unplanned):** The extraction well system was offline from 9:21 a.m. to 1:45 p.m. when the raw water pump, P-200, shut down causing the extraction system to shutdown. Extraction system downtime was 4 hours and 24 minutes.
- **November 10, 2008 (unplanned):** The extraction well system was offline from 1:34 p.m. to 1:37 p.m. and again from 2:11 p.m. to 2:22 p.m. when the City of Needles power supply imbalance alarmed and shut down the extraction wells. Extraction system downtime was 14 minutes.
- **November 13, 2008 (planned):** The extraction well system was offline from 1:04 p.m. to 1:05 p.m., from 1:32 p.m. to 1:33 p.m., and from 2:10 p.m. to 2:11 p.m. when the leak detection system was tested. Extraction system downtime was 3 minutes.

- **November 14, 2008 (unplanned):** The extraction well system was offline from 9:37 a.m. to 10:12 a.m. when maintenance was performed on pump P404. Extraction system downtime was 35 minutes.
- **November 17, 2008 (planned):** The extraction well system was offline from 2:06 p.m. to 2:24 p.m. and from 2:25 p.m. to 3:44 p.m. to perform maintenance on pump P-400. Extraction system downtime was 1 hour and 37 minutes.
- **November 18, 2008 (planned):** The extraction well system was offline from 9:13 a.m. to 10:43 a.m. when switching the microfilter from the west bank to the east bank. Extraction system downtime was 1 hour and 30 minutes.
- **November 19, 2008 (planned):** The extraction well system was offline from 10:06 a.m. to 4:31 p.m., from 5:19 p.m. to 5:20 p.m., and from 6:17 p.m. to 8:33 p.m. to perform a reverse osmosis clean in place for maintenance. Extraction system downtime was 8 hours and 42 minutes.
- **November 29, 2008 (unplanned):** The extraction well system was offline from 9:48 a.m. to 10:03 a.m. when the City of Needles power supply imbalance alarmed and shut down the extraction wells. Extraction well system downtime was 15 minutes.

December 2008

- **December 03, 2008 (planned):** The extraction well system was offline from 10:07 a.m. to 10:16 a.m. when the extraction well pumps were shut down temporarily to test voltage and complete a strainer cleaning event. Extraction well downtime was 9 minutes.
- **December 03, 2008 (planned):** The extraction well system was offline from 11:26 a.m. to 1:59 p.m. when the City of Needles adjusted the taps for the incoming plant voltage. Extraction system downtime was 2 hours and 33 minutes.
- **December 04, 2008 (planned):** The extraction well system was offline from 11:26 a.m. to 11:27 a.m., from 11:35 a.m. to 11:36 a.m., and from 11:46 a.m. to 11:47 a.m. to check leak detection system in extraction piping. Total extraction system downtime was 3 minutes.
- **December 17 to December 19, 2008 (planned):** The extraction well system was offline from 7:57 a.m. on December 17 to 10:59 a.m. on December 19, 2008 when planned maintenance, including rebuilding of the manifold on the effluent line, was completed. Extraction system downtime was 2 days, 3 hours, and 2 minutes.

January 2009

- **January 8, 2009 (planned):** The extraction well system was offline from 1:29 p.m. to 1:30 p.m. and from 1:46 p.m. to 1:47 p.m. when the extraction wells were shut down temporarily for testing of leak detection system. Extraction well downtime was 2 minutes.
- **January 10, 2009 (unplanned):** The extraction well system was offline from approximately 3:10 p.m. to 3:23 p.m. due to a power outage. The data historian battery

backup failed during this outage and did not come back online until January 12, 2009 at 9:54 a.m. Extraction system downtime was 13 minutes.

- **January 15, 2009 (planned):** The extraction well system was offline from 11:54 a.m. to 11:59 a.m. for inspection of leak detection system. Extraction system downtime was 5 minutes.
- **January 19, 2009 (unplanned):** The extraction well system was offline from 11:49 a.m. to 12:09 p.m. due to plugging of the low flow switch on the chemical mixing loop. Extraction system downtime was 20 minutes.
- **January 19, 2009 (unplanned):** The extraction well system was offline from 12:26 p.m. to 1:35 p.m. when the system shut down due to low flow. Extraction system downtime was 1 hour and 9 minutes.
- **January 20, 2009 (planned):** The extraction well system was offline from 7:40 a.m. to 8:20 a.m. to perform plant maintenance. Extraction system downtime was 40 minutes.
- **January 20, 2009 to January 21, 2009(planned):** The extraction well system was offline from 8:37 a.m. on January 20 to January 21, 2009 at 5:27 p.m. while plant maintenance, including relocation of the existing primary reverse osmosis system, was performed. Extraction system downtime was 32 hours and 50 minutes.
- **January 21, 2009 (unplanned):** The extraction well system was offline from 7:07 p.m. to 8:44 p.m. and from 9:11 p.m. to 11:25 p.m. because the raw water tank was full for plant startup. Extraction system downtime was 3 hours and 51 minutes.
- **January 23, 2009 (planned):** The extraction well system was offline from 11:05 a.m. to 3:56 p.m. for plant maintenance. Extraction well system downtime was 4 hours and 51 minutes.
- **January 29, 2009 (unplanned):** The extraction well system was offline from 8:23 a.m. to 10:53 a.m. and from 7:00 p.m. to 7:10 p.m. due to a leak in the microfiltration system. Extraction well system downtime was 2 hours and 40 minutes.
- **January 29, 2009 (unplanned):** The extraction well system was offline from 10:05 p.m. to 10:15 p.m. due to low level in extraction well PE-1. Extraction well system downtime was 10 minutes.
- **January 30, 2009 (planned):** The extraction well system was offline from 8:55 a.m. to 9:16 a.m. for microfiltration system maintenance. Extraction well system downtime was 21 minutes.
- **January 31, 2009 (unplanned):** The extraction well system was offline from 12:19 p.m. to 12:34 p.m. due to problems associated with the microfiltration system. Extraction well system downtime was 15 minutes.

Appendix B
Chromium Monitoring Data and Concentration Graphs for Performance Monitoring Program Wells

TABLE B-1

Groundwater Sampling Results for Floodplain Monitoring Wells, February 2008 through January 2009

Annual IM Performance Monitoring Report

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 feet MSL	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	12-Mar-08	ND (1.0)	ND (1.0)	-132	0.4	4,490	455.4	455.0
	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
MW-32-020	10-Mar-08	ND (2.1)	ND (1.0)	-121	0.3	45,930	454.8	454.6
	03-Oct-08	ND (0.2)	ND (1.0)	-7	0.1	55,840	454.1	454.5
MW-32-035	10-Mar-08	---	ND (1.0)	-145	0.1	25,210	455.0	454.5
	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	12-Mar-08	ND (0.2)	ND (1.0)	-30	0.3	6,112	455.2	454.8
	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	454.8
	09-Dec-08	ND (1.0)	2.10	42	1.0	8,831	453.1	452.3
MW-43-025	10-Mar-08	---	ND (1.0)	-161	0.2	1,614	455.1	454.8
	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	454.7
Middle Zone								
MW-27-060	03-Oct-08	0.32	ND (1.0)	-83	0.2	4,430	455.0	454.9
	10-Dec-08	ND (0.2)	ND (1.0)	-18	0.1	4,293	452.7	452.7
MW-33-090	12-Mar-08	23.7	22.5	-66	0.2	11,390	455.2	454.4
	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	454.4
	11-Dec-08	23.2	22.6	61	0.1	11,030	452.9	452.2
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	454.5
MW-39-050	01-Oct-08	ND (0.2)	ND (1.0)	-231	0.2	2,702	454.6	454.9
MW-39-060	01-Oct-08	ND (0.2)	ND (1.0)	-215	0.2	3,518	454.6	455.2
MW-39-070	01-Oct-08	ND (0.2)	ND (1.0)	-279	0.1	5,190	453.9	454.5
MW-42-055	11-Mar-08	ND (1.0)	ND (1.0)	-126	0.3	15,890	454.9	455.7
	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
MW-42-065	11-Mar-08	ND (1.0)	ND (1.0)	-50	0.2	17,980	455.1	455.5
	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
MW-44-070	11-Mar-08	ND (0.2)	ND (1.0)	-128	0.3	4,663	454.8	454.6
	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

Refer to table footnotes for data qualifier explanation.

TABLE B-1

Groundwater Sampling Results for Floodplain Monitoring Wells, February 2008 through January 2009

Annual IM Performance Monitoring Report

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 feet MSL	River Elevation Downstream I-3 Station
Middle Zone								
MW-44-070	10-Dec-08	ND (0.2)	ND (1.0)	-88	0.1	3,351	452.4	452.4
MW-52S	13-Mar-08	ND (1.0)	ND (1.0)	-176	0.5	11,390	---	455.0
	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	---	455.1
	11-Dec-08	ND (1.0)	ND (1.0)	---	---	---	---	452.2
Deep Wells								
MW-27-085	10-Mar-08	ND (1.0)	ND (1.0)	-64	0.2	18,550	454.8	454.5
	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
MW-28-090	13-Mar-08	ND (0.2)	ND (1.0)	-117	0.2	8,048	455.4	455.4
	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	454.9
	09-Dec-08	ND (1.0)	ND (1.0)	-55	0.2	8,242	452.8	452.8
MW-33-150	12-Mar-08	7.87	8.06	1	0.6	18,180	455.1	454.2
	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	454.0
	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
MW-33-210	12-Mar-08	11.7	11.5	-31	0.1	21,180	455.3	454.3
	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
MW-34-080	13-Feb-08	ND (0.2)	ND (1.0)	-52	0.2	9,412	455.0	454.7
	12-Mar-08	ND (0.2)	10.9	-62	0.1	9,779	455.5	455.5
	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
MW-34-100	13-Feb-08	492	560	-20	0.1	18,310	454.6	454.5
	12-Mar-08	358	338	9	0.2	19,150	455.2	455.3
	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

Refer to table footnotes for data qualifier explanation.

TABLE B-1

Groundwater Sampling Results for Floodplain Monitoring Wells, February 2008 through January 2009

Annual IM Performance Monitoring Report

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 feet MSL	River Elevation Downstream I-3 Station
Deep Wells								
MW-34-100	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
	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
MW-36-090	11-Mar-08	0.71	1.46	-54	0.2	2,918	454.0	454.9
	11-Mar-08 FD	0.703	1.24	FD	FD	FD	FD	FD
	03-Oct-08	0.61	1.46	-68	0.0	2,240	454.0	454.8
MW-36-100	11-Mar-08	146	145	-170	0.2	14,550	454.2	454.8
	07-Oct-08	88.4	89.0	-200	0.1	12,687	453.6	454.2
MW-39-080	14-Mar-08	34.8	28.6	-63	0.4	14,220	454.1	455.2
	01-Oct-08	7.58	8.05	-257	0.1	12,105	454.1	454.7
MW-39-100	14-Mar-08	1150	1290	37	0.6	22,680	454.9	455.5
	01-Oct-08	706	613	-19	0.2	20,895	455.0	455.6
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	14-Feb-08	744	668	-48	0.1	14,300	455.1	457.1
	14-Feb-08 FD	735	706	FD	FD	FD	FD	FD
	11-Mar-08	742	596	-70	0.3	14,330	454.4	454.6
	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
MW-44-125	14-Feb-08	326	324	-82	0.1	13,760	455.5	457.1
	14-Mar-08	338	291	-112	0.1	13,430	455.5	455.6
	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
	07-Jul-08	281	291	-155	0.2	13,860	455.5	455.2

Refer to table footnotes for data qualifier explanation.

TABLE B-1

Groundwater Sampling Results for Floodplain Monitoring Wells, February 2008 through January 2009

Annual IM Performance Monitoring Report

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 feet MSL	River Elevation Downstream I-3 Station
Deep Wells								
MW-44-125	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
MW-46-175	13-Feb-08	125	136	-146	0.1	18,300	454.1	454.5
	13-Mar-08	99.8	92.8	-174	0.1	18,300	455.3	455.6
	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
MW-46-205	13-Mar-08	5.21	5.20	91	0.1	22,360	455.7	455.8
	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
MW-49-135	13-Mar-08	ND (1.0)	1.43	-82	8.4	14,430	455.3	454.7
	06-Oct-08	ND (0.2)	1.59	-147	0.2	13,684	455.4	455.5
MW-49-275	13-Mar-08	ND (1.0)	1.27	-191	0.1	26,350	455.9	454.7
	30-Sep-08	ND (1.0)	ND (1.0)	-322	0.1	24,030	455.8	454.6
MW-49-365	13-Mar-08	ND (1.0)	ND (1.0)	-207	0.1	40,600	457.5	454.8
	06-Oct-08	ND (1.0)	ND (1.0)	-296	0.1	38,436	457.1	455.0
MW-52D	13-Mar-08	ND (1.0)	ND (1.0)	-142	0.1	22,190	---	455.3
	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
MW-52M	13-Mar-08	ND (1.0)	ND (1.0)	-220	0.2	17,460	---	455.1
	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
	11-Dec-08	ND (1.0)	ND (1.0)	-73	0.2	17,431	---	452.2
MW-53D	13-Mar-08	ND (1.0)	ND (1.0)	-241	0.4	27,630	---	454.7
	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

Refer to table footnotes for data qualifier explanation.

TABLE B-1

Groundwater Sampling Results for Floodplain Monitoring Wells, February 2008 through January 2009

Annual IM Performance Monitoring Report

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 feet MSL	River Elevation Downstream I-3 Station
Deep Wells								
MW-53D	11-Dec-08	ND (1.0)	ND (1.0)	-13	0.3	27,252	---	452.2
MW-53M	13-Mar-08	ND (1.0)	ND (1.0)	-140	6.9	18,890	---	454.7
	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

NOTES:

ND = not detected at listed reporting limit (RL)
FD = field duplicate
J = concentration or RL estimated by laboratory or data validation
MSL = mean sea level
(---) = data not collected, available, rejected, or field instrumentation malfunctioned
µg/L= micrograms per liter
mV = oxidation-reduction potential (ORP)
µS/cm = microSiemens per centimeter

Samples taken after February 1, 2008, were field filtered due to the approved change from analysis method 7199 to 218.6 for Cr(VI) analyses (DTSC, 2008b).

Beginning in July 2005, samples analyzed for total chromium by EPA Method 6010B or 6020 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 7199 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 mean sea level (MSL) 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, February 2008 through January 2009

Annual IM Performance Monitoring Report

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-12	10-Mar-08	2760	2860	-51.3	7.58	5980
	05-May-08	2580	2800	-7.0	6.43	6780
	07-Oct-08	2680	3000	105	5.71	6490
	07-Oct-08 FD	2580	2990	FD	FD	FD
	11-Dec-08	2460	2740	23.2	6.12	6310
MW-19	07-Oct-08	682	786	72.4	6.02	2510
MW-20-070	12-Mar-08	2580	2260	86.1	7.91	3210
	07-Oct-08	2010	2070	110	7.31	3190
MW-21	11-Mar-08	ND (1.0)	1.80	-81.9	0.49	14100
	06-May-08	ND (1.0)	3.01	-84.9	0.68	15100
	02-Oct-08	ND (1.0)	ND (1.0)	11.2	0.56	16200
	11-Dec-08	1.86	ND (1.0)	52.2	2.33	4410
MW-22	11-Mar-08	ND (1.0)	ND (1.0)	-93.5	2.29	30800
	29-Jul-08	---	ND (1.0)	---	---	---
	03-Oct-08	ND (0.2)	ND (1.0)	-151	0.00	36800
	11-Dec-08	---	10.4	-101	0.22	34400
MW-24A	12-Mar-08	---	2000	-201	0.20	9760
	08-May-08	---	10.0	-367	0.28	11300
	16-Oct-08	---	6.02	-254	0.70	10600
MW-25	07-Oct-08	544	618	122	6.41	1300
	07-Oct-08 FD	552	572	FD	FD	FD
MW-26	12-Mar-08	2980	2560	180	3.90	4380
	12-Mar-08 FD	2720	2640	FD	FD	FD
	05-May-08	---	2600	9.10	19.1	4220
	08-Oct-08	2560	2410	97.4	2.40	4120
MW-31-060	06-Oct-08	534	498	124	4.82	3340
MW-35-060	11-Mar-08	35.8	35.4	-181	0.94	6930
	07-Oct-08	24.3	26.8	185	0.80	7960
	07-Oct-08 FD	26.5	27.7	FD	FD	FD
MW-47-055	14-Feb-08	37.1	39.0	5.00	2.42	4450
	14-Feb-08 FD	37.2	39.4	FD	FD	FD
	14-Mar-08	53.7	46.1	84.9	2.82	3840
	14-Mar-08 FD	48.4	42.6	FD	FD	FD
	07-May-08	34.8	32.7	-0.1	2.20	4350
	08-Oct-08	ND (49)	50.3	-119	2.54	4270
	10-Dec-08	71.8	72.7	52.2	2.33	4410
TW-02S	03-Oct-08	860	748	134	3.28	5850
Middle Zone						
MW-20-100	12-Mar-08	9690	7910	96.2	2.95	3770
	08-Oct-08	6770	8140	89.3	3.27	3710
MW-50-095	12-Mar-08	150	160	80.4	2.29	5160

TABLE B-2

Groundwater Sampling Results for Other Monitoring Wells in PMP Area, February 2008 through January 2009
Annual IM Performance Monitoring Report
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-50-095	12-Mar-08 FD	148	160	FD	FD	FD
	07-May-08	154	187	-53	2.34	5630
	07-May-08 FD	164	192	FD	FD	FD
	06-Oct-08	ND (89)	87.7	90.9	1.78	5580
	10-Dec-08	82.2	73.4	55.0	2.00	5260
	10-Dec-08 FD	78.2	74.5	FD	FD	FD
MW-51	11-Mar-08	4940	4590	-70.6	0.97	12300
	08-May-08	---	4600	74.9	1.78	12700
	08-Oct-08	4160	4600	111	1.70	11800
Deep Wells						
MW-20-130	12-Mar-08	13300	11300	101	1.75	8850
	08-Oct-08	8990	11700	97.9	1.70	13200
MW-31-135	06-Oct-08	ND (8.6)	20.3	103	0.43	11300
MW-35-135	07-Oct-08	32.0	32.8	168	0.48	10500
MW-47-115	14-Mar-08	18.0	16.5	57.8	0.23	13500
	07-May-08	18.2	18.3	-37.2	0.24	14200
	08-Oct-08	ND (15)	15.6	-174	0.14	13800
	10-Dec-08	13.3	13.6	-18	0.11	15100
MW-50-200	12-Mar-08	10900	11800	101	1.29	21800
	08-May-08	10500	11000	47.9	2.86	23800
	07-Oct-08	7390	8890	101	2.47	21400
	12-Dec-08	8040	8700	60.4	2.27	21400
TW-02D	03-Oct-08	561	644	100	0.00	15500
TW-04	14-Mar-08	27.4	28.4	16.4	0.13	22000
	08-May-08	22.6	23.2	-107	0.13	22700
	02-Oct-08	19.9	17.5	-94.2	0.10	21300
	02-Oct-08 FD	19.0	20.5	FD	FD	FD
	10-Dec-08	9.81	10.0	30.5	0.07	23000
TW-05	02-Oct-08	9.76	8.89	187	0.56	11700

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 = oxidation-reduction potential (ORP)
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 7199 to 218.6 for Cr(VI) analyses (DTSC, 2008b).

Samples analyzed for total chromium by EPA Method 6010B or 6020 were filtered and preserved in the field after sample collection, as per DTSC's June 30, 2005 letter.

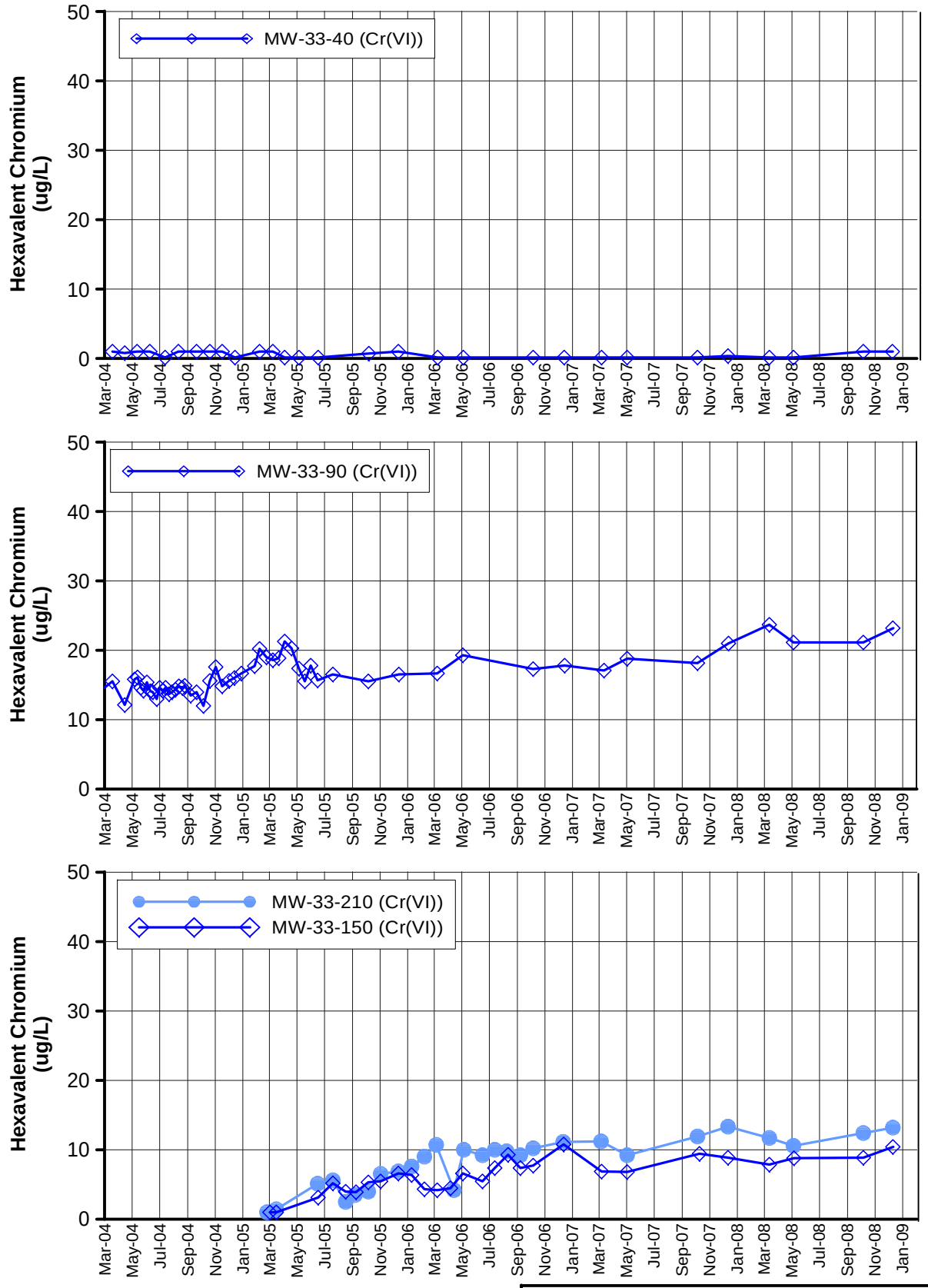


FIGURE B-1
HEXAVALENT CHROMIUM
IN MW-33 CLUSTER

ANNUAL IM PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

\\Zinfandel\Proj\PacificGasElectricCo\TopockProgram\Project_PMP\PMP_Reports\Annual_Reports\Annual_Report_3-15-2008\PG&E_Draft\Draft_Appendices\B\workfiles

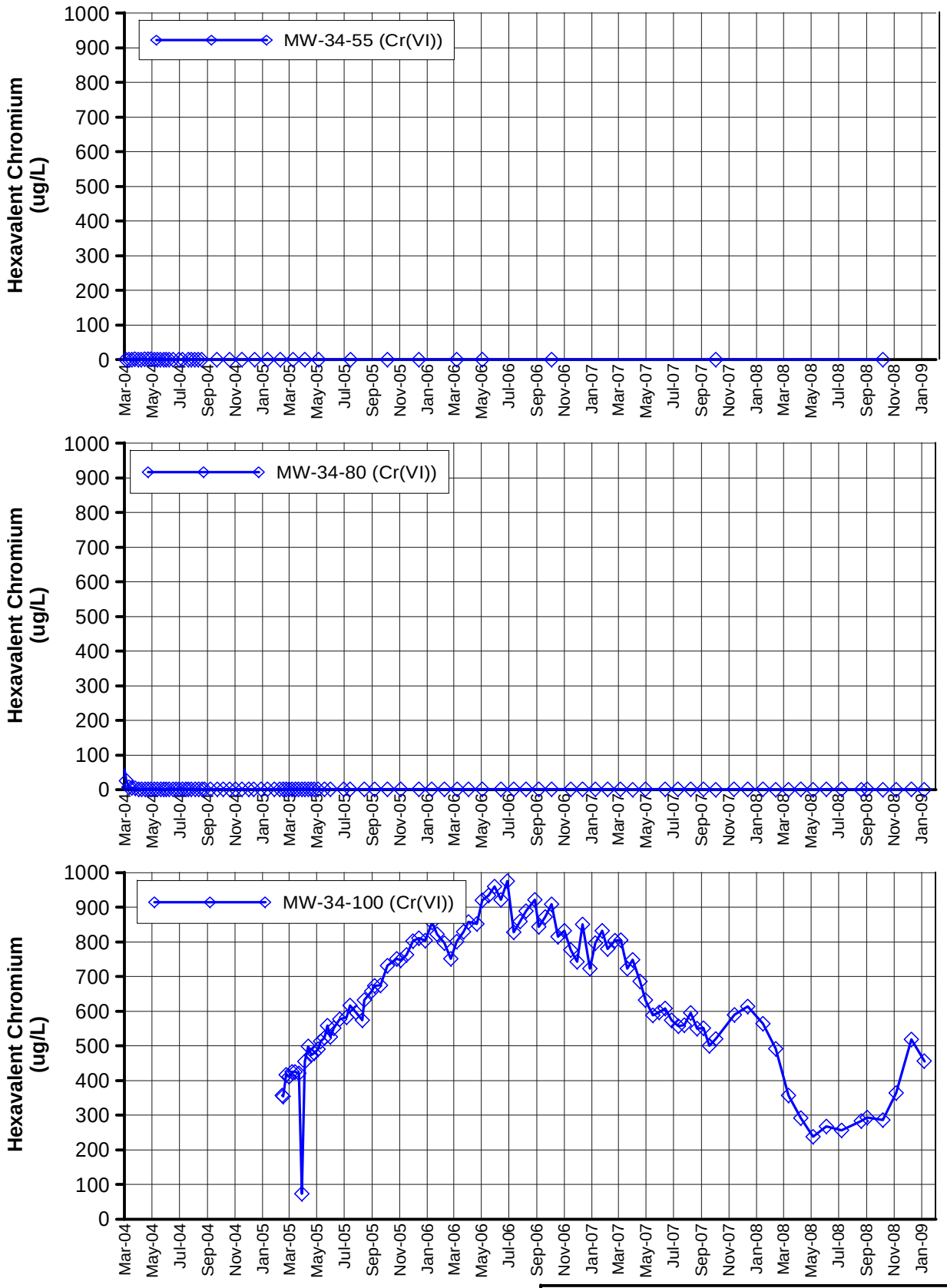


FIGURE B-2
HEXAVALENT CHROMIUM IN MW-34 CLUSTER

ANNUAL IM PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

\\Zinfandel\Proj\PacificGasElectricCo\TopockProgram\Project_PMP\PMP_Reports\Annual_Reports\Annual_Report_3-15-2008\PG&E_Draft\Draft_Appendices\B\workfiles

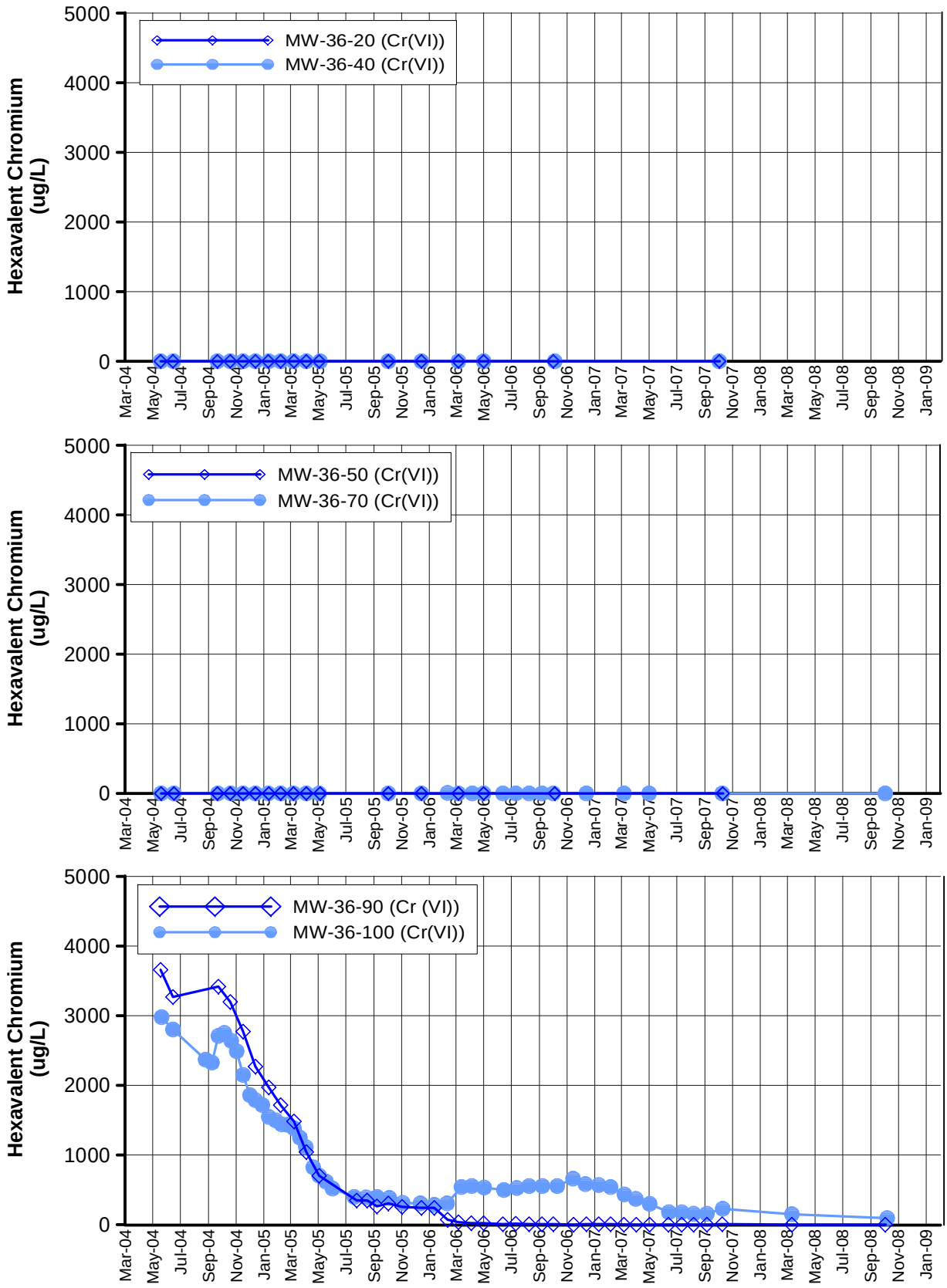


FIGURE B-3
HEXAVALENT CHROMIUM
IN MW-36 CLUSTER
ANNUAL IM PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

\\Zinfandel\Proj\PacificGasElectricCo\TopockProgram\Project_PMP\PMP_Reports\Annual_Reports\Annual_Report_3-15-2008\PG&E_Draft\Draft_Appendices\B/workfiles

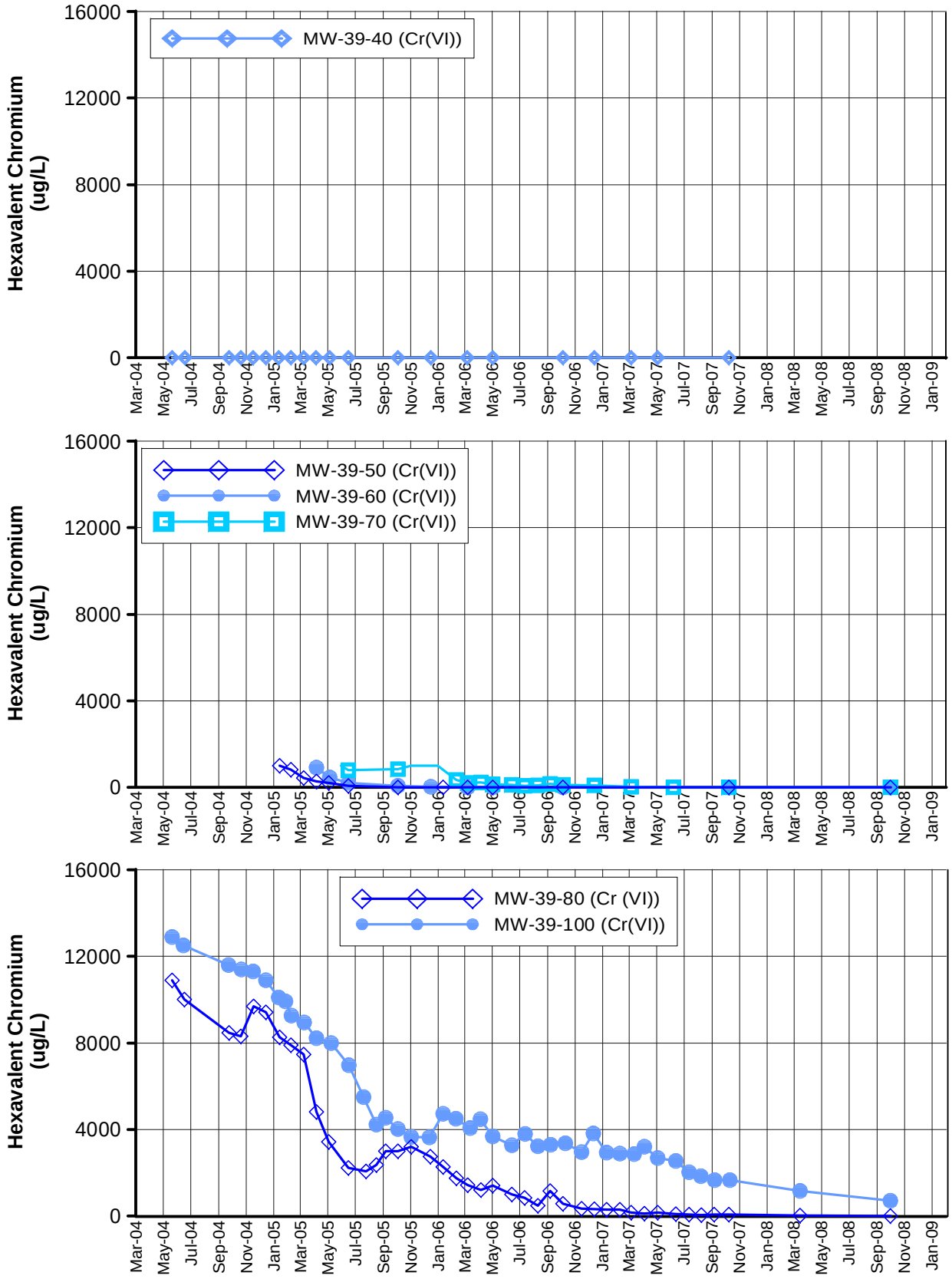


FIGURE B-4
HEXAVALENT CHROMIUM
IN MW-39 CLUSTER
ANNUAL IM PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

\\Zinfandel\Proj\PacificGasElectricCo\TopockProgram\Project_PMP\PMP_Reports\Annual_Reports\Annual_Report_3-15-2008\PG&E_Draft\Draft_Appendices\B\workfiles

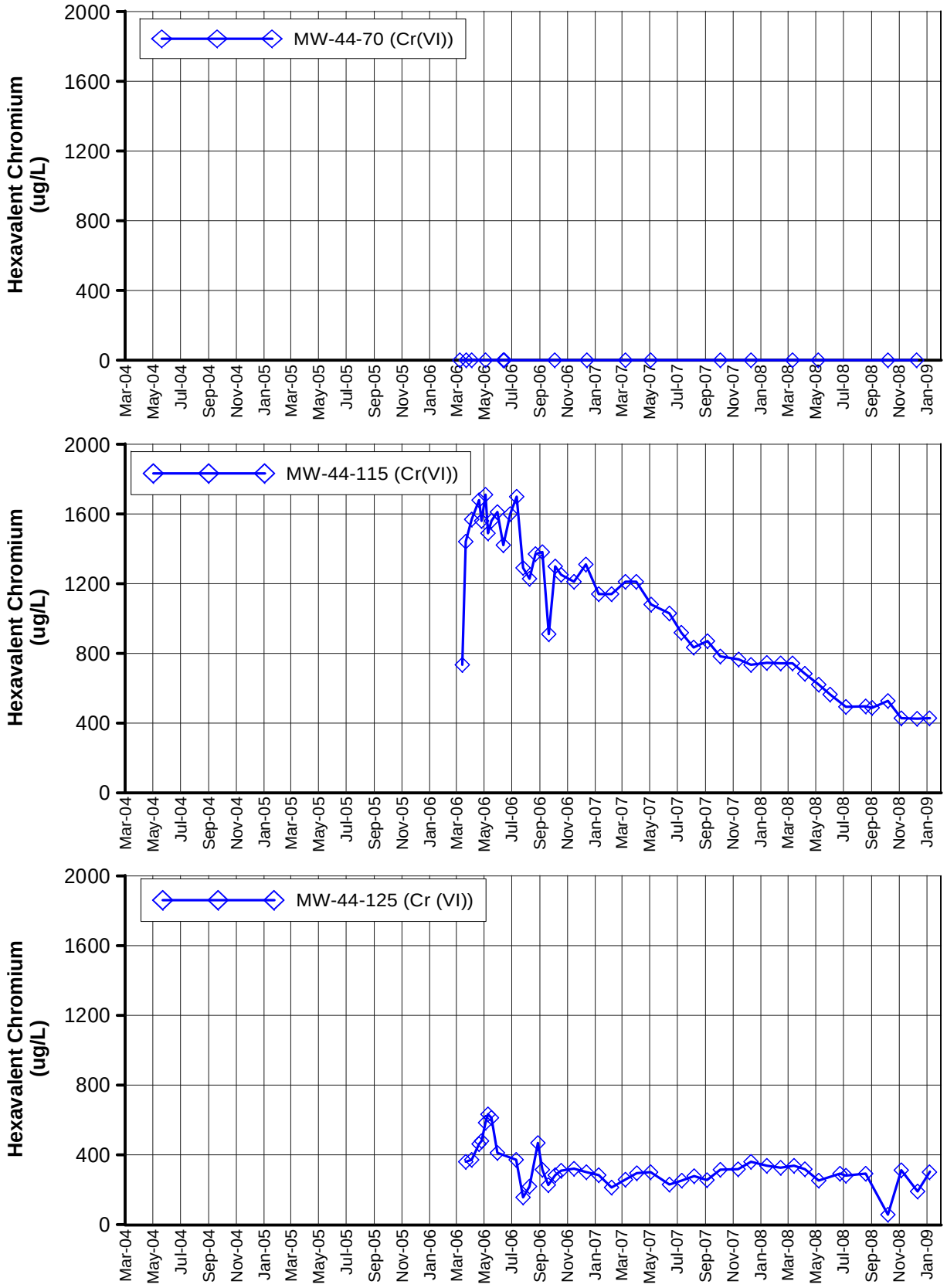


FIGURE B-5
HEXAVALENT CHROMIUM
IN MW-44 CLUSTER
ANNUAL IM PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

\\Zinfandel\Proj\PacificGasElectricCo\TopockProgram\Project_PMP\PMP_Reports\Annual_Reports\Annual_Report_3-15-2008\PG&E_Draft\Draft_Appendices\B\workfiles

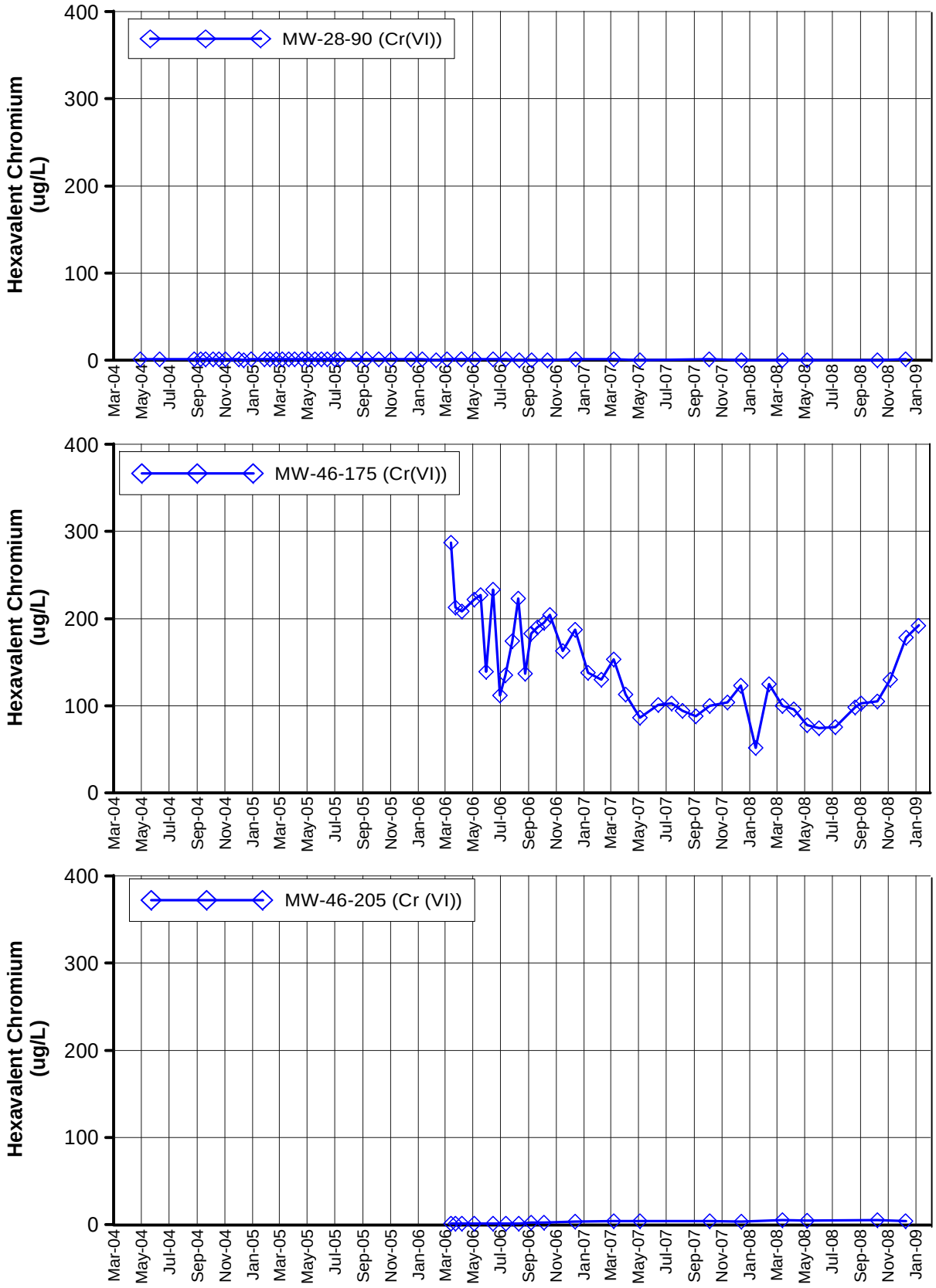


FIGURE B-6
HEXAVALENT CHROMIUM
IN MW-46 CLUSTER
ANNUAL IM PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

\\Zinfandel\Proj\PacificGasElectricCo\TopockProgram\Project_PMP\PMP_Reports\Annual_Reports\Annual_Report_3-15-2008\PG&E_Draft\Draft_Appendices\B\workfiles

Appendix C
Groundwater Quality Data for Evaluating Interim Measures Performance

TABLE C-1

Groundwater Indicator Parameters and Selected General Chemistry Results for Wells in IM Area,
February 2008 through January 2009
Annual IM Performance Monitoring Report
PG&E Topock Compressor Station

Location	Sample Date	Hexavalent Chromium µg/L	Field ORP mV	Nitrate mg/L	Total Dissolved Solids mg/L	Field Salinity %	Oxygen 18 ‰	Deuterium ‰
Shallow Zone								
MW-12	10-Mar-08	2760	-51.3	---	---	0.323	---	---
	05-May-08	2580	-7.0	---	---	3.70	---	---
	07-Oct-08	2680	105	7.60	---	---	---	---
	07-Oct-08 FD	2580	---	8.00	---	---	---	---
	11-Dec-08	2460	23.2	---	---	0.408	---	---
MW-19	07-Oct-08	682	72.4	5.00	---	---	---	---
MW-20-070	12-Mar-08	2580	86.1	22.1	1790	---	-7.6	-65.2
	07-Oct-08	2010	110	15.0	1900	---	-8.5	-64.4
MW-21	11-Mar-08	ND (1.0)	-81.9	---	---	0.809	---	---
	06-May-08	ND (1.0)	-84.9	---	---	0.74	---	---
	02-Oct-08	ND (1.0)	11.2	ND (2.5)	---	---	---	---
	11-Dec-08	1.86	52.2	---	---	0.285	---	---
MW-22	11-Mar-08	ND (1.0)	-93.5	---	---	---	---	---
	03-Oct-08	ND (0.2)	-151	ND (2.5)	---	---	---	---
	11-Dec-08	---	-101	---	---	2.23	---	---
MW-24A	12-Mar-08	---	-201	---	---	---	---	---
	08-May-08	---	-367	---	---	---	---	---
	16-Oct-08	---	-254	---	---	---	---	---
MW-25	07-Oct-08	544	122	4.30	740	---	-9.9	-68.5
	07-Oct-08 FD	552	---	4.40	730	---	-10.1	-69.1
MW-26	12-Mar-08	2980	180	10.7 J	2500	0.233	-8.1	-67.2
	12-Mar-08 FD	2720	---	7.61 J	2420	---	-8.9	-68.2
	05-May-08	---	9.10	---	---	2.23	---	---
	08-Oct-08	2560	97.4	10.0	2400	---	-8.7	-66.5
MW-27-020	03-Oct-08	ND (0.2)	-66.2	ND (0.5)	---	---	---	---
MW-28-025	08-Oct-08	ND (0.2)	14.0	ND (0.5)	---	---	---	---
MW-29	12-Mar-08	ND (1.0)	-132	---	---	---	---	---
	30-Sep-08	0.38 J	-269	ND (0.5)	---	---	---	---
	10-Dec-08	ND (0.2) J	-62.5	---	---	0.216	---	---
MW-31-060	06-Oct-08	534	124	4.20	2000	---	-10.2	-72.2
MW-32-020	10-Mar-08	ND (2.1)	-121	ND (1.0)	26000	---	-9.4	-72.6
	03-Oct-08	ND (0.2)	-6.6	ND (5.0)	---	---	---	---
MW-32-035	10-Mar-08	---	-145	---	---	---	---	---
	06-May-08	---	-120	---	---	1.56	---	---
	03-Oct-08	ND (0.2)	-51.5	ND (2.5)	15000	---	-9.8	-73.1
MW-33-040	12-Mar-08	ND (0.2)	-30.1	---	---	---	---	---
	05-May-08	ND (0.2)	58.6	---	---	0.299	---	---
	06-Oct-08	ND (1.0)	-118	ND (1.0)	---	---	---	---
	09-Dec-08	ND (1.0)	42.4	---	---	0.571	---	---
MW-35-060	11-Mar-08	35.8	-181	---	---	3.79	---	---
	07-Oct-08	24.3	185	2.30	---	---	---	---
	07-Oct-08 FD	26.5	---	2.30	---	---	---	---
MW-43-025	10-Mar-08	---	-161	---	---	---	---	---
	07-May-08	---	-165	---	---	0.10	---	---
	02-Oct-08	ND (0.2)	-98.1	ND (0.5)	---	---	---	---
MW-47-055	14-Feb-08	37.1	5.00	---	---	0.236	---	---

Refer to table footnotes for data qualifier explanation.

TABLE C-1

Groundwater Indicator Parameters and Selected General Chemistry Results for Wells in IM Area,
February 2008 through January 2009
Annual IM Performance Monitoring Report
PG&E Topock Compressor Station

Location	Sample Date	Hexavalent Chromium µg/L	Field ORP mV	Nitrate mg/L	Total Dissolved Solids mg/L	Field Salinity %	Oxygen 18 ‰	Deuterium ‰
Shallow Zone								
MW-47-055	14-Feb-08 FD	37.2	---	---	---	---	---	---
	14-Mar-08	53.7	84.9	---	---	---	---	---
	14-Mar-08 FD	48.4	---	---	---	---	---	---
	07-May-08	34.8	-0.1	---	---	0.23	---	---
	08-Oct-08	ND (49)	-119	2.20	---	---	---	---
	10-Dec-08	71.8	52.2	---	---	0.285	---	---
TW-02S	03-Oct-08	860	134	4.80	---	---	---	---
Middle Zone								
MW-20-100	12-Mar-08	9690	96.2	19.2	2470	---	-6.9	-58.3
	08-Oct-08	6770	89.3	16.0	2200	---	-7.9	-60.2
MW-27-060	03-Oct-08	0.32	-83.4	ND (0.5)	---	---	---	---
	10-Dec-08	ND (0.2)	-18	ND (1.0)	---	0.278	---	---
MW-33-090	12-Mar-08	23.7	-65.8	---	---	---	---	---
	05-May-08	21.1	45.0	---	---	0.637	---	---
	06-Oct-08	21.1	-209	2.20	---	---	---	---
	11-Dec-08	23.2	60.8	---	---	0.713	---	---
MW-34-055	07-Oct-08	ND (0.2)	-108	ND (0.5)	700	---	-13	-100
MW-36-070	03-Oct-08	ND (0.2)	-29	ND (0.5)	---	---	---	---
MW-39-050	01-Oct-08	ND (0.2)	-231	ND (0.5)	---	---	---	---
MW-39-060	01-Oct-08	ND (0.2)	-215	ND (0.5)	---	---	---	---
MW-39-070	01-Oct-08	ND (0.2)	-279	ND (0.5)	---	---	---	---
MW-42-055	11-Mar-08	ND (1.0)	-126	---	---	---	---	---
	06-May-08	ND (1.0)	-99.5	---	---	1.00	---	---
	03-Oct-08	ND (0.2)	-123	ND (2.5)	---	---	---	---
	09-Dec-08	ND (1.0)	-93.2	---	---	0.882	---	---
MW-42-065	11-Mar-08	ND (1.0)	-50.4	---	---	---	---	---
	06-May-08	ND (1.0)	-23.1	---	---	1.00	---	---
	03-Oct-08	ND (0.2) J	-32.2	ND (2.5)	---	---	---	---
	09-Dec-08	ND (1.0)	-12.1	---	---	0.993	---	---
MW-44-070	11-Mar-08	ND (0.2)	-128	---	---	---	---	---
	07-May-08	ND (0.2)	-107	---	---	0.236	---	---
	07-Oct-08	ND (0.2)	-159	ND (0.5)	---	---	---	---
	10-Dec-08	ND (0.2)	-87.7	---	---	0.217	---	---
MW-50-095	12-Mar-08	150	80.4	---	---	---	---	---
	12-Mar-08 FD	148	---	---	---	---	---	---
	07-May-08	154	-53	---	---	0.302	---	---
	07-May-08 FD	164	---	---	---	---	---	---
	06-Oct-08	ND (89)	90.9	1.80	---	---	---	---
	10-Dec-08	82.2	55.0	---	---	0.34	---	---
	10-Dec-08 FD	78.2	---	---	---	---	---	---
MW-51	11-Mar-08	4940	-70.6	---	---	0.698	---	---
	08-May-08	---	74.9	---	---	---	---	---
	03-Jun-08	---	-2.7	---	---	6.84	---	---
	08-Oct-08	4160	111	12.0	---	---	---	---
MW-52S	13-Mar-08	ND (1.0)	-176	ND (1.0)	---	---	---	---
	07-May-08	ND (1.0)	-226	ND (1.0)	---	0.91	---	---

Refer to table footnotes for data qualifier explanation.

TABLE C-1

Groundwater Indicator Parameters and Selected General Chemistry Results for Wells in IM Area,
February 2008 through January 2009
Annual IM Performance Monitoring Report
PG&E Topock Compressor Station

Location	Sample Date	Hexavalent Chromium µg/L	Field ORP mV	Nitrate mg/L	Total Dissolved Solids mg/L	Field Salinity %	Oxygen 18 ‰	Deuterium ‰
Middle Zone								
MW-52S	01-Oct-08	ND (1.0)	-173	ND (2.5)	---	---	---	---
	11-Dec-08	ND (1.0)	---	---	---	---	---	---
Deep Wells								
MW-20-130	12-Mar-08	13300	101	14.3	8460	---	-6.2	-58.7
	08-Oct-08	8990	97.9	12.0	7800	---	-7.3	-59.6
MW-27-085	10-Mar-08	ND (1.0)	-64	---	---	---	---	---
	06-May-08	ND (1.0)	15.8	---	---	1.11	---	---
	03-Oct-08	ND (0.2)	6.60	ND (2.5)	---	---	---	---
	10-Dec-08	ND (1.0)	19.1	---	---	1.12	---	---
MW-28-090	13-Mar-08	ND (0.2)	-117	---	---	---	---	---
	07-May-08	ND (0.2)	-112	---	---	0.442	---	---
	08-Oct-08	ND (0.2)	-83.4	ND (1.0)	---	---	---	---
	09-Dec-08	ND (1.0)	---	---	---	---	---	---
MW-31-135	06-Oct-08	ND (8.6)	103	ND (2.5)	---	---	---	---
MW-33-150	12-Mar-08	7.87	1.40	---	---	---	---	---
	06-May-08	8.83	23.6	---	---	1.08	---	---
	06-Oct-08	8.84	-223	ND (2.5)	---	---	---	---
	06-Oct-08 FD	8.91	---	ND (2.5)	---	---	---	---
	11-Dec-08	10.4	84.8	---	---	1.18	---	---
MW-33-210	12-Mar-08	11.7	-31.3	---	---	---	---	---
	05-May-08	10.6	139	---	---	1.26	---	---
	06-Oct-08	12.4	-190	ND (2.5)	---	---	---	---
	11-Dec-08	13.2	67.0	---	---	1.30	---	---
MW-34-080	13-Feb-08	ND (0.2)	-52.1	---	---	0.53	---	---
	12-Mar-08	ND (0.2)	-61.7	ND (1.0)	5500	---	-11.4	-87.3
	08-Apr-08	ND (1.0)	29.2	---	---	0.509	---	---
	06-May-08	ND (0.2)	-2.7	ND (0.2)	5820	0.56	-11.4	-87.3
	04-Jun-08	ND (1.0)	-114	---	---	0.529	---	---
	08-Jul-08	ND (1.0)	-103	---	---	---	---	---
	20-Aug-08	ND (0.2)	-25.8	---	---	---	---	---
	03-Sep-08	ND (1.0)	-286	---	---	0.495	---	---
	07-Oct-08	ND (0.2)	-126	ND (2.0)	5300	---	-11.8	-87.6
	06-Nov-08	ND (0.2)	23.8	---	---	---	---	---
	10-Dec-08	ND (1.0)	1.10	ND (1.0)	5300	0.533	---	---
	07-Jan-09	ND (0.2)	13.8	---	---	---	---	---
MW-34-100	13-Feb-08	492	-19.6	---	---	1.08	---	---
	12-Mar-08	358	9.20	---	---	---	---	---
	08-Apr-08	280	20.4	---	---	1.06	---	---
	08-Apr-08 FD	292	---	---	---	---	---	---
	06-May-08	234	51.9	---	---	1.17	---	---
	06-May-08 FD	238	---	---	---	---	---	---
	04-Jun-08	268	70.1	---	---	1.13	---	---
	08-Jul-08	250	21.7	---	---	---	---	---
	08-Jul-08 FD	257	---	---	---	---	---	---
	20-Aug-08	283	74.7	---	---	---	---	---
	20-Aug-08 FD	250	---	---	---	---	---	---

Refer to table footnotes for data qualifier explanation.

TABLE C-1

Groundwater Indicator Parameters and Selected General Chemistry Results for Wells in IM Area,
February 2008 through January 2009
Annual IM Performance Monitoring Report
PG&E Topock Compressor Station

Location	Sample Date	Hexavalent Chromium µg/L	Field ORP mV	Nitrate mg/L	Total Dissolved Solids mg/L	Field Salinity %	Oxygen 18 ‰	Deuterium ‰
Deep Wells								
MW-34-100	03-Sep-08	294	-264	---	---	1.10	---	---
	07-Oct-08	272	17.1	ND (2.5)	11000	---	-10.9	-80.8
	07-Oct-08 FD	286 J	---	ND (2.5)	11000	---	-11	-81.3
	06-Nov-08	364	44.9	---	---	---	---	---
	10-Dec-08	481	10.4	---	---	1.15	---	---
	10-Dec-08 FD	519	---	---	---	---	---	---
	07-Jan-09	456	17.9	---	---	---	---	---
MW-35-135	07-Oct-08	32.0	168	2.70	---	---	---	---
MW-36-090	11-Mar-08	0.71	-53.6	---	---	---	---	---
	11-Mar-08 FD	0.703	---	---	---	---	---	---
	03-Oct-08	0.61	-68	ND (0.5)	---	---	---	---
MW-36-100	11-Mar-08	146	-170	---	---	---	---	---
	07-Oct-08	88.4	-200	ND (2.5)	---	---	---	---
MW-39-080	14-Mar-08	34.8	-63.2	---	---	---	---	---
	01-Oct-08	7.58	-257	ND (2.5)	---	---	---	---
MW-39-100	14-Mar-08	1150	37.4	---	---	---	---	---
	01-Oct-08	706	-19.1	ND (2.5)	---	---	---	---
MW-43-075	02-Oct-08	ND (0.2)	-90.3	ND (2.5)	---	---	---	---
MW-43-090	02-Oct-08	ND (0.2)	-85.2	ND (2.5)	---	---	---	---
MW-44-115	14-Feb-08	744	-48	---	---	0.831	---	---
	14-Feb-08 FD	735	---	---	---	---	---	---
	11-Mar-08	742	-69.5	---	---	---	---	---
	07-Apr-08	685	99.7	---	---	0.778	---	---
	08-May-08	620	-1.6	---	---	0.832	---	---
	02-Jun-08	564	-142	---	---	---	---	---
	07-Jul-08	493	-108	---	---	---	---	---
	19-Aug-08	498 J	-65.9	---	---	---	---	---
	02-Sep-08	488	-274	---	---	0.777	---	---
	07-Oct-08	456	-185	ND (2.5)	---	---	---	---
	07-Oct-08 FD	527 J	---	ND (2.5)	---	---	---	---
	06-Nov-08	429	38.6	---	---	---	---	---
	11-Dec-08	426	20.1	---	---	0.845	---	---
	07-Jan-09	428	13.9	---	---	---	---	---
MW-44-125	14-Feb-08	326	-81.5	---	---	0.797	---	---
	14-Mar-08	338	-112	---	---	---	---	---
	07-Apr-08	318	-6.4	---	---	0.59	---	---
	08-May-08	253	1.30	---	---	0.718	---	---
	24-Jun-08	293	-77	---	---	1.03	---	---
	07-Jul-08	281	-155	---	---	---	---	---
	19-Aug-08	294	-64.7	---	---	---	---	---
	02-Sep-08	---	77.1	---	---	0.237	---	---
	07-Oct-08	55.9	-150	ND (2.5)	---	---	---	---
	06-Nov-08	312	51.7	---	---	---	---	---
	06-Nov-08 FD	301	---	---	---	---	---	---
	12-Dec-08	189	55.7	---	---	0.933	---	---
	07-Jan-09	300	-31.9	---	---	---	---	---

Refer to table footnotes for data qualifier explanation.

TABLE C-1

Groundwater Indicator Parameters and Selected General Chemistry Results for Wells in IM Area,
February 2008 through January 2009
Annual IM Performance Monitoring Report
PG&E Topock Compressor Station

Location	Sample Date	Hexavalent Chromium µg/L	Field ORP mV	Nitrate mg/L	Total Dissolved Solids mg/L	Field Salinity %	Oxygen 18 ‰	Deuterium ‰
Deep Wells								
MW-46-175	13-Feb-08	125	-146	---	---	1.09	---	---
	13-Mar-08	99.8	-174	---	---	---	---	---
	07-Apr-08	95.6	-51.5	---	---	1.04	---	---
	07-May-08	77.9	-121	---	---	1.94	---	---
	02-Jun-08	74.2	-225	---	---	---	---	---
	02-Jun-08 FD	73.6	---	---	---	---	---	---
	08-Jul-08	75.3	-192	---	---	---	---	---
	20-Aug-08	98.2	-103	---	---	---	---	---
	03-Sep-08	100	-314	---	---	1.04	---	---
	03-Sep-08 FD	103	---	---	---	---	---	---
	08-Oct-08	105	-207	ND (2.5)	---	---	---	---
	06-Nov-08	130	5.60	---	---	---	---	---
	11-Dec-08	178	1.00	---	---	1.15	---	---
	07-Jan-09	190	-4.9	---	---	---	---	---
	07-Jan-09 FD	192	---	---	---	---	---	---
MW-46-205	13-Mar-08	5.21	90.7	---	---	---	---	---
	07-May-08	4.52	56.8	---	---	1.36	---	---
	08-Oct-08	ND (4.9)	-127	ND (2.5)	---	---	---	---
	09-Dec-08	4.28	57.9	---	---	1.45	---	---
MW-47-115	14-Mar-08	18.0	57.8	---	---	---	---	---
	07-May-08	18.2	-37.2	---	---	0.816	---	---
	08-Oct-08	ND (15)	-174	ND (2.5)	---	---	---	---
	10-Dec-08	13.3	-18	---	---	0.977	---	---
MW-49-135	13-Mar-08	ND (1.0)	-82.1	---	---	---	---	---
	06-Oct-08	ND (0.2)	-147	ND (2.5)	---	---	---	---
MW-49-275	13-Mar-08	ND (1.0)	-191	---	---	---	---	---
	30-Sep-08	ND (1.0)	-322	ND (2.5)	---	---	---	---
MW-49-365	13-Mar-08	ND (1.0)	-207	---	---	---	---	---
	06-Oct-08	ND (1.0)	-296	ND (5.0)	---	---	---	---
MW-50-200	12-Mar-08	10900	101	---	---	---	---	---
	08-May-08	10500	47.9	---	---	---	---	---
	07-Oct-08	7390	101	6.30	---	---	---	---
	12-Dec-08	8040	60.4	---	---	1.38	---	---
MW-52D	13-Mar-08	ND (1.0)	-142	ND (1.0)	---	---	---	---
	07-May-08	ND (1.0)	-192	---	---	1.46	---	---
	08-May-08	---	---	ND (1.0) J	---	---	---	---
	01-Oct-08	ND (1.0)	-262	ND (2.5)	---	---	---	---
	11-Dec-08	ND (1.0)	---	---	---	---	---	---
MW-52M	13-Mar-08	ND (1.0)	-220	ND (1.0)	---	---	---	---
	07-May-08	ND (1.0)	-230	ND (1.0)	---	1.25	---	---
	01-Oct-08	ND (1.0)	-191	ND (2.5)	---	---	---	---
	11-Dec-08	ND (1.0)	-73	---	---	1.13	---	---
MW-53D	13-Mar-08	ND (1.0)	-241	ND (1.0)	---	---	---	---
	07-May-08	ND (1.0)	-160	ND (1.0)	---	2.16	---	---
	01-Oct-08	ND (1.0)	-279	ND (2.5)	---	---	---	---
	11-Dec-08	ND (1.0)	-12.9	---	---	1.76	---	---

Refer to table footnotes for data qualifier explanation.

TABLE C-1

Groundwater Indicator Parameters and Selected General Chemistry Results for Wells in IM Area,
February 2008 through January 2009
Annual IM Performance Monitoring Report
PG&E Topock Compressor Station

Location	Sample Date	Hexavalent Chromium µg/L	Field ORP mV	Nitrate mg/L	Total Dissolved Solids mg/L	Field Salinity %	Oxygen 18 ‰	Deuterium ‰
Deep Wells								
MW-53M	13-Mar-08	ND (1.0)	-140	ND (1.0)	---	---	---	---
	07-May-08	ND (1.0)	-167	ND (1.0)	---	1.26	---	---
	01-Oct-08	ND (1.0)	-153	ND (2.5)	---	---	---	---
	11-Dec-08	ND (1.0)	---	---	---	---	---	---
PE-01	06-Feb-08	42.8	---	---	4360	---	---	---
	05-Mar-08	39.5	---	---	4080	---	---	---
	02-Apr-08	29.0	---	---	4180	---	---	---
	08-May-08	26.4	---	---	4100	---	---	---
	04-Jun-08	16.0	---	---	3560	---	---	---
	02-Jul-08	25.7	---	---	4060	---	---	---
	06-Aug-08	28.2	---	---	4090	---	---	---
	04-Sep-08	29.7	---	---	3810	---	---	---
	01-Oct-08	27.6	---	---	3600	---	---	---
	04-Dec-08	28.8	---	---	3700	---	---	---
	09-Jan-09	33.4	---	---	3740	---	---	---
TW-02D	03-Oct-08	561	100	1.70	---	---	---	---
TW-03D	06-Feb-08	1760	---	---	5690	---	---	---
	05-Mar-08	1810	---	---	4730	---	---	---
	02-Apr-08	1550	---	---	4450	---	---	---
	08-May-08	1540	---	---	5320	---	---	---
	04-Jun-08	1460	---	---	5220	---	---	---
	02-Jul-08	1460	---	---	5660	---	---	---
	06-Aug-08	1440	---	---	5270	---	---	---
	04-Sep-08	1490	---	---	5250	---	---	---
	01-Oct-08	1460	---	---	5640	---	---	---
	04-Dec-08	1570	---	---	5430	---	---	---
	09-Jan-09	1570	---	---	5770	---	---	---
TW-04	14-Mar-08	27.4	16.4	---	---	---	---	---
	08-May-08	22.6	-107	---	---	---	---	---
	02-Oct-08	19.9	-94.2	ND (2.5)	---	---	---	---
	02-Oct-08 FD	19.0	---	ND (2.5)	---	---	---	---
	10-Dec-08	9.81	30.5	---	---	---	---	---
TW-05	02-Oct-08	9.76	187	ND (2.5)	---	---	---	---

Refer to table footnotes for data qualifier explanation.

TABLE C-1

Groundwater Indicator Parameters and Selected General Chemistry Results for Wells in IM Area,
February 2008 through January 2009
Annual IM Performance Monitoring Report
PG&E Topock Compressor Station

NOTES:

ND = not detected at listed reporting limit (RL)
FD = field duplicate
J = concentration or RL estimated by laboratory or data validation
R = result exceeded analytical criteria for precision and accuracy; should not be used for project decision-making
NV = not validated
(---) = data not collected, available, rejected, or field instrumentation malfunctioned
µg/L= micrograms per liter
mg/L = milligrams per liter
mV = millivolts
‰ = differences from global standards in parts per thousand

The RLs for certain hexavalent chromium results from Method 7199 analyses have been elevated above the standard RL of 0.2 µg/L due to required sample dilution to accommodate matrix interferences.

Oxygen 18 and Deuterium results from the December 2008 sampling event were not available from the analyzing laboratory prior to submittal of this report.

Refer to table footnotes for data qualifier explanation.

TABLE C-2

Chemical Performance Monitoring Results, February 2008 through January 2009
Annual IM Performance Monitoring Report
PG&E Topock Compressor Station

Location	Sample Date	Total Dissolved Solids	Oxygen 18	Deuterium	Chloride	Sulfate	Nitrate	Bromide	Calcium	Magnesium	Potassium	Sodium	Boron	Alkalinity
Monitoring Wells														
MW-20-70	12-Mar-08	1790	-7.6	-65.2	695	360	22.1	ND (1.0)	139	41.2	10.7	403	0.51	77.0
	07-Oct-08	1900	-8.5	-64.4	650	360	15.0	0.61	136	37.9	10.5	400	0.608	83.0
MW-20-100	12-Mar-08	2470	-6.9	-58.3	827	442	19.2	ND (1.0)	218	35.4	11.9	469	0.702	870
	08-Oct-08	2200	-7.9	-60.2	760	420	16.0	ND (1.0)	215	36.8	10.3	453	0.669	90.0
MW-20-130	12-Mar-08	8460	-6.2	-58.7	3690	1220	14.3	ND (1.0)	342	23.4	47.0	2260	2.07	75.0
	08-Oct-08	7800	-7.3	-59.6	3500	1200	12.0	ND (2.5)	329	22.0	40.1	1990	2.23	81.0
MW-25	07-Oct-08	740	-9.9	-68.5	170	150	4.30	ND (0.5)	59.2	12.9	9.89	143	0.559	200
	07-Oct-08 FD	730	-10.1	-69.1	170	150	4.40	ND (0.5)	58.4	12.9	10.2	144	0.559	210
MW-26	12-Mar-08	2500	-8.1	-67.2	908	398	10.7 J	ND (1.0)	176	44.1 J	16.2 J	498	0.589	103
	12-Mar-08 FD	2420	-8.9	-68.2	905	398	7.61 J	ND (1.0)	160	32.8 J	12.7 J	462	0.601	102
	08-Oct-08	2400	-8.7	-66.5	930	440	10.0	ND (1.0)	183	45.8	14.6	555	0.591	110
MW-27-20	03-Oct-08	---	---	---	94.0	240	ND (0.5)	---	87.9	29.5	---	110	---	---
MW-28-25	08-Oct-08	---	---	---	100	280	ND (0.5)	---	109	34.7	---	102	---	220
MW-31-60	06-Oct-08	2000	-10.2	-72.2	810	240	4.20	ND (1.0)	150	26.0	9.39	460	0.399	81.0
MW-32-20	10-Mar-08	26000	-9.4	-72.6	15800	2280	ND (1.0)	5.66	1190	710	67.4	11600	2.31	800
	03-Oct-08	---	---	---	21000	3500	ND (5.0)	---	1700	1080	---	9550	---	640
MW-32-35	03-Oct-08	15000	-9.8	-73.1	7600	1300	ND (2.5)	3.10	829	150	52.3	3490	1.49	550
MW-34-55	07-Oct-08	700	-13	-100.0	100	250	ND (0.5)	---	72.4	16.9	5.26	192	0.248	170
MW-34-80	12-Mar-08	5500	-11.4	-87.3	2510	739	ND (1.0)	ND (1.0)	237	52.6	19.2	2030	1.14	238
	06-May-08	5820	-11.4	-87.3	2460	753	ND (0.2)	0.525	230	49.0	30.0	1600	1.20	216
	07-Oct-08	5300	-11.8	-87.6	2400	720	ND (2.0)	ND (2.0)	223	46.3	22.0	1220	0.765	250
	10-Dec-08	5300	---	---	2190	698	ND (1.0)	ND (1.0)	147	45.2	20.6	3880	1.11	253
Surface Water Stations														
R-27	02-Apr-08	---	---	---	93.0	267	ND (1.0)	ND (1.0)	80.2	30.7	5.50	106	0.432	136
	17-Jun-08	682	---	---	91.6	254	ND (1.0)	ND (1.0)	76.2	31.8	6.69	89.7	ND (0.2)	134
R-28	02-Apr-08	---	---	---	92.5	309	ND (1.0)	ND (1.0)	84.7	31.4	5.58	108	0.467	137
	18-Jun-08	672	---	---	89.4	248	ND (1.0)	ND (1.0)	43.3	31.1	6.95	93.9	ND (0.2)	132
	17-Sep-08	640	---	---	91.4	256	ND (0.5)	ND (0.5)	83.4	31.2	6.48	78.0	ND (0.2)	132
	04-Dec-08	649	---	---	97.4	260	ND (1.0)	ND (1.0)	81.7	30.0	5.95	114	0.262	135
	21-Jan-09	652	---	---	91.5	253	ND (0.5)	ND (0.5)	79.2	27.8	6.01	91.7	ND (0.2)	134

TABLE C-2

Chemical Performance Monitoring Results, February 2008 through January 2009
Annual IM Performance Monitoring Report
PG&E Topock Compressor Station

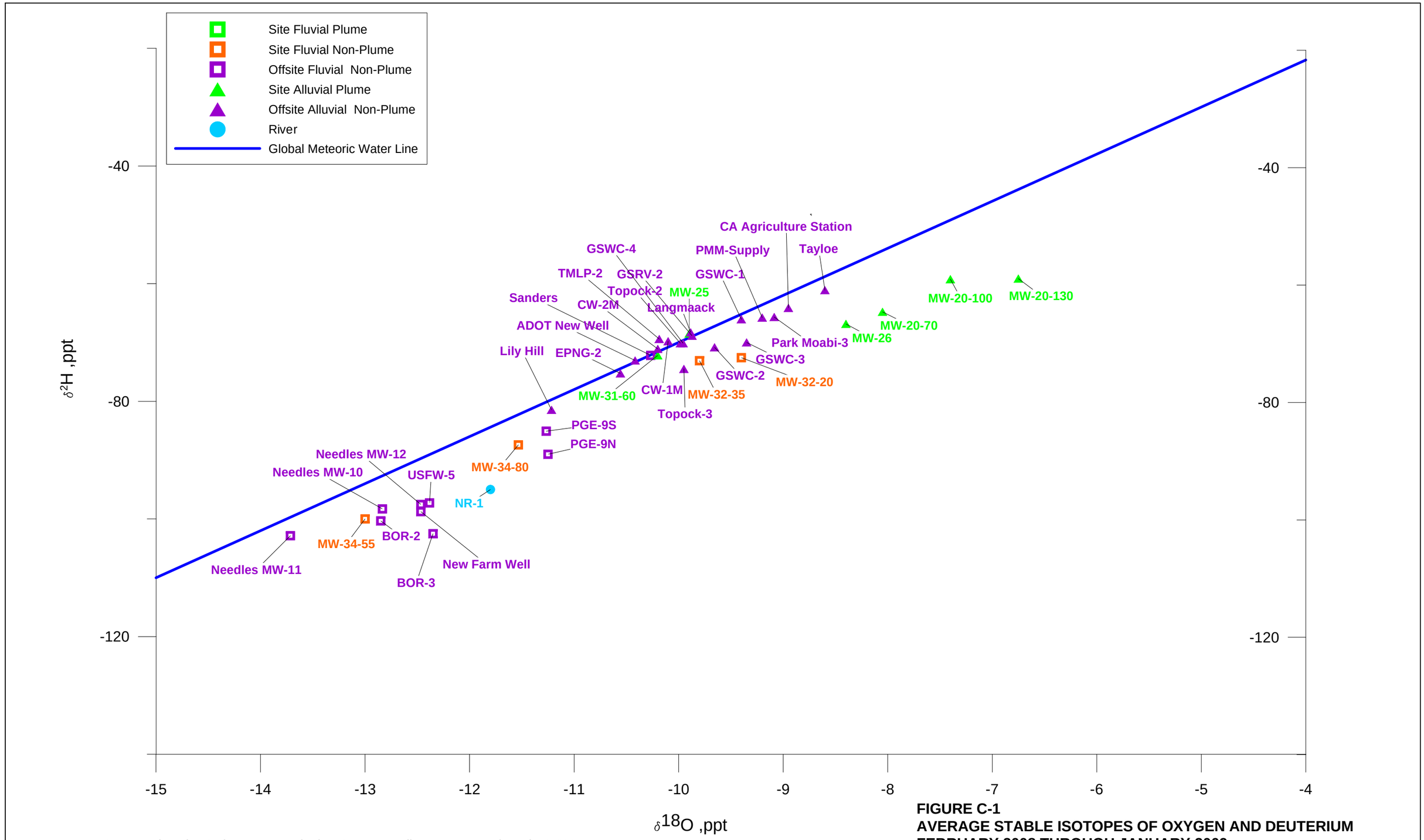
NOTES:

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

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 reported as carbonate (CaCO3). Nitrate reported as Nitrogen (N).

Oxygen 18 and Deuterium results from the December 2008 sampling event were not available from the analyzing laboratory prior to submittal of this report.



Notes: Values for Performance Monitoring Program Wells are averages from the 2008 Reporting Period. Values from Background Wells are cumulative averages from all years.

FIGURE C-1
AVERAGE STABLE ISOTOPES OF OXYGEN AND DEUTERIUM
FEBRUARY 2008 THROUGH JANUARY 2009
ANNUAL IM PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

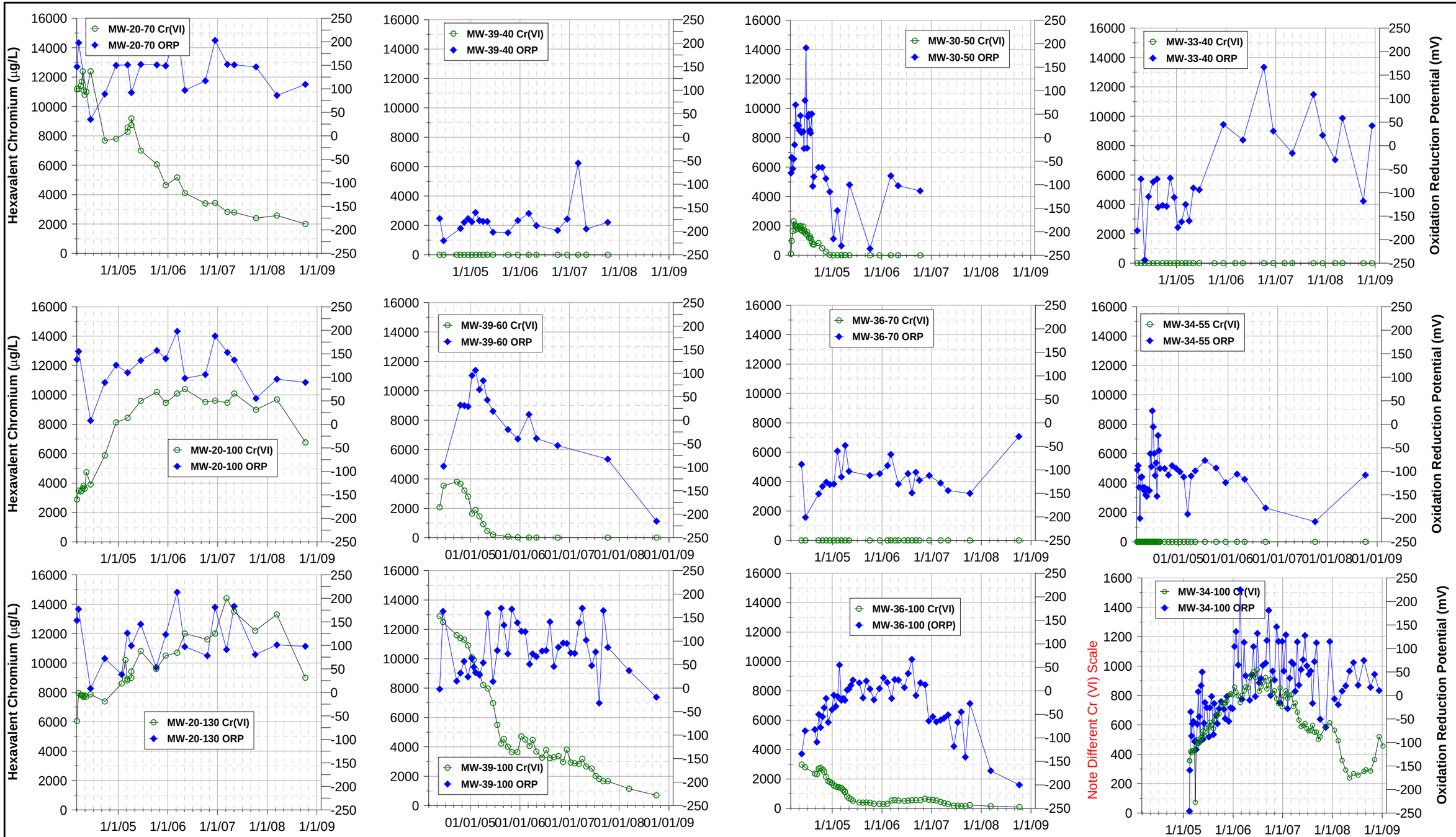
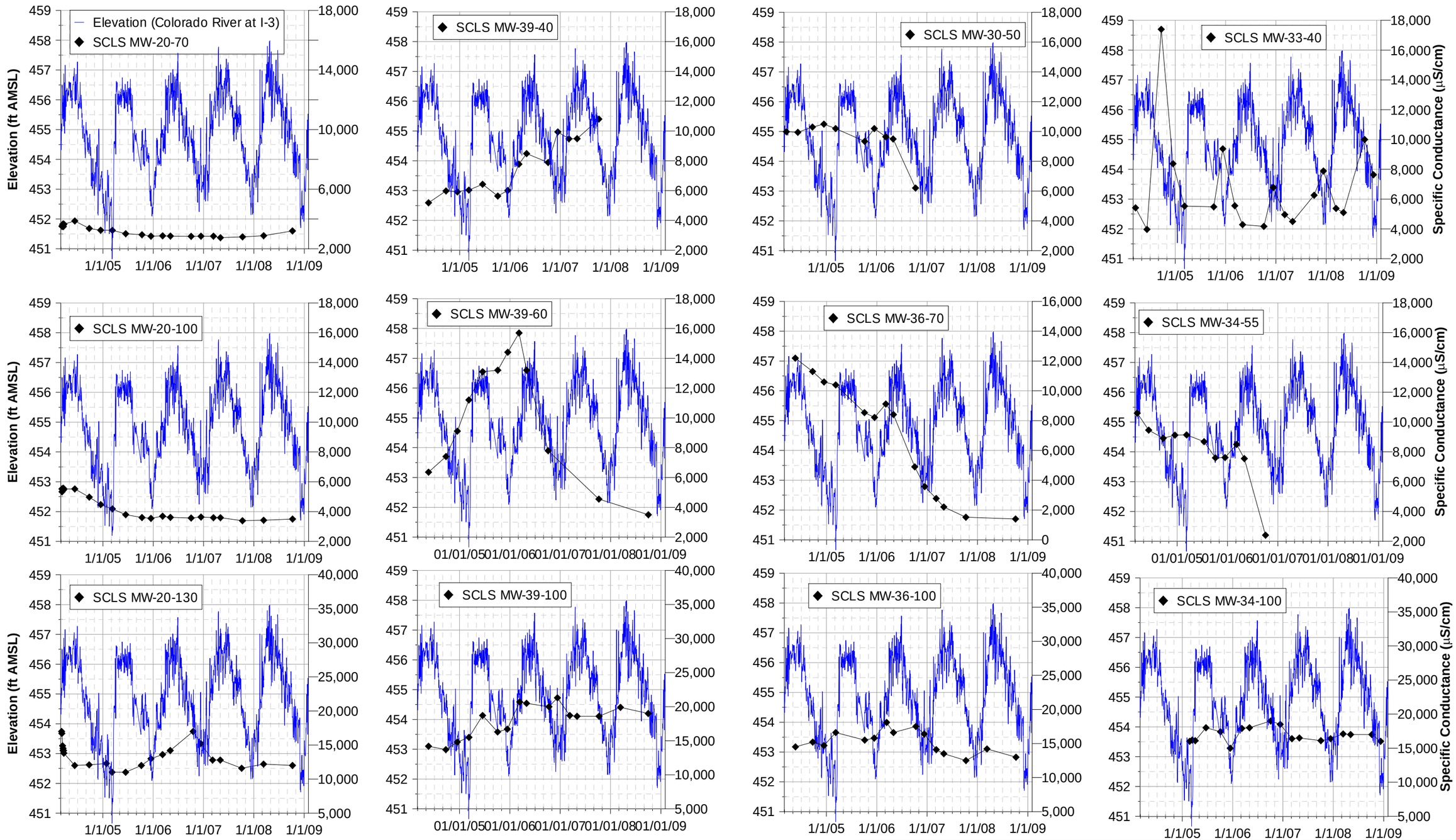


FIGURE C-2
GRAPHS OF HEXAVALENT CHROMIUM AND OXIDATION REDUCTION POTENTIAL FOR WELLS ALONG FLOODPLAIN CROSS SECTION A
ANNUAL IM PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL



Note: Elevation = Colorado River Elevation at I-3.
SCLS = specific conductance lab sample.

FIGURE C-3
GRAPHS OF RIVER ELEVATION (I-3) AND SPECIFIC CONDUCTANCE FOR FLOODPLAIN WELLS IN CROSS SECTION A
ANNUAL IM PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

Appendix D
Hydraulic Monitoring Data for Annual Reporting Period

TABLE D-1

Average Monthly and Quarterly Groundwater Elevations, November 2008 through January 2009
Interim Measures Performance Monitoring
PG&E Topock Compressor Station

Well ID	Aquifer Zone	November 2008	December 2008	January 2009	Quarter Average	Days in Quarter Average
I-3	River Station	454.03	452.28	454.02	453.44	92
MW-20-070	Shallow Zone	453.12	452.20	452.58	452.63	92
MW-20-100	Middle Zone	452.75	451.81	452.23	452.26	92
MW-20-130	Deep Wells	452.36	451.38	451.93	451.89	92
MW-22	Shallow Zone	454.13	453.59	453.66	453.79	92
MW-25	Shallow Zone	454.87	454.26	454.06	454.39	92
MW-26	Shallow Zone	454.55	453.95	453.79	454.09	92
MW-27-020	Shallow Zone	453.93	452.37	453.71	453.33	92
MW-27-060	Middle Zone	453.93	452.36	453.77	453.35	92
MW-27-085	Deep Wells	453.94	452.36	453.77	453.35	92
MW-28-025	Shallow Zone	453.91	452.30	453.73	453.31	92
MW-28-090	Deep Wells	453.97	452.39	453.85	453.40	92
MW-30-050	Middle Zone	453.71	452.32	453.47	453.16	92
MW-31-060	Shallow Zone	453.96	452.90	453.44	453.43	92
MW-31-135	Deep Wells	453.22	452.25	452.89	452.78	92
MW-32-035	Shallow Zone	453.84	452.58	453.57	453.32	92
MW-33-040	Shallow Zone	454.13	452.81	453.71	453.54	92
MW-33-090	Middle Zone	454.21	452.91	453.87	453.66	92
MW-33-150	Deep Wells	454.32	453.12	453.98	453.80	92
MW-34-055	Middle Zone	453.94	452.35	453.80	453.36	92
MW-34-080	Deep Wells	453.93	452.40	453.93	453.41	92
MW-34-100	Deep Wells	453.79	452.39	453.78	453.31	92
MW-35-060	Shallow Zone	454.45	453.12	454.25	453.93	92
MW-35-135	Deep Wells	455.43	453.57	454.39	454.22	42
MW-36-020	Shallow Zone	453.93	452.54	453.67	453.37	92
MW-36-040	Shallow Zone	453.82	452.36	453.59	453.25	92
MW-36-050	Middle Zone	453.80	452.33	453.59	453.23	92
MW-36-070	Middle Zone	453.69	452.21	453.49	453.13	92
MW-36-090	Deep Wells	453.01	451.70	452.79	452.50	92
MW-36-100	Deep Wells	453.21	451.93	453.05	452.73	92
MW-39-040	Shallow Zone	453.67	452.32	453.41	453.13	92
MW-39-050	Middle Zone	453.51	452.17	453.23	452.96	92
MW-39-060	Middle Zone	INC		453.47	INC	20
MW-39-070	Middle Zone	453.10	451.92	452.77	452.59	92
MW-39-080	Deep Wells	453.10	451.91	452.75	452.58	92
MW-39-100	Deep Wells	453.52	452.41	453.30	453.07	92
MW-42-030	Shallow Zone	453.55	452.22	453.23	452.99	92
MW-42-065	Middle Zone	453.77	452.43	453.47	453.22	92
MW-43-025	Shallow Zone	453.90	452.30	453.76	453.31	92
MW-43-090	Deep Wells	454.22	452.66	454.15	453.67	92
MW-44-070	Middle Zone	453.96	452.37	453.73	453.35	92
MW-44-115	Deep Wells	453.52	452.16	453.36	453.01	92
MW-44-125	Deep Wells	454.00	452.45	453.67	453.37	92
MW-45-095a	Deep Wells	452.56	451.44	452.72	452.15	73
MW-46-175	Deep Wells	454.15	452.84	453.89	453.62	92
MW-47-055	Shallow Zone	454.45	453.28	454.01	453.91	92
MW-47-115	Deep Wells	454.46	453.36	453.97	453.92	92
MW-49-135	Deep Wells	454.52	453.21	454.22	453.98	92
MW-50-095	Middle Zone	454.26	453.29	453.68	453.74	92

TABLE D-1

Average Monthly and Quarterly Groundwater Elevations, November 2008 through January 2009
Interim Measures Performance Monitoring
PG&E Topock Compressor Station

Well ID	Aquifer Zone	November 2008	December 2008	January 2009	Quarter Average	Days in Quarter Average
MW-51	Middle Zone	454.51	453.90	453.80	454.07	92
MW-54-085	Deep Wells	454.21	452.66	454.13	453.66	92
MW-54-140	Deep Wells	454.35	453.09	454.24	453.89	92
MW-54-195	Deep Wells	454.35	453.20	454.20	453.91	92
MW-55-045	Middle Zone	455.23	454.60	455.14	454.99	92
MW-55-120	Deep Wells	455.19	454.62	455.08	454.96	92
PT2D	Deep Wells	452.88	451.74	452.60	452.40	92
PT5D	Deep Wells	453.06	451.84	452.78	452.55	92
PT6D	Deep Wells	453.28	452.79	453.42	453.32	51
RRB	River Station	454.44	453.02	454.46	453.97	92

NOTES:

Averages include data collected from October 2008 through December 2008
Averages reported in ft AMSL (feet above mean sea level)
INC = data incomplete over reporting period

TABLE D-2
Average, Minimum, and Maximum Groundwater Elevations, February 2008 through January 2009
Interim Measures Performance Monitoring
PG&E Topock Compressor Station

Well ID		Aquifer Zone	Minimum[1] (ft AMSL)	Maximum[1] (ft AMSL)	Average[1] (ft AMSL)	Number of Days Reporting Data
I-3		River Station	451.71	457.99	455.09	366
MW-10	2	Shallow Zone	454.91	457.10	456.34	179
MW-19	2	Shallow Zone	453.73	456.89	455.75	182
MW-20-070		Shallow Zone	451.79	456.60	453.92	365
MW-20-100		Middle Zone	451.37	456.76	453.51	366
MW-20-130		Deep Wells	450.91	456.98	453.18	365
MW-22		Shallow Zone	453.29	456.39	454.75	337
MW-25		Shallow Zone	453.81	456.54	455.39	366
MW-26		Shallow Zone	453.51	455.95	454.67	250
MW-27-020		Shallow Zone	452.05	457.67	454.91	366
MW-27-060		Middle Zone	452.01	457.70	454.91	366
MW-27-085		Deep Wells	452.01	457.81	454.82	340
MW-28-025		Shallow Zone	451.95	457.72	454.96	366
MW-28-090		Deep Wells	452.02	457.82	454.97	363
MW-30-050		Middle Zone	451.95	457.56	454.69	366
MW-31-060		Shallow Zone	452.55	456.89	454.75	365
MW-31-135		Deep Wells	451.87	457.07	454.15	366
MW-32-020	2	Shallow Zone	453.31	456.83	455.49	179
MW-32-035		Shallow Zone	452.25	457.27	454.76	366
MW-33-040		Shallow Zone	452.46	457.12	454.91	333
MW-33-090		Middle Zone	452.58	458.42	454.86	297
MW-33-150		Deep Wells	452.78	457.18	455.00	314
MW-33-210	2	Deep Wells	454.04	457.37	455.97	179
MW-34-055		Middle Zone	451.95	457.95	454.99	366
MW-34-080		Deep Wells	452.01	458.04	454.91	366
MW-34-100		Deep Wells	452.01	457.92	454.76	366
MW-35-060		Shallow Zone	452.83	457.81	455.45	366
MW-35-135		Deep Wells	453.46	457.48	455.96	316
MW-36-020		Shallow Zone	452.17	457.61	454.87	366
MW-36-040		Shallow Zone	451.99	457.64	454.79	366
MW-36-050		Middle Zone	451.95	457.62	454.75	366
MW-36-070		Middle Zone	451.84	457.56	454.65	366
MW-36-090		Deep Wells	451.28	457.42	453.95	366
MW-36-100		Deep Wells	451.52	457.70	454.22	303
MW-39-040		Shallow Zone	451.94	457.48	454.61	366
MW-39-050		Middle Zone	451.78	457.38	454.45	366
MW-39-060		Middle Zone	452.25	457.50	454.61	112
MW-39-070		Middle Zone	451.50	457.29	453.98	366
MW-39-080		Deep Wells	451.48	457.32	454.02	366
MW-39-100		Deep Wells	452.00	457.73	454.48	366
MW-42-030		Shallow Zone	451.86	456.97	454.44	366
MW-42-055	2	Middle Zone	453.06	457.15	455.32	179
MW-42-065		Middle Zone	452.07	457.35	454.69	366
MW-43-025		Shallow Zone	451.96	457.72	454.94	366
MW-43-075	2	Deep Wells	453.64	458.12	456.35	180
MW-43-090		Deep Wells	452.31	458.05	455.30	366
MW-44-070		Middle Zone	451.98	457.79	454.90	363
MW-44-115		Deep Wells	451.79	457.59	454.36	336
MW-44-125		Deep Wells	452.00	458.01	454.83	335

TABLE D-2
Average, Minimum, and Maximum Groundwater Elevations, February 2008 through January 2009
Interim Measures Performance Monitoring
PG&E Topock Compressor Station

Well ID	Aquifer Zone	Minimum[1] (ft AMSL)	Maximum[1] (ft AMSL)	Average[1] (ft AMSL)	Number of Days Reporting Data
MW-45-095a	Deep Wells	450.86	459.37	453.81	347
MW-46-175	Deep Wells	452.49	457.63	455.06	363
MW-46-205 [2]	Deep Wells	454.04	457.76	456.06	153
MW-47-055	Shallow Zone	452.96	457.23	455.27	366
MW-47-115	Deep Wells	453.02	457.21	455.31	366
MW-49-135	Deep Wells	452.87	457.66	455.40	366
MW-49-275 [2]	Deep Wells	454.53	457.64	456.48	179
MW-49-365 [2]	Deep Wells	456.01	459.01	457.93	179
MW-50-095	Middle Zone	452.94	456.79	454.97	366
MW-50-200 [2]	Deep Wells	453.81	456.89	455.68	181
MW-51	Middle Zone	453.50	456.26	455.05	366
MW-54-085	Deep Wells	452.28	458.00	455.01	247
MW-54-140	Deep Wells	452.82	457.77	455.12	291
MW-54-195	Deep Wells	452.94	457.64	455.18	291
MW-55-045	Middle Zone	454.43	457.57	455.79	289
MW-55-120	Deep Wells	454.46	457.45	455.82	289
PT2D	Deep Wells	451.31	457.32	453.76	366
PT5D	Deep Wells	451.42	457.33	453.99	366
PT6D	Deep Wells	452.19	457.58	454.45	297
RRB	River Station	452.68	458.61	455.62	366

NOTES

[1] minimium, maximum and average of daily groundwater elevation averages

[2] With DTSC approval the list of wells included in the PMP was modified beginning August 1, 2008 so data is only available for February 1, 2008 through July 31, 2008.

Averages include data collected from 2/1/2008 through 1/31/2009

ft AMSL = feet above mean sea level

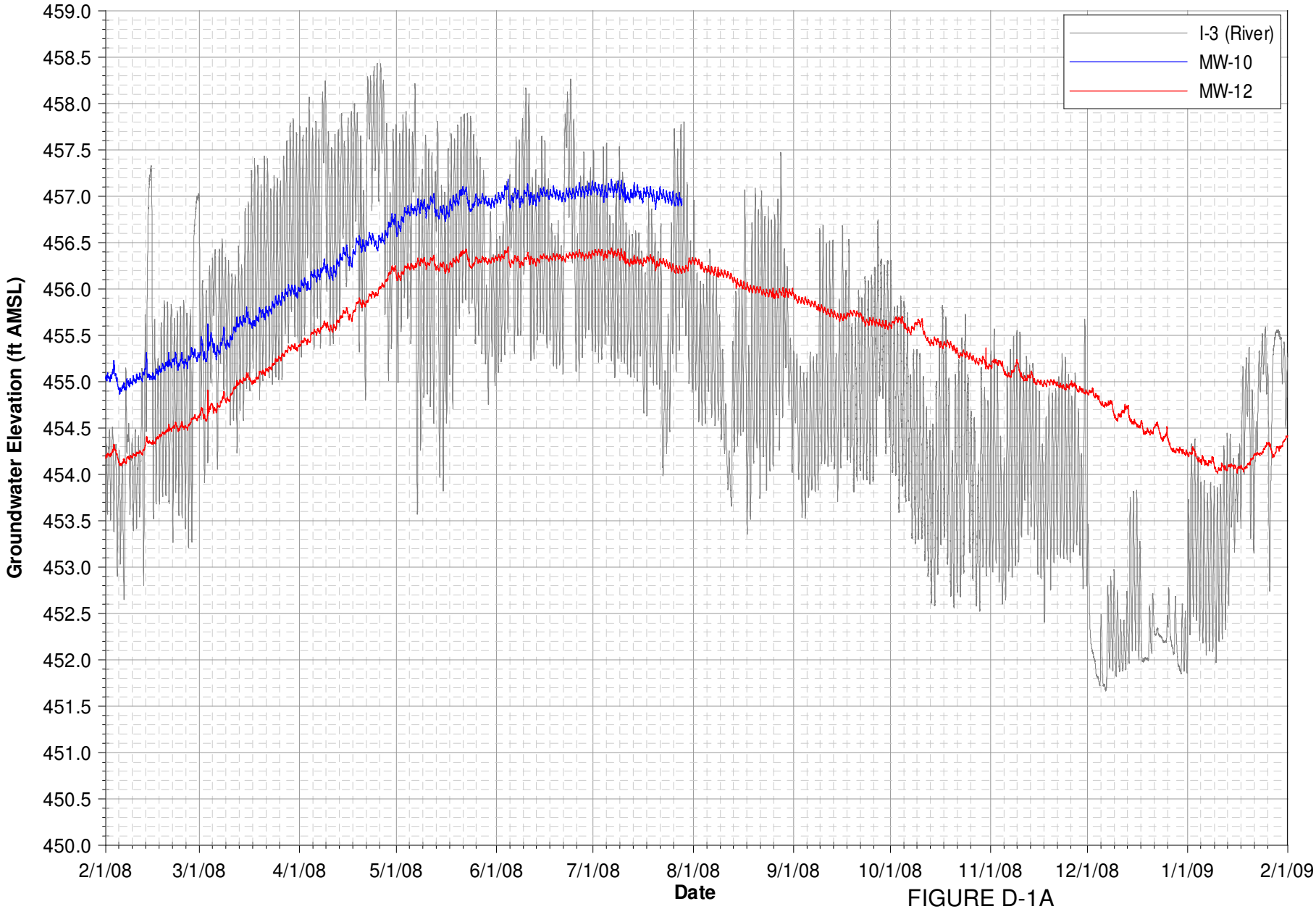
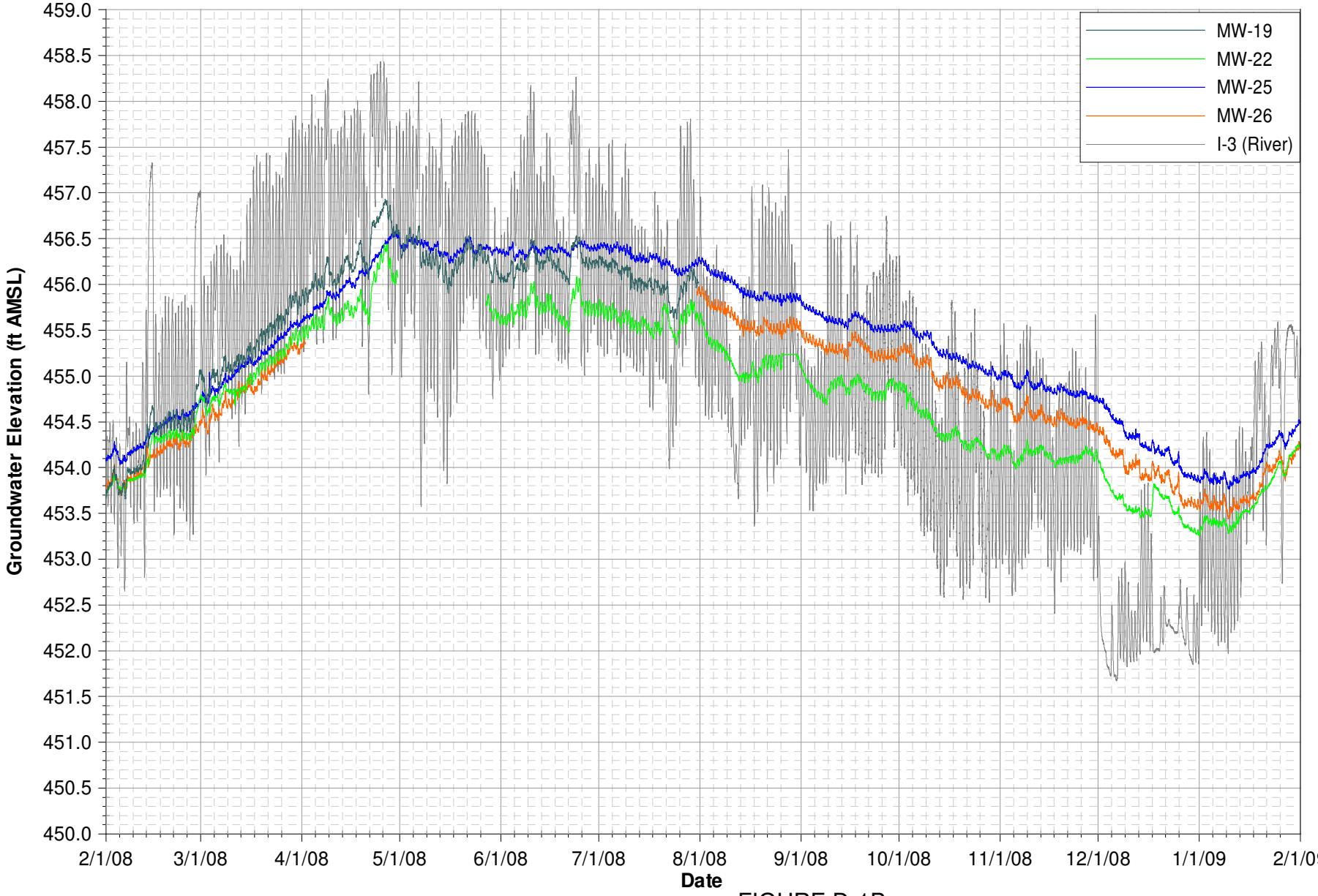


FIGURE D-1A
MW-10 and MW-12 HYDROGRAPHS
ANNUAL IM PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

Note: Data subject to review.
With DTSC approval, MW-10 was removed from the PMP in August 2008.

CH2MHILL



Notes:
Data subject to review.
MW-22 data unavailable from 4/30/2008 through 5/27/2008.
MW-26 data unavailable from 4/2/2008 through 7/30/2008.
With DTSC approval, MW-19 was removed from the PMP in August 2008.

FIGURE D-1B
MW-19, MW-22, MW-25, AND MW-26 HYDROGRAPHS
ANNUAL IM PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

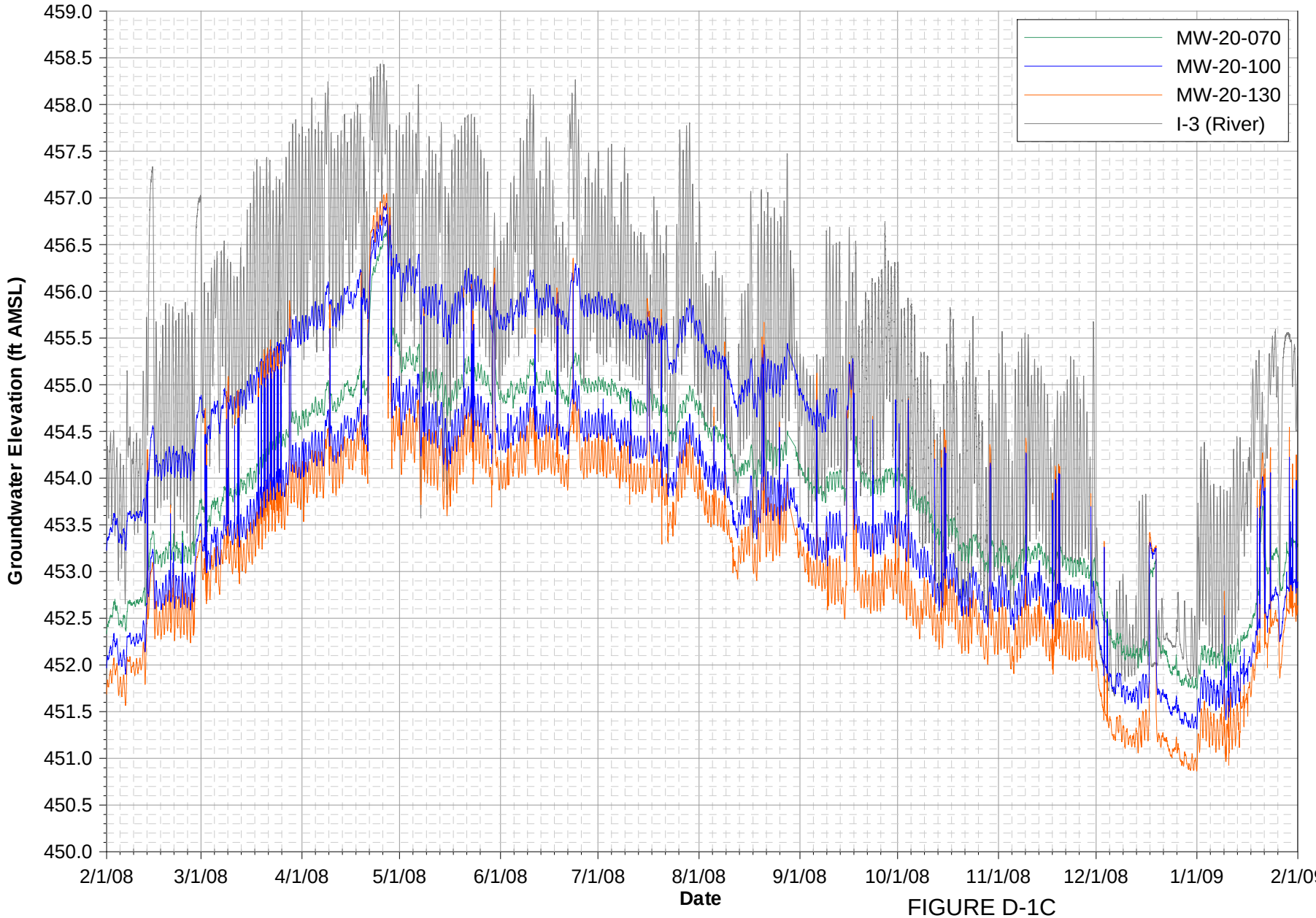
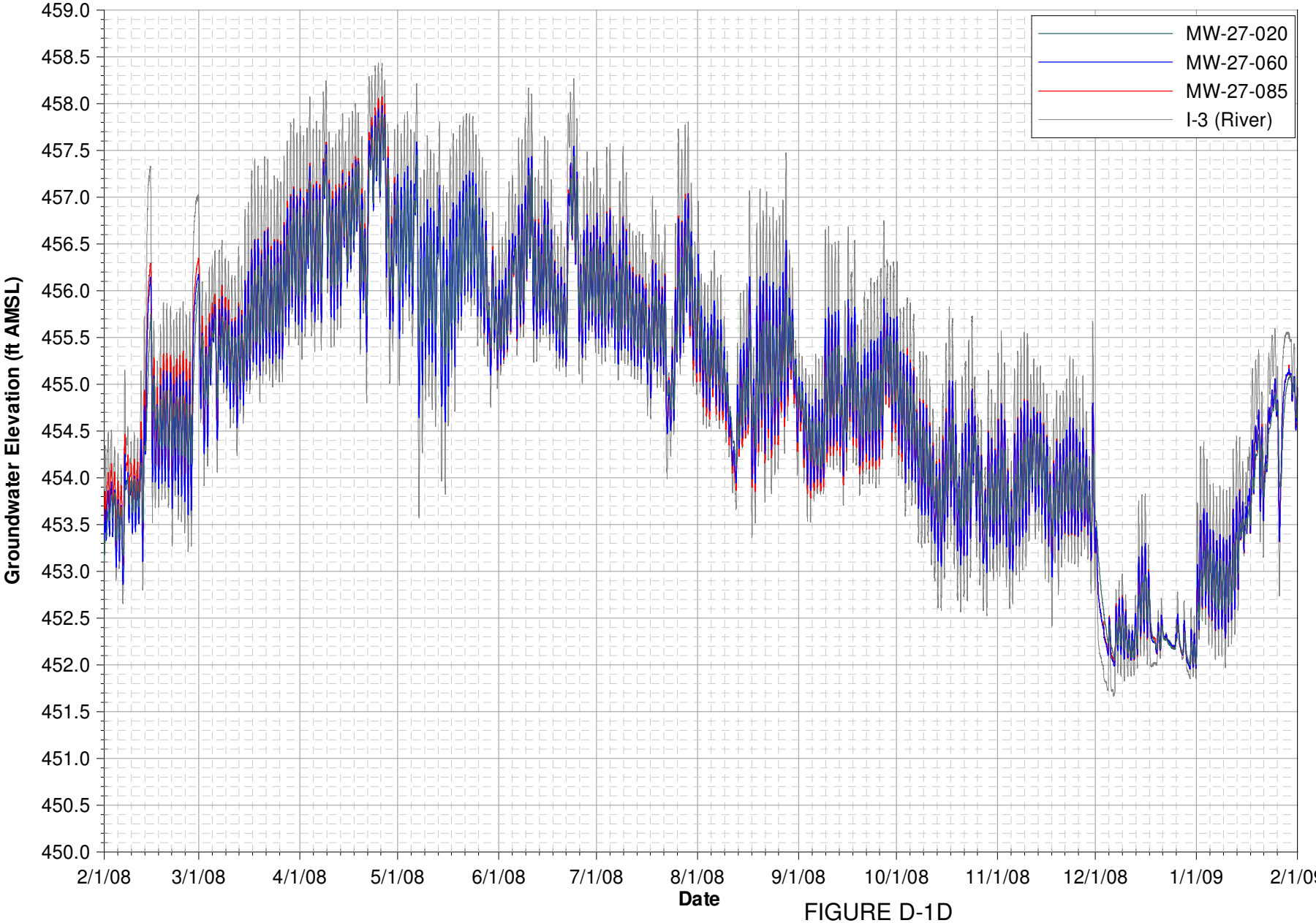


FIGURE D-1C
MW-20 CLUSTER HYDROGRAPHS
ANNUAL IM PERFORMANCE MONITORING REPORT
PG & E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

Notes:
Data subject to review.

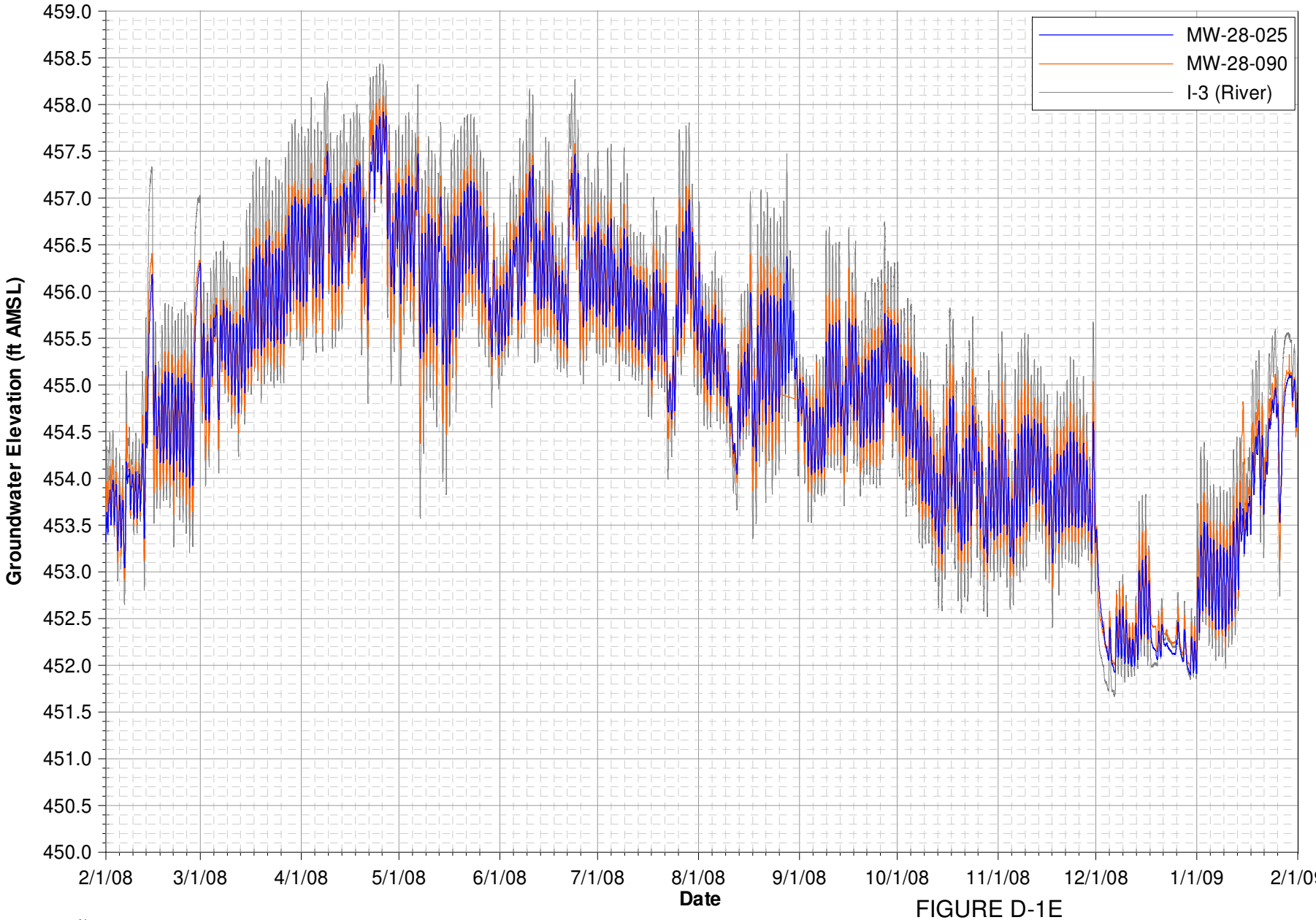
CH2MHILL



Notes:
Data subject to review.
MW-27-85 data unavailable between 4/30/2008 and 5/27/2008.

FIGURE D-1D
MW-27 CLUSTER HYDROGRAPHS
ANNUAL IM PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL



Notes:
Data subject to review.

FIGURE D-1E
MW-28 WELL HYDROGRAPHS
ANNUAL IM PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

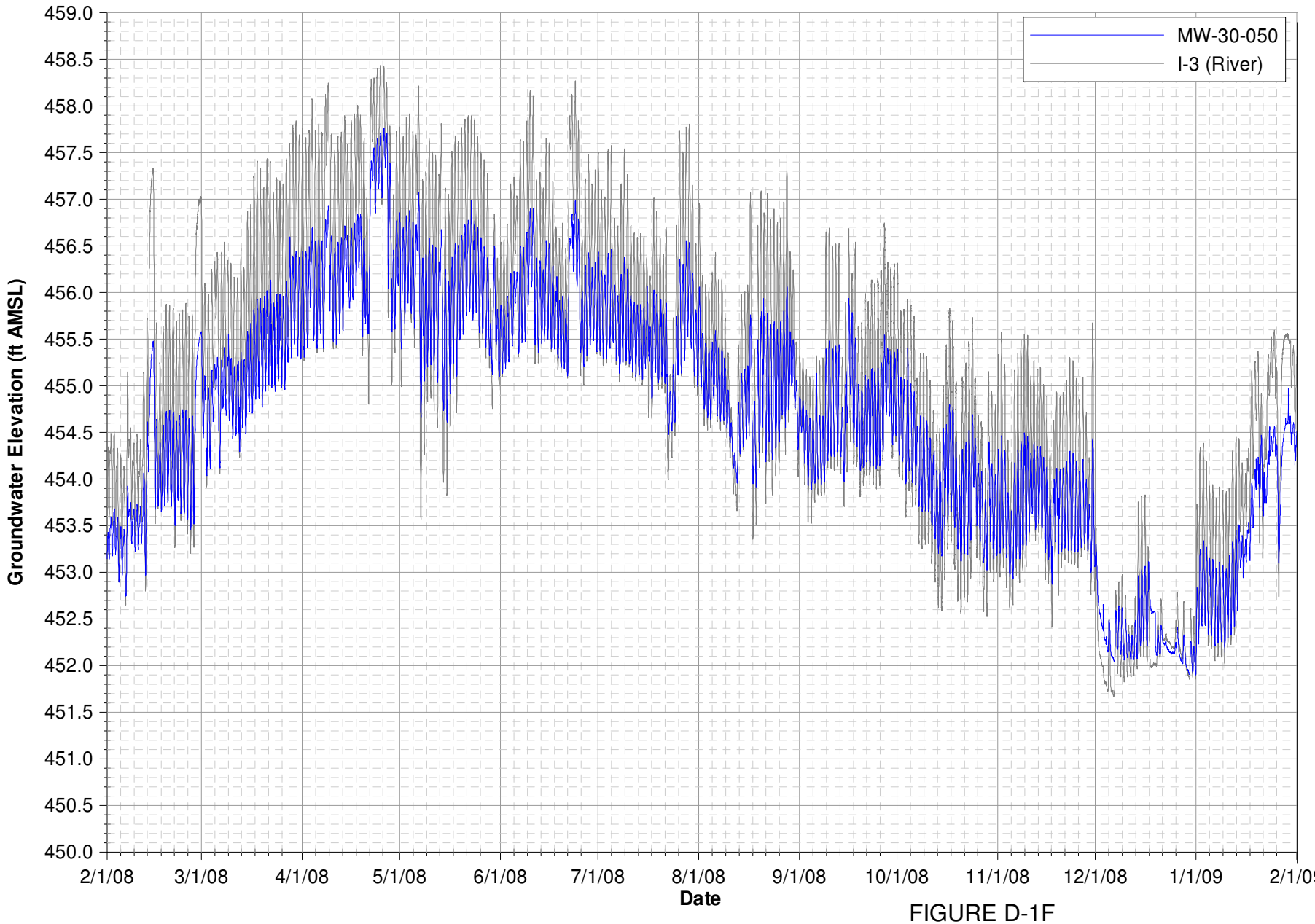


FIGURE D-1F
MW-30-50 WELL HYDROGRAPH
ANNUAL IM PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

Notes:
Data subject to review.

CH2MHILL

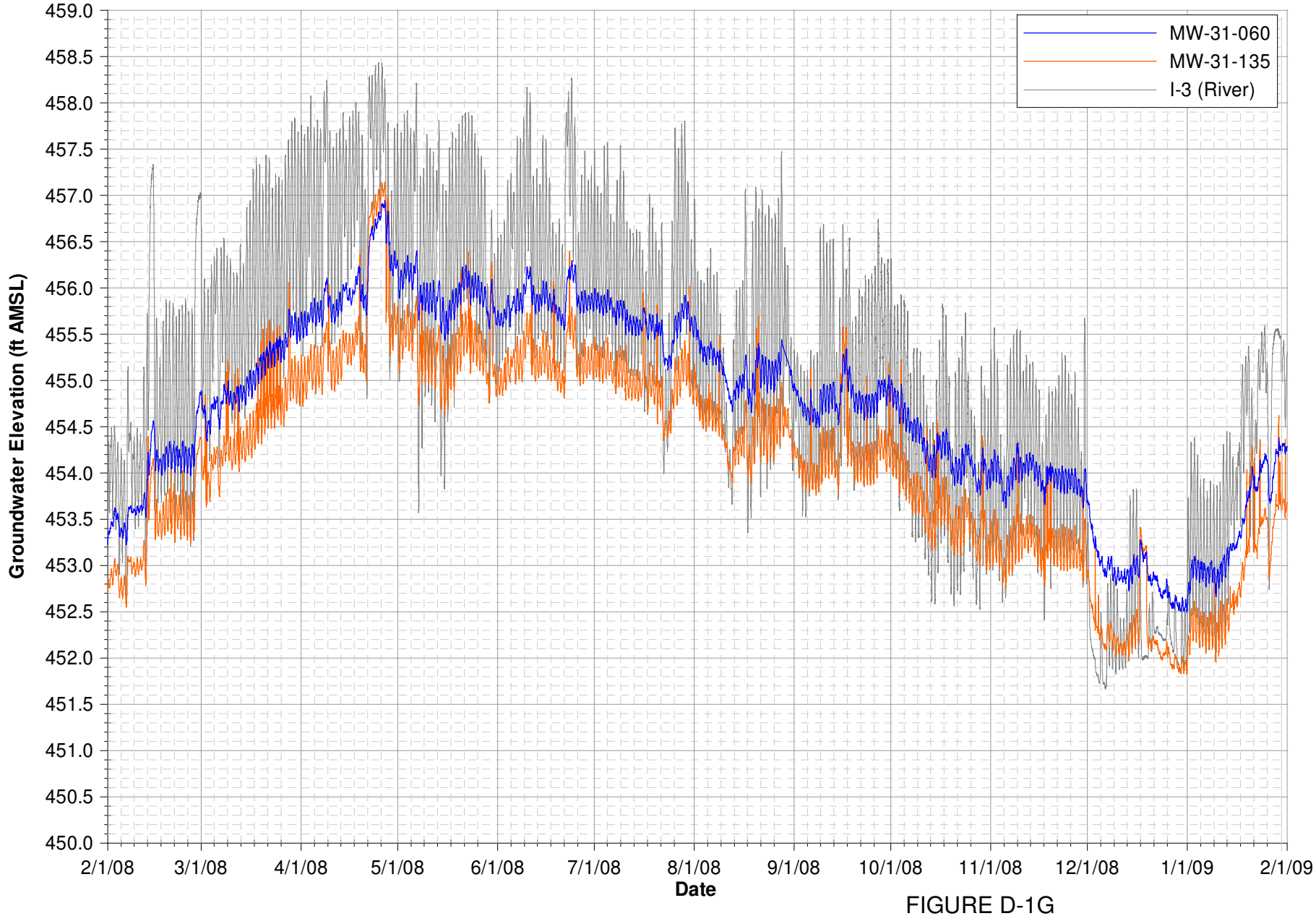
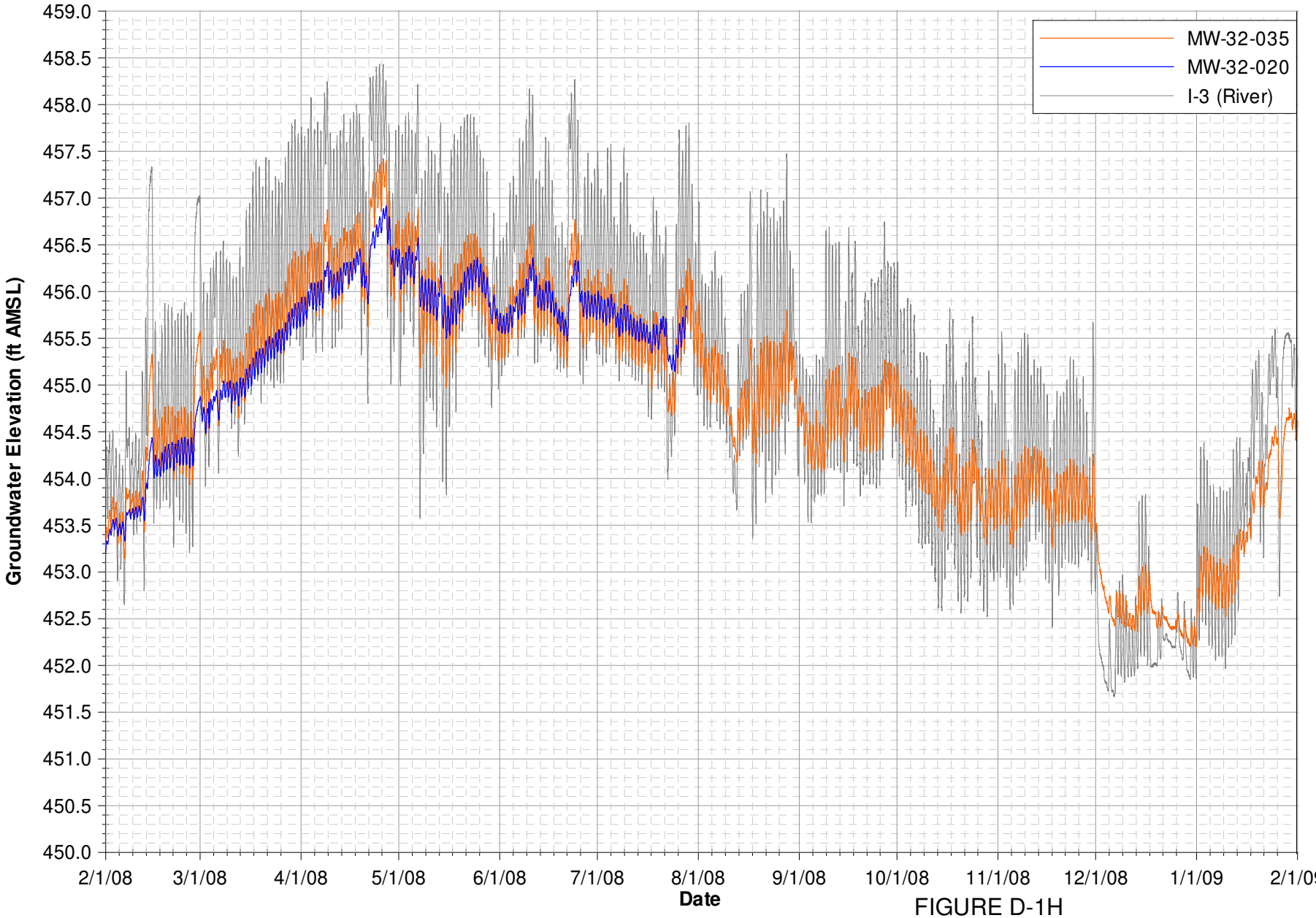


FIGURE D-1G
MW-31 WELL HYDROGRAPHS
ANNUAL IM PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

Notes:
Data subject to review.

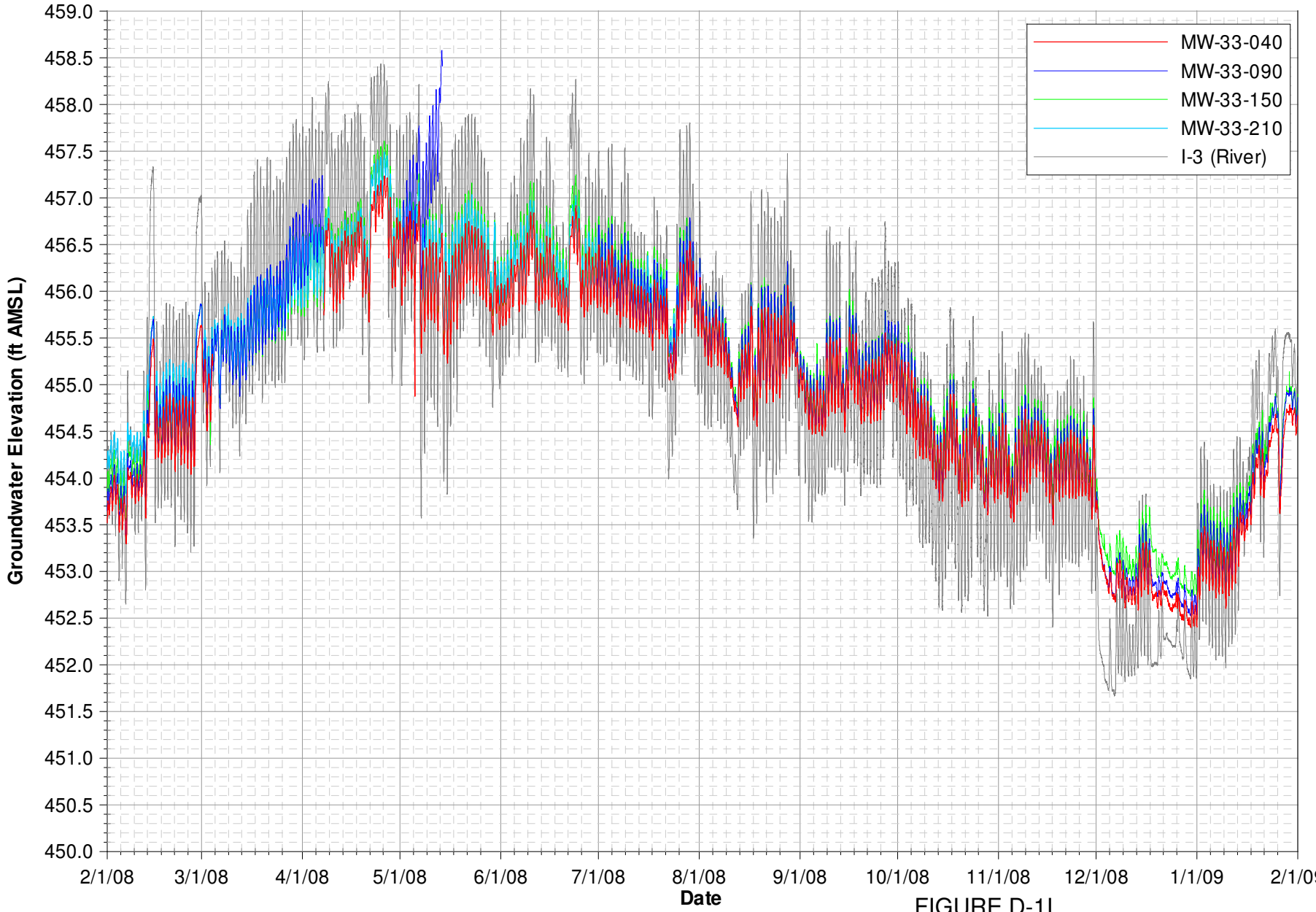
CH2MHILL



Notes:
Data subject to review.
With DTSC approval, MW-32-20 was removed from the PMP in August 2008.

FIGURE D-1H
MW-32 WELL HYDROGRAPHS
ANNUAL IM PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

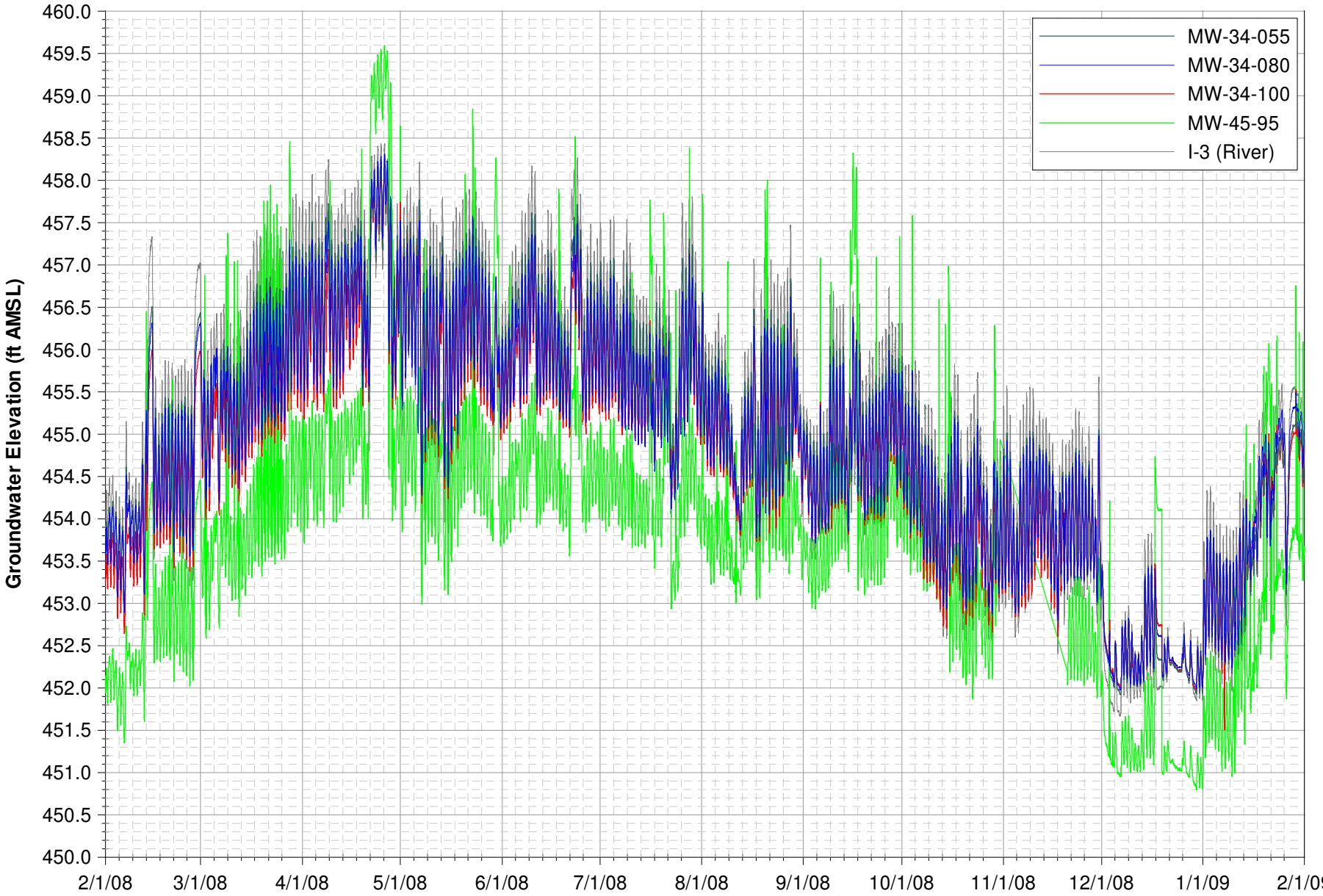
CH2MHILL



Notes:
Data subject to review.
MW-33-40 data unavailable from 3/4/2008 through 4/7/2008.
MW-33-90 data unavailable from 4/7/2008 through 5/1/2008
and unavailable from 5/14/2008 through 6/30/2008.
With DTSC approval, MW-33-210 was removed from the PMP in August 2008.

FIGURE D-1I
MW-33 CLUSTER HYDROGRAPHS
ANNUAL IM PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

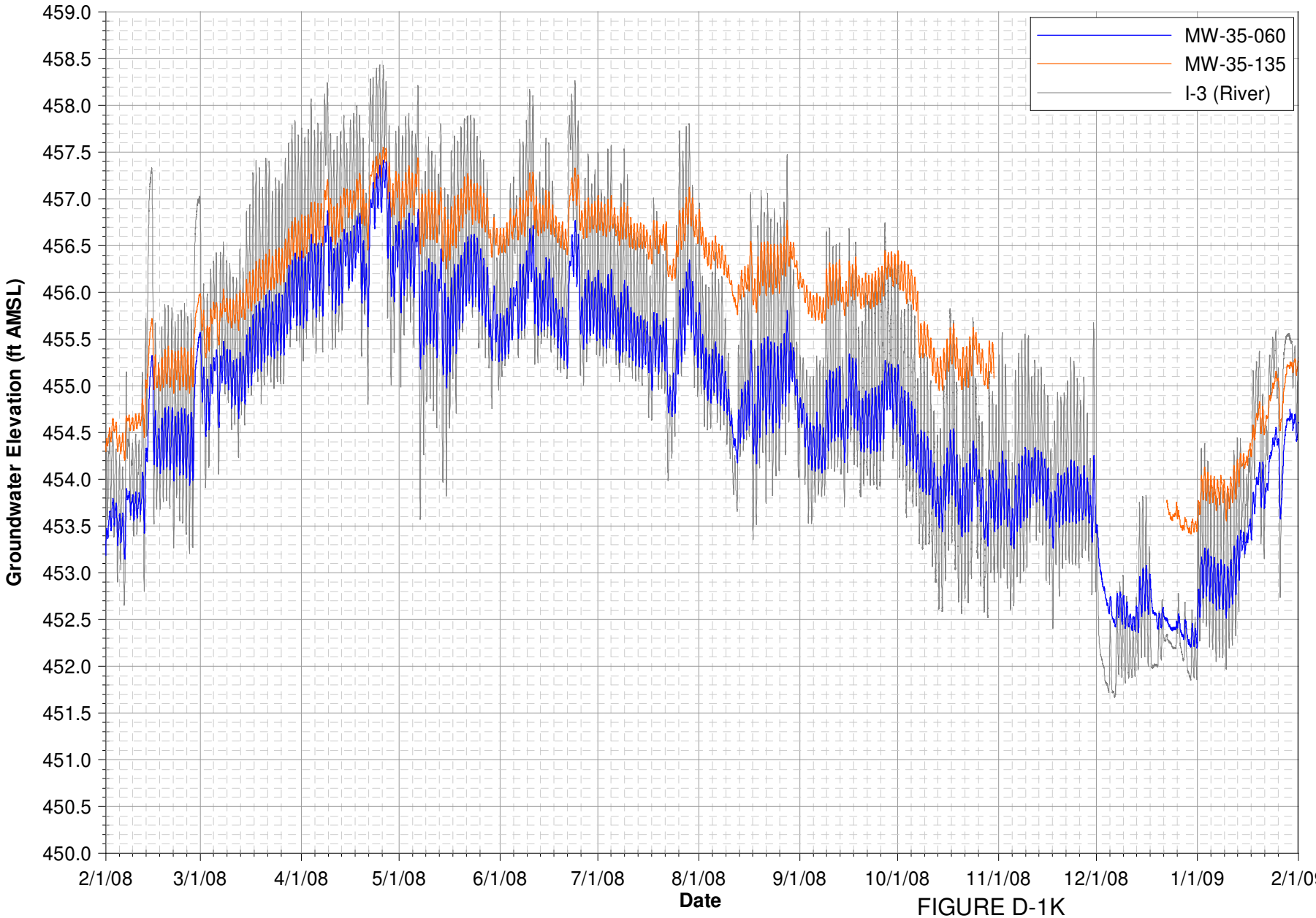
CH2MHILL



Notes:
Data subject to review.

FIGURE D-1J
MW-34 CLUSTER AND MW-45-95 HYDROGRAPHS
ANNUAL IM PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

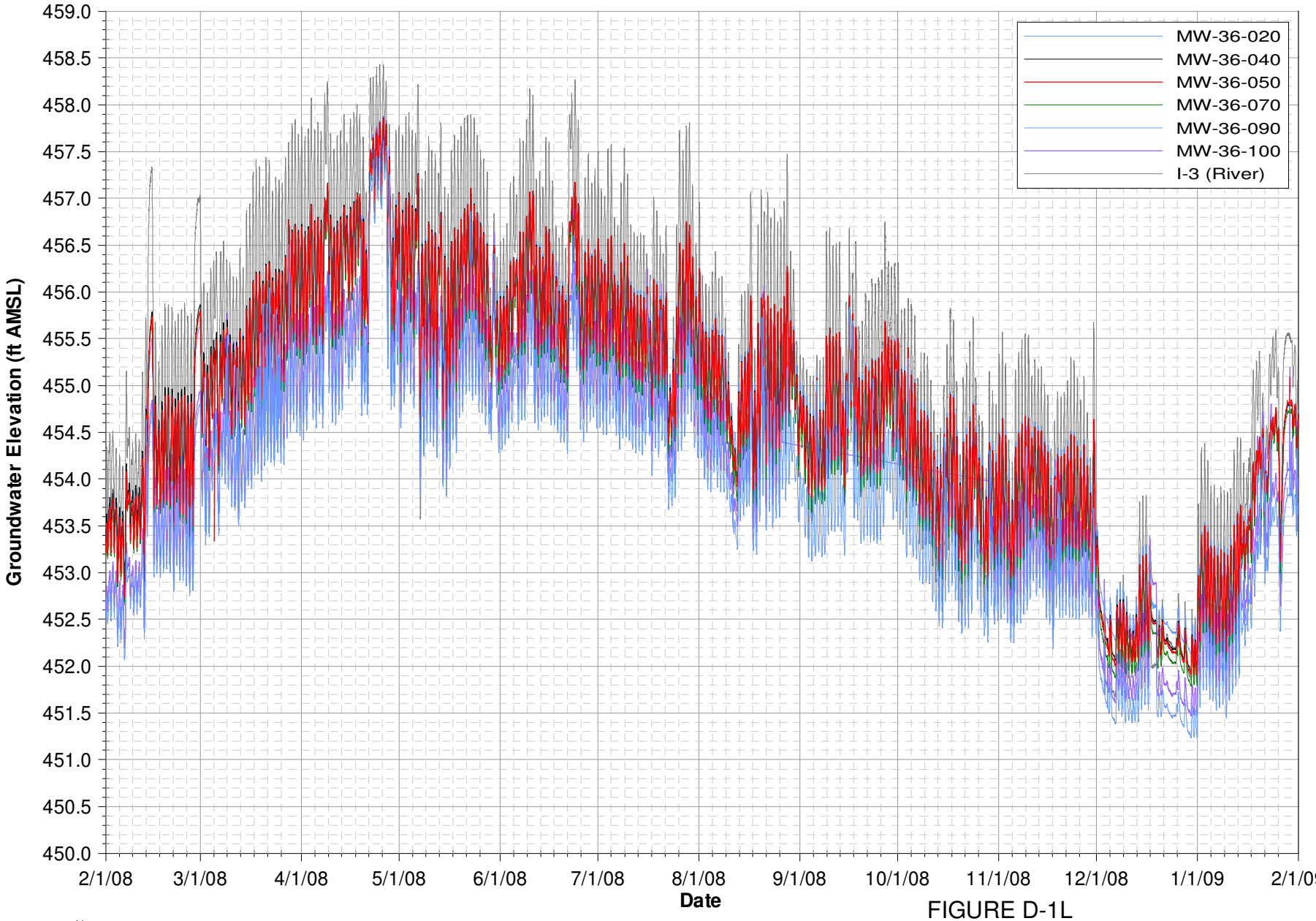
CH2MHILL



Notes:
Data subject to review.
MW-35-135 data unavailable 10/30/2008 through 12/22/2008.

FIGURE D-1K
MW-35 WELL HYDROGRAPHS
ANNUAL IM PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

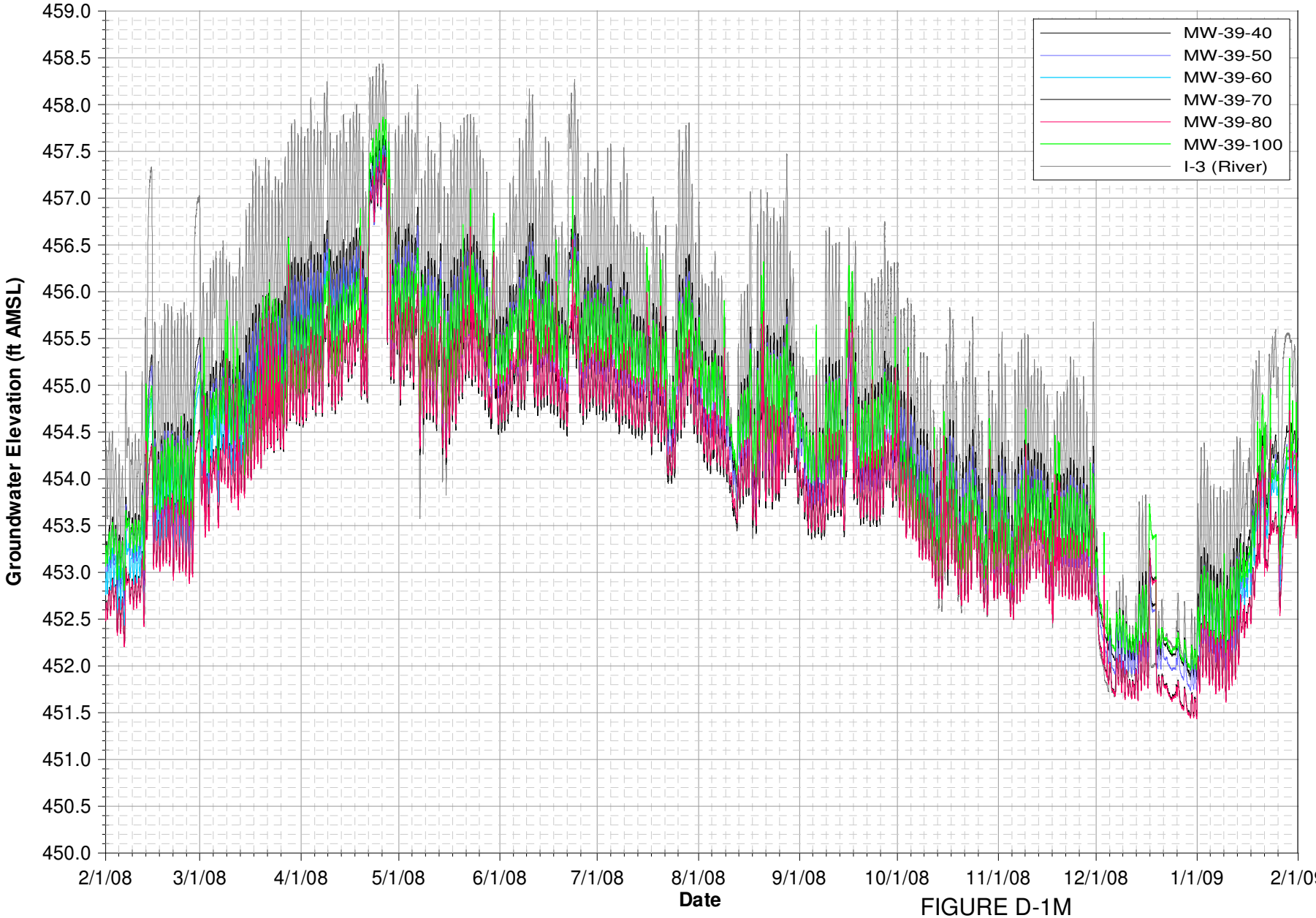
CH2MHILL



Notes:
Data subject to review.

FIGURE D-1L
MW-36 CLUSTER
ANNUAL IM PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

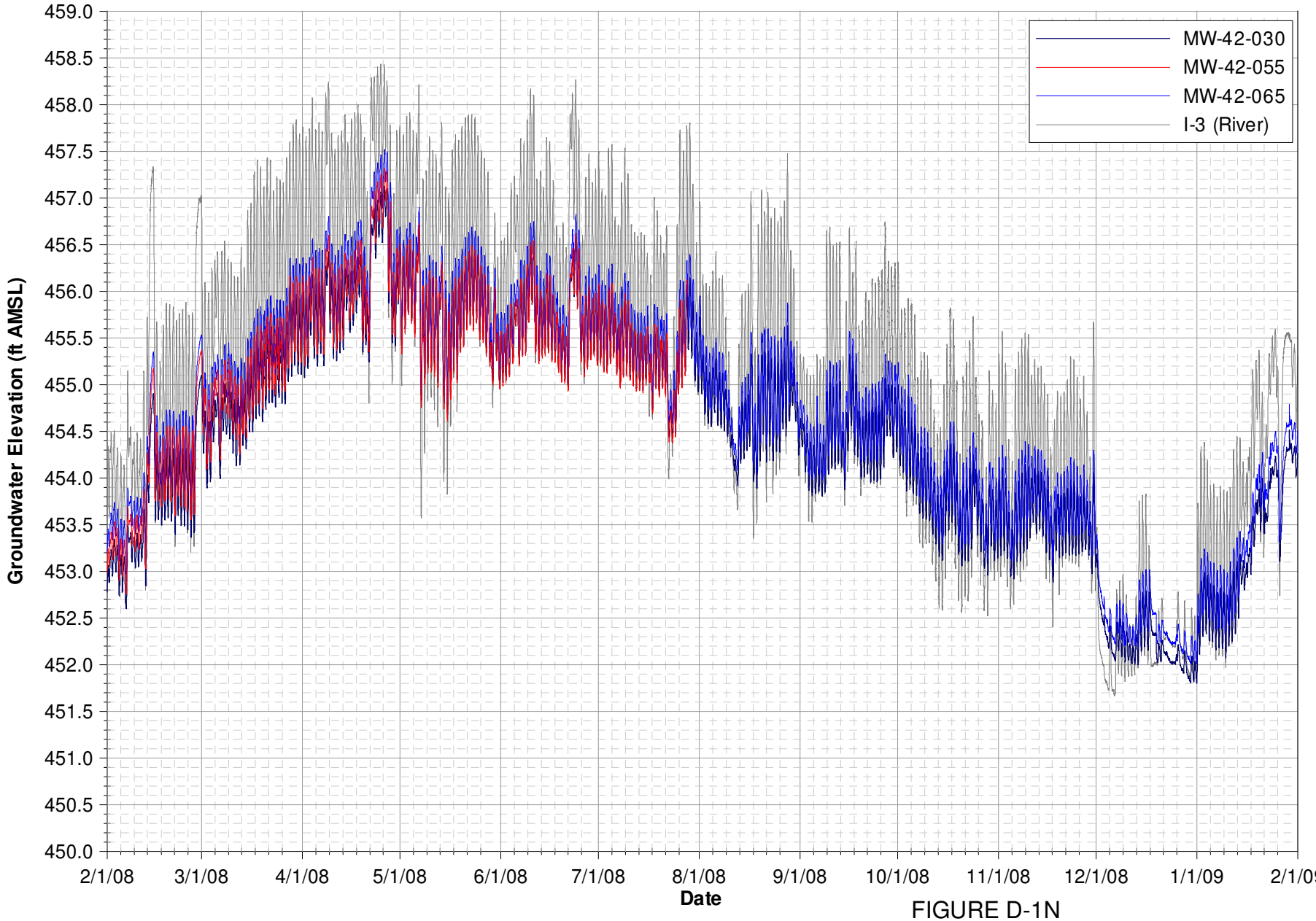
CH2MHILL



Notes:
Data subject to review.
MW-39-060 data unavailable from 4/30/2008 to 1/12/2009.

FIGURE D-1M
MW-39 CLUSTER HYDROGRAPHS
ANNUAL IM PERFORMANCE MONITORING REPORT
PG & E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

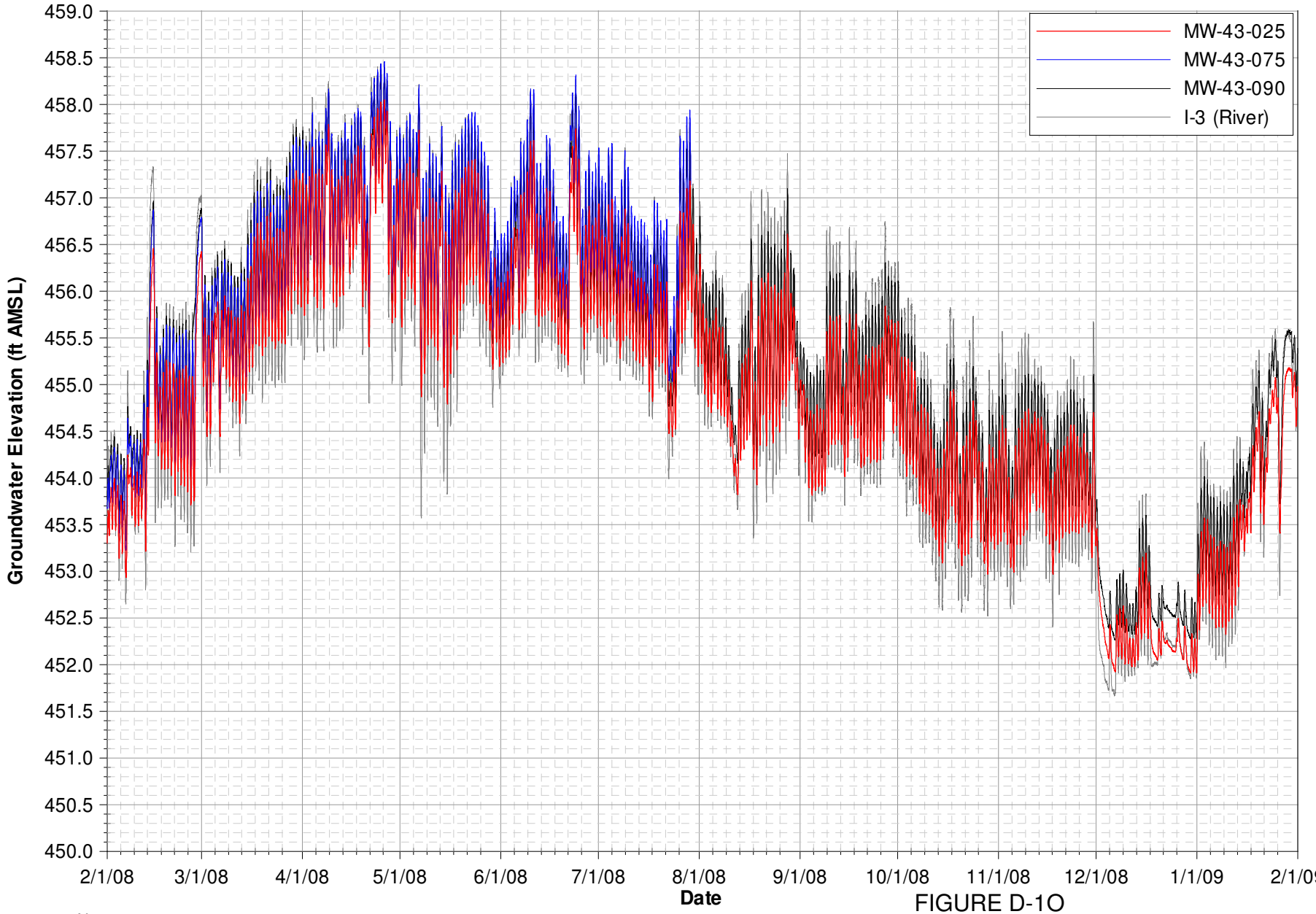
CH2MHILL



Notes:
Data subject to review.
With DTSC approval, MW-42-55 was removed from the PMP in August 2008.

FIGURE D-1N
MW-42 CLUSTER HYDROGRAPHS
ANNUAL IM PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

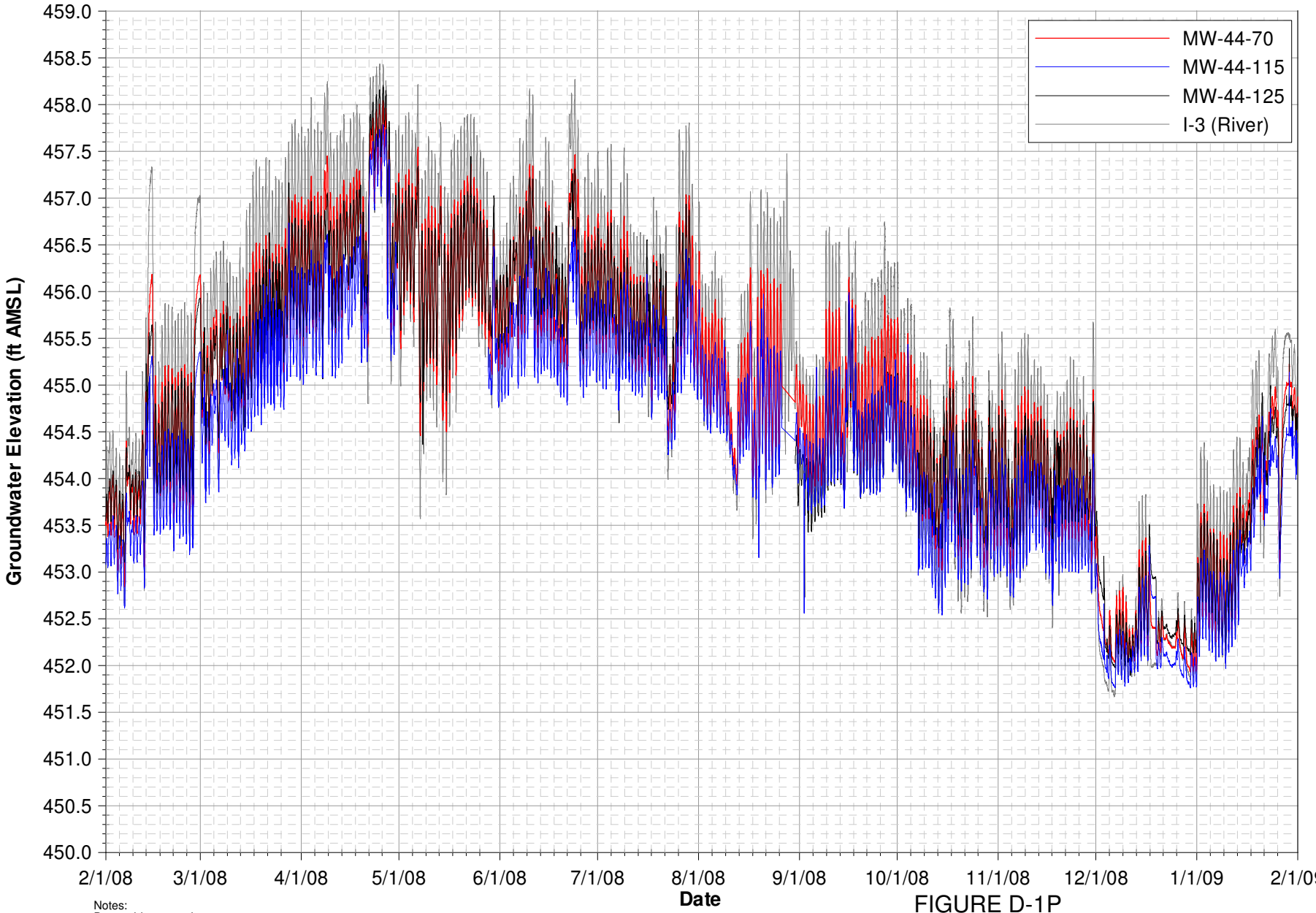
CH2MHILL



Notes:
Data subject to review.
With DTSC approval, MW-43-75 was removed from the PMP in August 2008.

FIGURE D-1O
MW-43 CLUSTER HYDROGRAPHS
ANNUAL IM PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

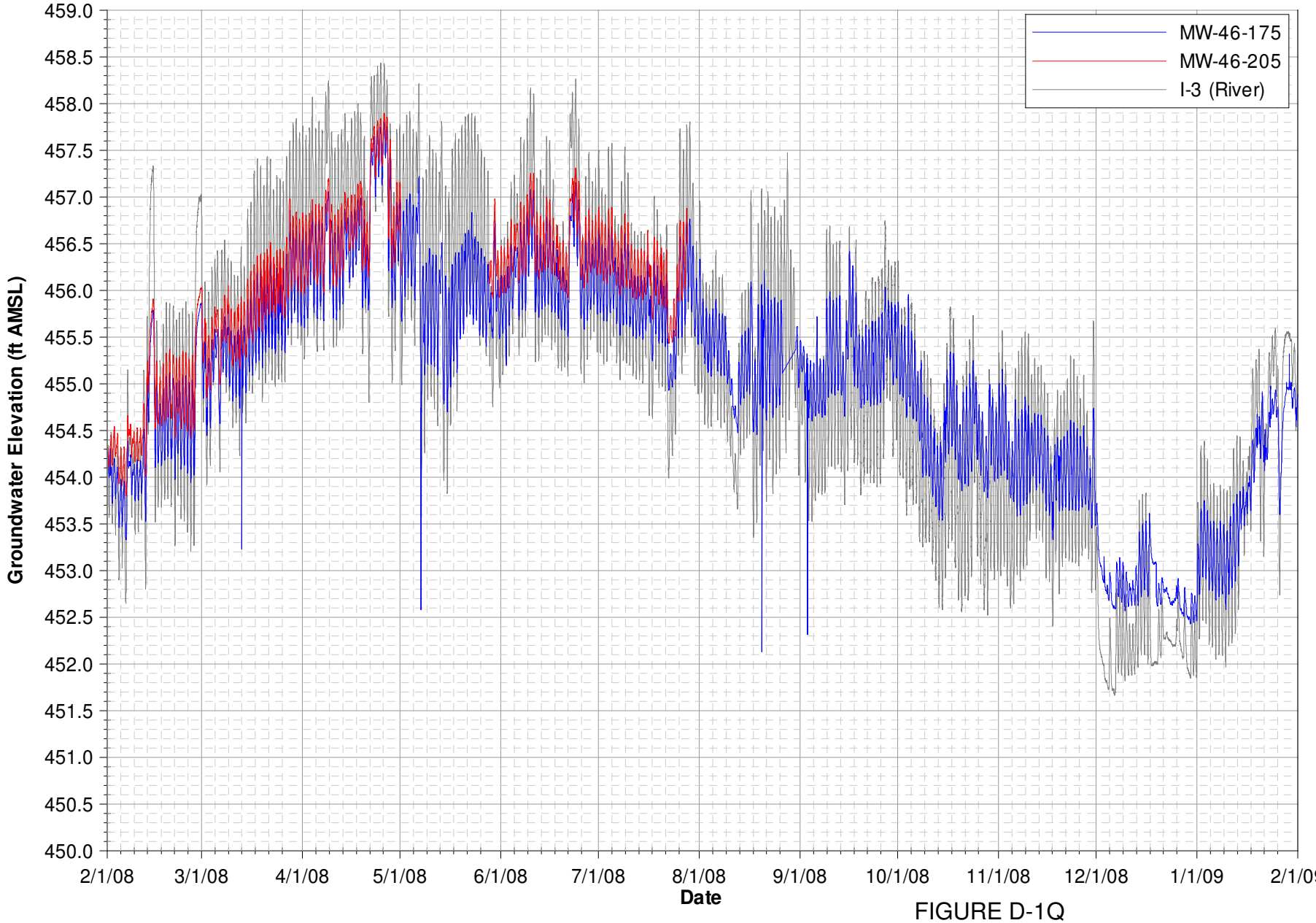
CH2MHILL



Notes:
Data subject to review.
MW-44-115 data unavailable 4/30/2008 through 5/28/2008.
MW-44-125 data unavailable 7/29/2008 through 8/30/2008.

FIGURE D-1P
MW-44 CLUSTER HYDROGRAPHS
ANNUAL IM PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL



Notes:
Data subject to review.
MW-46-205 data unavailable 5/1/2008 through 5/28/2008.
With DTSC approval, MW-46-205 was removed from the PMP in August 2008.

FIGURE D-1Q
MW-46 CLUSTER HYDROGRAPHS
ANNUAL IM PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

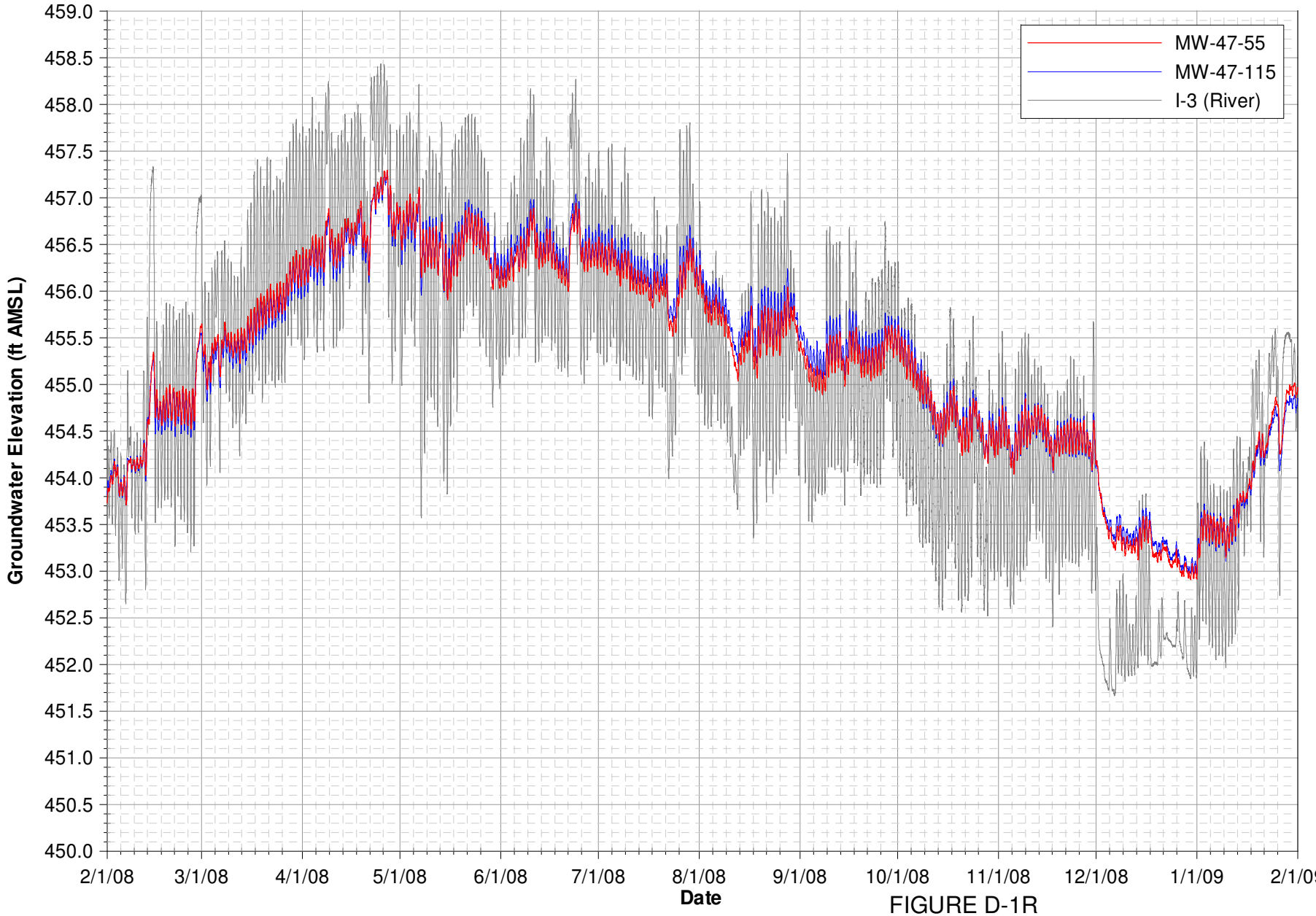
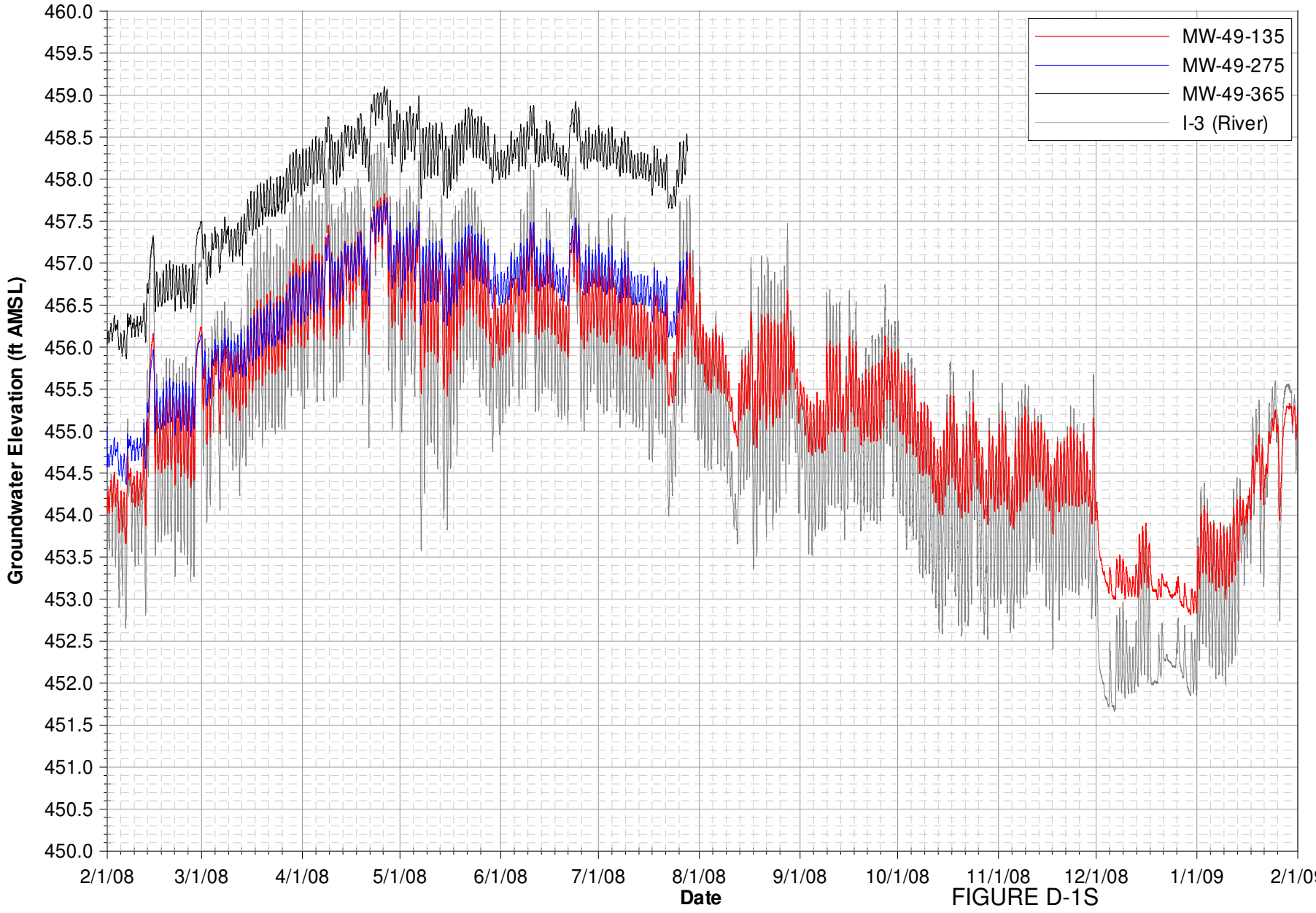


FIGURE D-1R
MW-47 CLUSTER HYDROGRAPHS
ANNUAL IM PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

Notes:
Data subject to review.

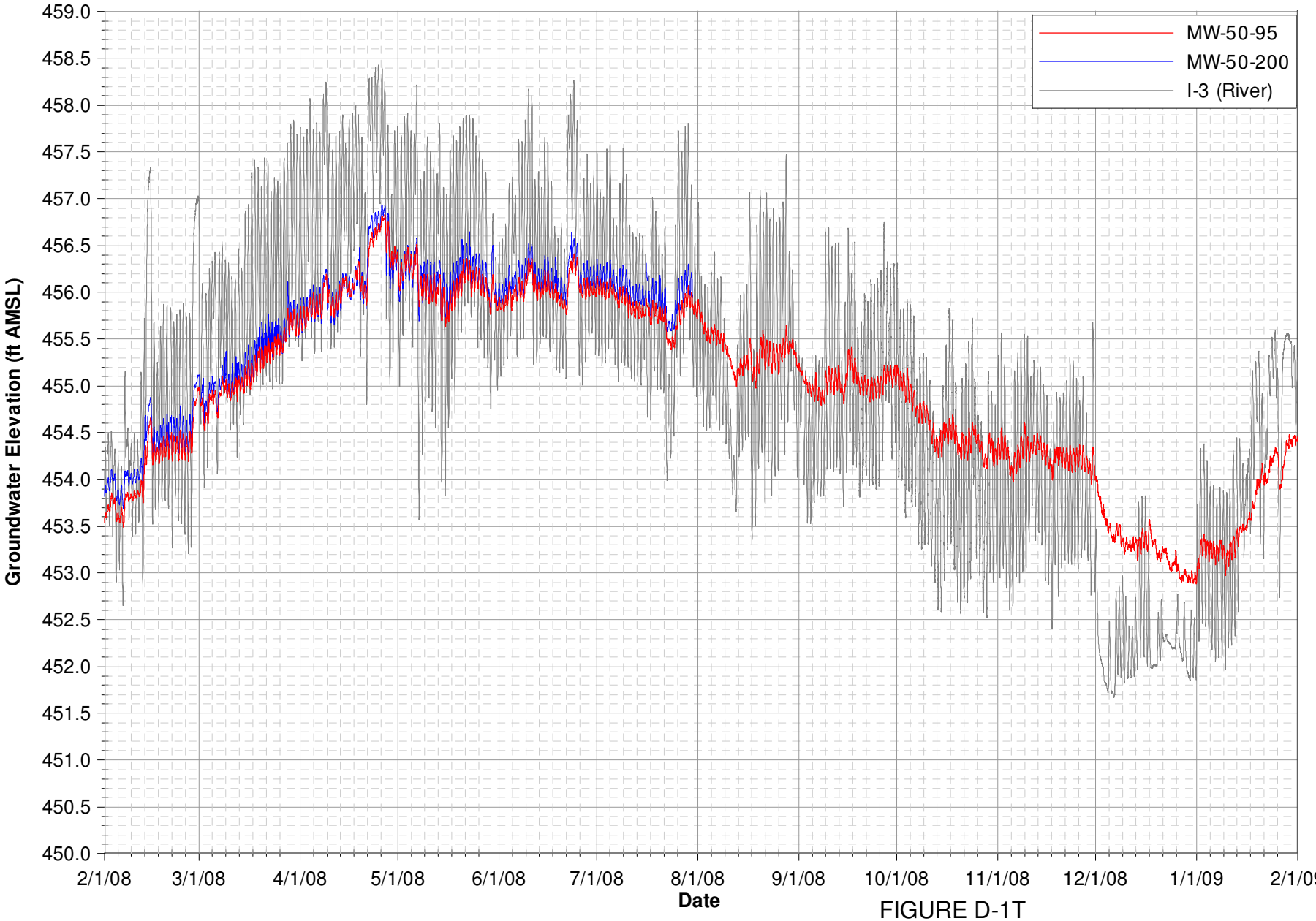
CH2MHILL



Notes:
Data subject to review.
With DTSC approval, MW-49-275 and MW-49-365 were removed from the PMP in August 2008.

FIGURE D-1S
MW-49 CLUSTER HYDROGRAPHS
ANNUAL IM PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

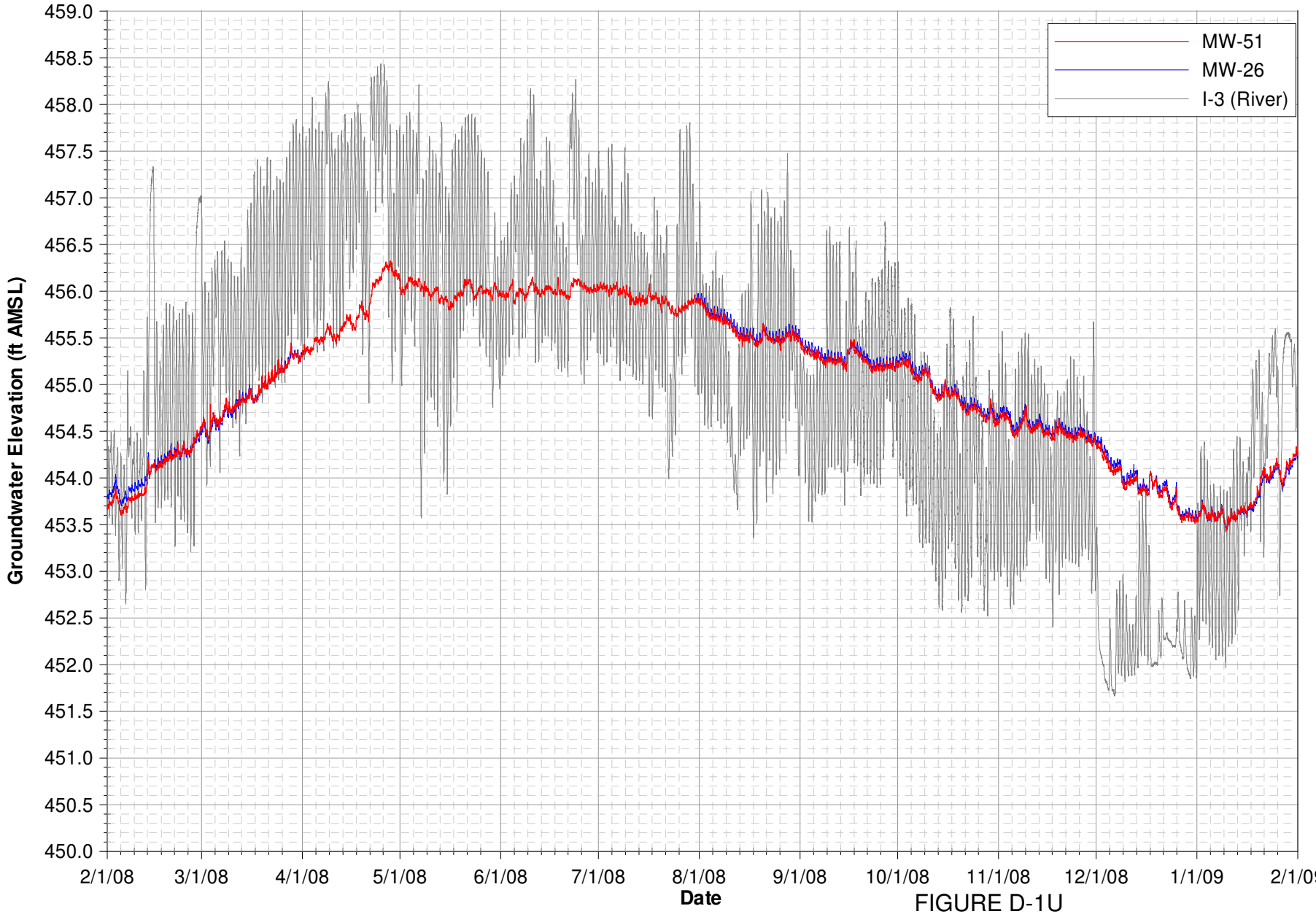
CH2MHILL



Notes:
Data subject to review.
With DTSC approval, MW-50-200 was removed from the PMP in August 2008.

FIGURE D-1T
MW-50 CLUSTER HYDROGRAPHS
ANNUAL IM PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

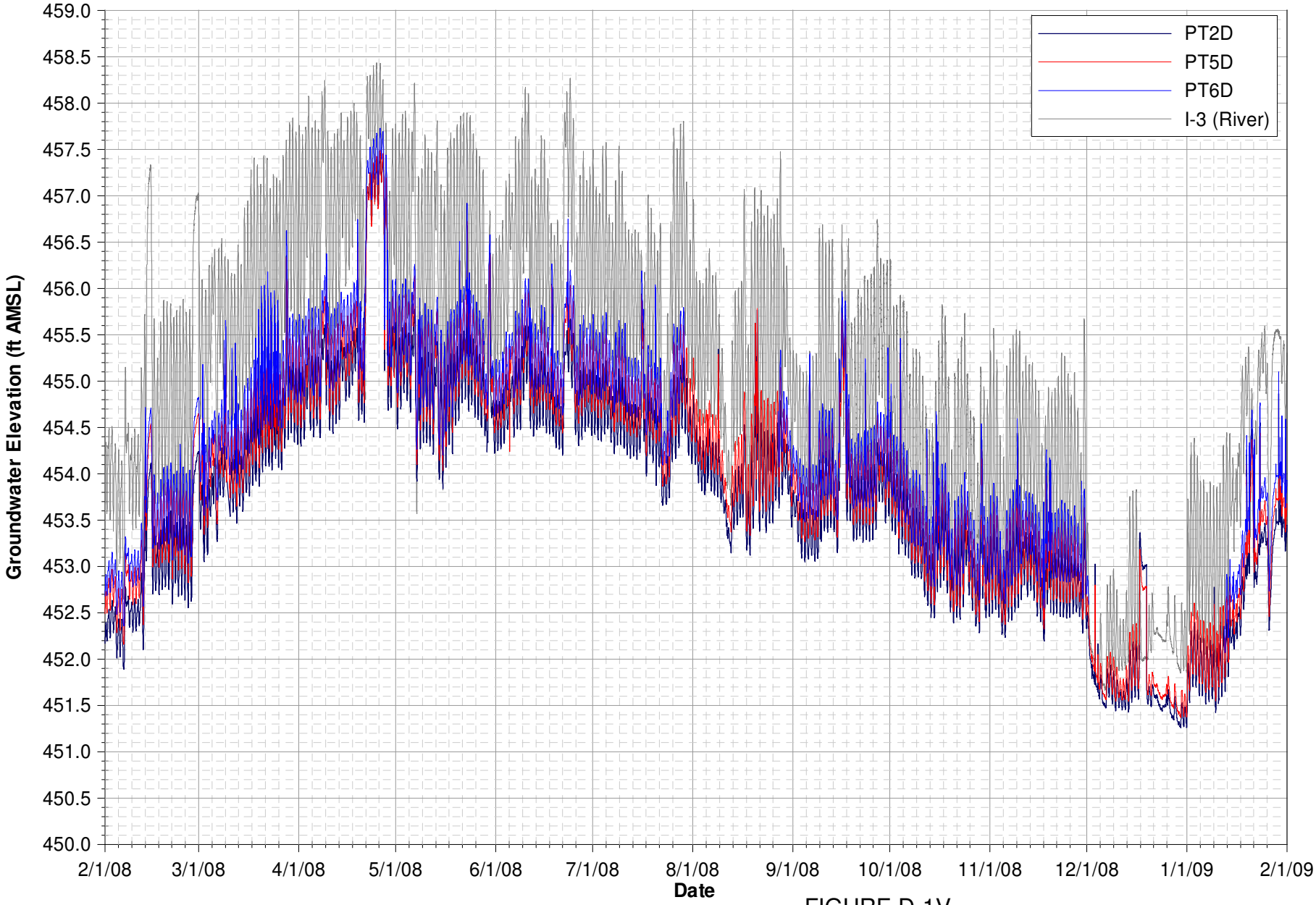
CH2MHILL



Notes:
Data subject to review.
MW-26 data unavailable 4/2/2008 through 7/30/2008.

FIGURE D-1U
MW-51& MW-26 HYDROGRAPHS
ANNUAL IM PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL



Note: Data subject to review.
PT6D data unavailable between 7/29/2008 and 8/27/2008, and between 12/1/2008 and 1/12/2009.

FIGURE D-1V
INSITU PILOT STUDY WELL HYDROGRAPHS
ANNUAL IM PERFORMANCE MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

Appendix E
Summary Information for Interim Measures Performance Monitoring

TABLE E-1

Summary of IM Extraction and Performance Monitoring Wells, January 2007

Annual IM Performance Monitoring Report

PG&E Topock Compressor Station

Well ID	Description & Well Use in 2008 PMP	Date Incorporated in Hydraulic Monitoring Network	Well Elevation		TOP of Screen		BASE of Screen	
			Measure Pt. Elevation	Ground Elevation	Depth	Elevation	Depth	Elevation
			feet MSL	feet MSL	feet BGS	feet MSL	feet BGS	feet MSL
Wells in Upper Interval								
MW-10	Not needed for gradient mapping (DTSC, 2008a)	Jan-04	531	529	74	456	94	436
MW-19	Not needed for gradient mapping (DTSC, 2008a)	Mar-04	500	499	46	453	66	433
MW-20-70	Monitoring well for gradient mapping	Feb-04	500	499	50	449	70	429
MW-22	very shallow well - not used for grad. mapping	Apr-05	461	458	6	453	11	447
MW-25	Monitoring well for gradient mapping	Mar-04	543	541	85	457	105	437
MW-26	Monitoring well for gradient mapping	Mar-04	502	503	52	451	72	431
MW-27-20	Monitoring well for gradient mapping	Apr-04	461	459	7	452	17	442
MW-28-25	Monitoring well for gradient mapping	Feb-04	467	465	13	452	23	442
MW-29	well in floodplain silt - not used for gradient mapping	Feb-04	485	483	30	454	40	444
MW-30-30	saline well - not used for grad. mapping	Jan-04	468	466	12	454	32	434
MW-31-60	Monitoring well for gradient mapping	Feb-04	497	495	42	454	62	434
MW-32-20	Not used for gradient mapping	Mar-04	462	459	10	449	20	439
MW-32-35	Redundant well with MW-32-20 (not used)	Mar-04	462	459	28	432	35	424
MW-33-40	Monitoring well for gradient mapping	Mar-04	487	485	30	455	40	445
MW-35-60	Monitoring well for gradient mapping	Apr-04	484	481	37	444	57	424
MW-36-20	Monitoring well for gradient mapping	Jun-04	470	467	10	457	20	447
MW-36-40	Monitoring well for gradient mapping	Jun-04	470	467	30	437	40	427
MW-42-30	Monitoring well for gradient mapping	Feb-05	464	461	10	451	30	431
MW-43-25	Monitoring well for gradient mapping	Mar-05	463	460	15	445	25	435
MW-47-55	Monitoring well for gradient mapping	Apr-06	484	483	45	438	55	428
Wells in Middle Interval								
MW-20-100	Monitoring well for gradient mapping	Feb-04	501	499	90	410	100	400
MW-27-60	Monitoring well for gradient mapping	Feb-05	461	458	47	411	57	401
MW-30-50	Monitoring well for gradient mapping	Jan-04	469	466	41	426	51	416
MW-33-90	Monitoring well for gradient mapping	Mar-04	488	485	67	418	87	398
MW-34-55	Monitoring well for gradient mapping	Jan-04	461	459	45	414	55	404
MW-36-50	Monitoring well for gradient mapping	Jun-04	470	467	46	421	51	416
MW-36-70	Monitoring well for gradient mapping	Jun-04	470	467	60	407	70	397
MW-39-40	Monitoring well for gradient mapping	Apr-04	468	465	30	435	40	425
MW-39-50	Monitoring well for gradient mapping	Apr-04	468	465	47	418	52	413
MW-39-60	Monitoring well for gradient mapping	Apr-04	468	465	49	416	59	406
MW-39-70	Monitoring well for gradient mapping	Apr-04	468	465	60	405	70	395
MW-42-55	Not needed for gradient mapping (DTSC, 2008a)	Feb-05	464	461	43	418	53	408
MW-42-65	Current Gradient Control Well	Feb-05	463	461	56	405	66	395
MW-44-70	Monitoring well for gradient mapping	Apr-06	472	471	61	410	71	400
MW-50-95	Monitoring well for gradient mapping (not used)	May-06	497	495	85	410	95	400
MW-51	Monitoring well for gradient mapping	May-06	502	502	97	405	112	390
TW-2S	Standby Extraction Well (MW-20 bench)	Apr-04	500	497	43	454	93	404

TABLE E-1

Summary of IM Extraction and Performance Monitoring Wells, January 2007

Annual IM Performance Monitoring Report

PG&E Topock Compressor Station

Well ID	Description & Well Use in 2008 PMP	Date Incorporated in Hydraulic Monitoring Network	Well Elevation		TOP of Screen		BASE of Screen	
			Measure Pt. Elevation	Ground Elevation	Depth	Elevation	Depth	Elevation
			feet MSL	feet MSL	feet BGS	feet MSL	feet BGS	feet MSL
Wells in Lower Interval-1								
MW-27-85	Monitoring well for gradient mapping	Feb-05	461	458	78	380	88	370
MW-28-90	Monitoring well for gradient mapping	Jun-04	468	465	70	395	90	375
MW-34-80	Current Gradient Control Well	Jan-04	461	459	73	386	83	376
MW-36-90	Monitoring well for gradient mapping	Jun-04	470	467	80	387	90	377
MW-39-80	Monitoring well for gradient mapping	Apr-04	468	465	70	395	80	385
MW-43-75	Not needed for gradient mapping (DTSC, 2008a)	Mar-05	463	460	65	395	75	385
MW-43-90	Monitoring well for gradient mapping	Mar-05	463	460	80	380	90	370
MW-45-95	Key piezometer for PE-1 gradient control	Apr-06	470	467	83	384	93	374
PE-01	Active Extraction Well (Floodplain)	May-05	470	467	79	388	89	378
PT-2D	IS pilot test well - used for grad. mapping	Jun-06	474	472	95	377	105	367
PT-5D	IS pilot test well - used for grad. mapping	Jun-06	474	471	95	376	105	366
PT-6D	IS pilot test well - used for grad. mapping	Jun-06	476	474	95	379	105	369
Wells in Lower Interval-2								
MW-20-130	Current Gradient Control Well	Feb-04	501	499	121	378	131	368
MW-31-135	Current Gradient Control Well	Apr-05	498	495	113	382	133	362
MW-33-150	Current Gradient Control Well	Mar-05	488	485	132	353	152	333
MW-34-100	Key monitoring well for gradient mapping	Feb-05	461	459	90	369	100	359
MW-35-135	Monitoring well for gradient mapping	Apr-04	484	481	117	364	137	344
MW-36-100	Monitoring well for gradient mapping	May-04	470	467	88	379	98	369
MW-39-100	Monitoring well for gradient mapping	Apr-04	468	465	80	385	100	365
MW-44-115	Key monitoring well for gradient mapping	Apr-06	472	471	105	366	115	356
MW-44-125	Redundant well with MW-44-115 (not used)	Apr-06	472	471	114	357	124	347
MW-47-115	Monitoring well for gradient mapping	Apr-06	484	483	105	378	115	368
TW-2D	Standby Extraction Well (MW-20 bench)	Apr-04	500	497	113	384	148	349
TW-3D	Active Extraction Well (MW-20 bench)	Nov-05	498	497	111	386	156	341
TW-05	Hydraulic test well (40-foot screen)	May-06	496	497	110	387	150	347
MW-49-135	Monitoring well for gradient mapping	May-06	484	483	125	358	135	348
Wells in Lower Interval-3								
MW-33-210	Not needed for gradient mapping (DTSC, 2008a)	Mar-05	487	485	190	295	210	275
MW-46-175	Deep well - not used for gradient mapping	Apr-06	482	481	165	316	175	306
MW-46-205	Not needed for gradient mapping (DTSC, 2008a)	Apr-06	482	481	196	285	206	275
MW-50-200	Not needed for gradient mapping (DTSC, 2008a)	May-06	496	495	188	307	198	297
Wells in Lower Interval-4								
MW-49-275	Not needed for gradient mapping (DTSC, 2008a)	May-06	484	483	265	218	275	208
MW-49-365	Not needed for gradient mapping (DTSC, 2008a)	May-06	484	483	356	127	366	117
TW-04	Hydraulic test well (40-foot screen)	Apr-06	484	483	210	273	250	233

NOTES:

1. MSL = mean sea level, bgs = below ground surface, IS = Floodplain In-situ pilot test
2. Alluvial Aquifer elevation intervals in feet above mean sea level (MSL):
   Upper Interval (Upper) = water table (ave. 455' MSL) to 425', Mid-Depth Interval (Middle) = 425-395, Lower Interval-1 (Lower-1) = 395-37(
   Lower Interval-2 (Lower-2) = 370-330, Lower Interval-3 (Lower-3) = 330-250, and Lower Interval-4 (Lower-4) = below 250' MS
   See Figure A-1 for graphical presentation of well screen elevations
3. Ground surface elevations and all well and screen depths and elevations rounded to whole-foot values.

TABLE E-2
Chemical Sampling Program for IM Extraction and Monitoring Wells, July 2008 Update
Annual IM Performance Monitoring Report
PG&E Topock Compressor Station

Well ID	Current Sampling Frequency[a]	Hexavalent Chromium and Total Chromium	Water Quality Field Parameters[b]	IM Chemical Performance Parameters[c]
Shallow Wells				
MW-12	Quarterly	X	X	
MW-19	Annually	X	X	
MW-20-70	Semiannually	X	X	X
MW-22	Semiannually	X	X	
MW-24A	Semiannually	X	X	
MW-25	Annually	X	X	X
MW-26	Semiannually	X	X	X
MW-27-20	Annually	X	X	X
MW-28-25	Annually	X	X	X
MW-29	Semiannually	X	X	
MW-31-60	Annually	X	X	X
MW-32-20	Semiannually	X	X	X
MW-32-35	Annually	X	X	X
MW-33-40	Quarterly	X	X	
MW-35-60	Semiannually	X	X	
MW-36-20	Biennially	X	X	
MW-39-40	Biennially	X	X	
MW-42-30	Biennially	X	X	
MW-43-25	Annually	X	X	
MW-47-55	Quarterly	X	X	
TW-2S	Annually	X	X	
Mid-depth wells				
MW-20-100	Semiannually	X	X	X
MW-27-60	Annually	X	X	
MW-30-50	Not Sampled	X	X	
MW-33-90	Quarterly	X	X	
MW-34-55	Annually	X	X	X
MW-36-50	Biennially	X	X	
MW-36-70	Annually	X	X	
MW-39-50	Annually	X	X	
MW-39-60	Annually	X	X	
MW-39-70	Annually	X	X	
MW-42-55	Quarterly	X	X	
MW-42-65	Quarterly	X	X	
MW-44-70	Quarterly	X	X	
MW-50-95	Quarterly	X	X	
MW-51	Semiannually	X	X	
MW-52S	Quarterly	X	X	
Deep wells				
MW-20-130	Semiannually	X	X	X

TABLE E-2

Chemical Sampling Program for IM Extraction and Monitoring Wells, July 2008 Update

Annual IM Performance Monitoring Report

PG&E Topock Compressor Station

Well ID	Current Sampling Frequency[a]	Hexavalent Chromium and Total Chromium	Water Quality Field Parameters[b]	IM Chemical Performance Parameters[c]
MW-24B	Semiannually	X	X	
MW-27-85	Quarterly	X	X	
MW-28-90	Quarterly	X	X	
MW-33-150	Quarterly	X	X	
MW-33-210	Quarterly	X	X	
MW-34-80	Monthly	X	X	X
MW-34-100	Monthly	X	X	
MW-35-135	Annually	X	X	
MW-36-90	Semiannually	X	X	
MW-36-100	Semiannually	X	X	
MW-39-80	Semiannually	X	X	
MW-43-75	Annually	X	X	
MW-43-90	Annually	X	X	
MW-44-115	Monthly	X	X	
MW-44-125	Monthly	X	X	
MW-46-175	Monthly	X	X	
MW-46-205	Quarterly	X	X	
MW-47-115	Quarterly	X	X	
MW-49-135	Semiannually	X	X	
MW-49-275	Semiannually	X	X	
MW-49-365	Semiannually	X	X	
MW-50-200	Quarterly	X	X	
MW-52D	Quarterly	X	X	
MW-52M	Quarterly	X	X	
MW-53D	Quarterly	X	X	
MW-53M	Quarterly	X	X	
PE-1	Monthly	X	X	
TW-2D	Annually	X	X	
TW-3D	Monthly	X	X	

Notes:

[a] Sampling frequencies listed are current as of February 2008, and reflect updated sampling frequencies approved by DTSC (2007b).

[b] Water quality field parameters include: ORP, specific conductance, pH, and temperature.

[c] Updated July 2008. Chemical performance parameters include: TDS, chloride, sulfate, nitrate, bromide, calcium, potassium, magnesium, sodium, boron, alkalinity, deuterium, and oxygen-18.

Additional notes:

Active extraction wells TW-3D and PE-1 are sampled for Cr(VI), Cr(T), and TDS monthly for IM operations.

This table indicates sampling included in the scheduled chemical performance monitoring program only.

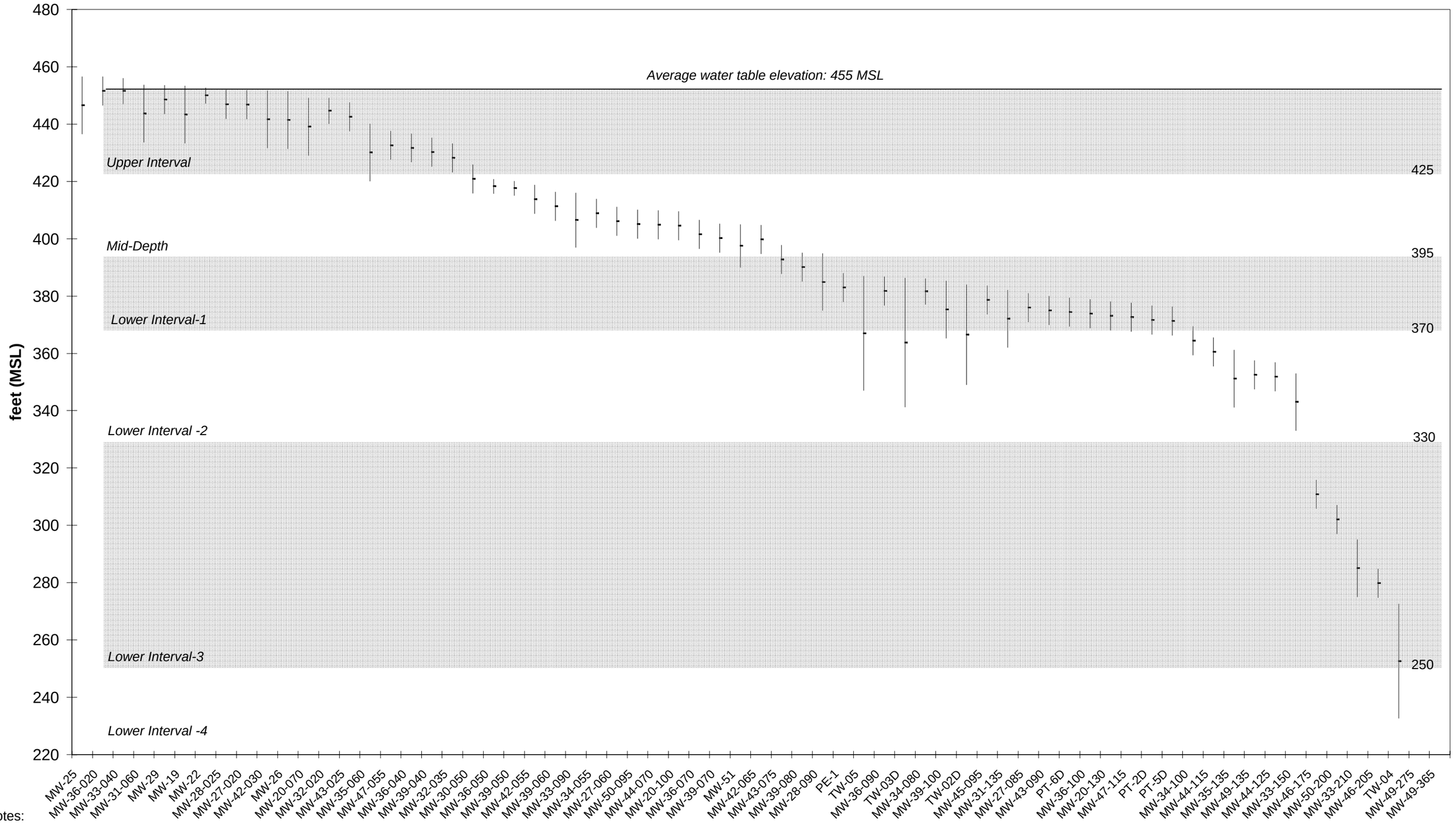
TABLE E-3
Assessment Monitoring Wells and Trigger Levels for Performance Monitoring
July 2008 Update for Interim Measures Contingency Plan
Interim Measures Performance Monitoring Program
PG&E Topock Compressor Station

Assessment Monitoring Well	Well Location Relative to Cr(VI) Plume	Cr(VI) Concentrations [1] July 2006 - December 2007	Trigger Level [2] for Implementing IM Contingency Plan
Shallow Wells (Upper Interval)			
MW-21	outside plume	ND (1)	IM target concentration
MW-32-20	outside plume	ND (2)	IM target concentration
MW-32-35	outside plume	ND (1)	IM target concentration
MW-33-40	outside plume	ND (0.2) - 0.4	IM target concentration
MW-39-40	outside (above) plume	ND (0.2)	IM target concentration
MW-47-55	plume margin	30.3 - 152	150 μg/L
Intermediate Wells (Mid-Depth)			
MW-33-90	plume edge	2.3 - 21.0	25[3] μg/L
MW-36-70	outside (above) plume	ND (0.2)	IM target concentration
MW-42-55	outside plume	ND (0.2)	IM target concentration
MW-42-65	outside plume	ND (0.2)	IM target concentration
MW-44-70	outside (above) plume	ND (0.2)	IM target concentration
Deep Wells (Lower Interval)			
MW-27-85	outside plume	ND (0.2)	IM target concentration
MW-28-90	outside plume	ND (0.2)	IM target concentration
MW-33-150	outside (below) plume	6.8 - 10.8	IM target concentration
MW-33-210	outside (below) plume	9.2 - 13.3	IM target concentration
MW-34-80	outside (above) plume	ND (0.2)	IM target concentration
MW-34-100	easternmost well in plume	501 - 922	750 μg/L
MW-43-75	outside plume	ND (1)	IM target concentration
MW-43-90	outside plume	ND (1)	IM target concentration
MW-44-115	inside plume	736 - 1,700	1,200 μg/L
MW-44-125	inside plume	155 - 468	475 μg/L
MW-46-175	within plume, central floodplain	86.4 - 223	225 μg/L
MW-46-205	outside (below) plume	2.0 - 4.0	IM target concentration
MW-47-115	plume edge	7.9 - 14.1	20[4] μg/L

Notes:

1. Hexavalent chromium [Cr(VI)] results are range of concentrations, in micrograms per liter (μg/L), detected in July 2006 - December 2007.
   ND (1) = not detected at listed reporting limit.
2. The Cr(VI) sampling **Trigger Levels** for implementing the Contingency Plan per DTSC's June 17, 2008 letter (provided as Figure 1):
   a) ND wells and wells with Cr(VI) detections <20 μg/L: Trigger level is the target concentration for IM hydraulic containment (20 μg/L).
   b) Wells with historical Cr(VI) detections >20 μg/L:
   Wells with decreasing data trends used a 0.75 year window (April 2007 to December 2007).
   Wells with non-trending data used a 1.5 year window (July 2006 to December 2007).
3. Based on 3/2008 maximum. Otherwise the maximum would be 20.
4. Based on 3/2008 maximum. Otherwise the maximum would be 15.
5. Per DTSC instructions, Contingency Plan trigger levels will be evaluated and updated annually within the Annual PMP Report.

FIGURE E-1
Well Screen Elevations for Groundwater Monitoring Wells and Extraction Wells in the PMP area.
Annual IM Performance Monitoring Report
PGE Topock Compressor Station



Notes:
MSL = Mean Sea Level
Well screen elevations in feet above mean sea level (MSL)
Wells MW-49-275 and MW-49-365 are screened below 220 ft MSL
FigE-1_WellScreenElevPlot.xls, All Wells Chart