



**Pacific Gas and  
Electric Company®**

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January 13, 2006

Norman Shopay  
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California Department of Toxic Substances Control  
Geology and Corrective Action Branch  
700 Heinz Avenue  
Berkeley, California 94710

Subject: Performance Monitoring Report for December 2005  
Interim Measures Performance Monitoring Program  
PG&E Topock Compressor Station, Needles, California

Dear Mr. Shopay:

Enclosed is the *Performance Monitoring Report for December 2005* for the Interim Measure Performance Monitoring Program at the PG&E Topock Compressor Station. This monitoring report documents the performance monitoring results for December 1 through 31, 2005, and has been prepared in conformance with DTSC's letter dated February 14, 2005.

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

Sincerely,

*Julie Ekins for Yvonne Meeks*

Enclosure

# **Performance Monitoring Report for December 2005**

**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**

January 13, 2006

**CH2MHILL**  
155 Grand Avenue, Suite 1000  
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**Performance Monitoring Report  
for December 2005**

**Interim Measures Performance Monitoring Program**

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

**Prepared for  
California Department of Toxic Substances Control**

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Pacific Gas and Electric Company**

**January 13, 2006**

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

*Paul Bertucci*

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



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# Acronyms and Abbreviations

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cfs	cubic feet per second
Cr(T)	total chromium
Cr(VI)	hexavalent chromium
BLM	United States Bureau of Land Management
DTSC	Department of Toxic Substances Control
gpm	gallons per minute
IM	Interim Measure
IM-3	Interim Measure No. 3
PG&E	Pacific Gas and Electric Company
PMP	Performance Monitoring Program
µg/L	micrograms per liter (the same as parts per billion [ppb])
RCRA	Resource Conservation and Recovery Act
TDS	total dissolved solids
USBR	United States Bureau of Reclamation
WDR	Waste Discharge Requirements

# 1.0 Introduction

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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 collectively are referred to as Interim Measure No. 3 (IM-3). Currently, the IM-3 facilities include a groundwater extraction system (currently three extraction wells, TW-2D, TW-3D, and TW-2S), 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-3 extraction, conveyance, treatment, and injection facilities.

In a letter dated February 14, 2005, the California Department of Toxic Substances Control (DTSC) established the criteria for evaluating the performance of the IM. 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” (Enclosure A, DTSC February 14, 2005 letter). The DTSC directive also defined the monitoring and reporting requirements for the IM. A draft *Performance Monitoring Plan for Interim Measures in the Floodplain Area* 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.

This monthly report has been prepared in compliance with DTSC’s requirements and documents the monitoring activities and performance evaluation of the IM hydraulic containment system for the period from December 1 through 31, 2005. The next monthly report for the January 2006 period will be submitted on February 15, 2006. The next quarterly report for the November, December, and January reporting period will be submitted in conjunction with the first annual report on March 15, 2006.

Figure 1-2 shows the locations of wells used for the IM extraction, performance monitoring, and hydraulic gradient calculation. The performance monitoring wells are defined as:

- **Floodplain Wells** (monitoring wells on the Colorado River floodplain): MW-22, MW-27 cluster (3), MW-28 cluster (2), MW-29, MW-30 cluster (2), MW-32 cluster (2), MW-33 cluster (4), MW-34 cluster (3), MW-36 cluster (6), MW-39 cluster (6), MW-42 cluster (3), and MW-43 cluster (3).
- **Intermediate Wells** (monitoring wells located immediately north, west, and southwest of the floodplain): MW-12, MW-19, MW-20 cluster (3), MW-21, MW-26, MW-31 cluster (2), MW-35 cluster (2).
- **Interior Wells** (monitoring wells located upgradient of IM pumping): MW-10, MW-25.

The three current extraction wells, TW-2D, TW-3D and TW-2S, are located on the MW-20 bench (Figure 1-1). In March 2005, extraction well PE-1 was installed on the floodplain approximately 450 feet east of extraction well TW-2D (Figure 1-1). Construction of the conveyance piping and power supply to PE-1 on the floodplain began in December 2005 and will be operational by late-January/early February 2006.

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—designated upper, middle, and lower—are based on grouping the monitoring wells screened at common elevations and do not represent distinct hydrostratigraphic units or separate aquifer zones. 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. It should be noted, however, that these divisions do not correspond to any lithostratigraphic layers within the aquifer. The floodplain aquifer is considered to be hydraulically undivided.



## 2.0 Extraction System Operations

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Pumping data for the IM groundwater extraction system for the period December 1 through December 31, 2005 are shown in Table 2-1. Extraction well TW-3D construction and initial testing was completed on December 20, 2005. At that time, PG&E increased the extraction system pump rate from a target of at least 90 gallons per minute (gpm), the maximum sustainable rate for TW-2D, to approximately 135 gpm (treatment plant capacity) by operating both TW-2D and TW-3D concurrently. PG&E will continue to operate the extraction system in this manner to maintain a monthly average pump rate goal of 125 gpm.

The December 2005 monthly average pumping rate was 111.5 gallons per minute (gpm). A total of 4,976,297 gallons of groundwater were extracted from TW-2D and TW-3D and treated by the IM-3 treatment plant during December 2005. The operational run time for the IM extraction system was 97 percent during this reporting period. An operations log for the extraction system during December 2005, including downtime, is included in Appendix A.

The concentrate (i.e., brine) from the reverse osmosis system was manifested as a Resource Conservation and Recovery Act (RCRA) non-hazardous waste and transported to United States Filter Corporation in Los Angeles, California for additional treatment and disposal. One container of solids (approximately 14 cubic yards) from the IM-3 facility was disposed at the Chemical Waste Management, Kettleman Hills facility during December 2005.

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 analytical results of groundwater from extraction well TW-2D during the December reporting period and prior months. These samples are collected from a port at the groundwater treatment plant prior to water treatment. 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-3 treatment facility.

## 3.0 Chromium Sampling Results

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The groundwater monitoring wells in the floodplain area are currently sampled for Cr(VI), total chromium [Cr(T)], and field water quality parameters under quarterly, monthly, and biweekly schedules, in accordance with the approved groundwater monitoring plan and DTSC directives. On July 20, 2005, DTSC approved a modified sampling schedule for groundwater monitoring in the floodplain that specified monthly sampling of 12 selected monitoring wells, biweekly sampling of one well (MW-34-100), and quarterly sampling of the other monitoring wells in the PMP area. Table B-1 in Appendix B presents the groundwater sampling results for Cr(VI) and Cr(T), as well as groundwater elevation and selected field water quality parameters for monitoring wells in the floodplain area during December 2005 and the previous months. Table B-2 in Appendix B presents the groundwater sampling data for the other wells monitored in the PMP area during the evaluation period.

The Cr(VI) and Cr(T) concentrations for the sample from well MW-39-50 collected during December 2005 were anomalously high. The December Cr(VI) and Cr(T) concentrations for MW-39-80 appear very similar to the anomalous results for MW-39-50 (see Table B-1). Wells MW-39-50 and MW-39-80 are 1-inch diameter nested wells installed in the same well cluster borehole and monument. Hence, there is a possibility that the sample assigned to MW-39-50 may have been collected from MW-39-80 instead. The MW-39-50 results have been J flagged and the field records and data are being further investigated. Pending further evaluation, the results from MW-39-50 have been posted, but not contoured, in the figures included in this report. Both MW-39-50 and MW-39-80 were re-sampled on January 12, 2006 to resolve this matter; those results are not available at this time.

Figure 3-1 presents the Cr(VI) results distribution for December 2005 in plan view for the groundwater wells monitoring the upper, middle, and lower depth intervals of the Alluvial Aquifer in the floodplain area. Figure 3-1 also shows the approximate locations of the 20 µg/L and 50 µg/L Cr(VI) contour lines in groundwater within each depth interval. The California drinking water standard for Cr(T) is 50 µg/L.

The Cr(VI) sampling results from the December 2005 monthly sampling event are shown on Figure 3-2, a vertical cross-section extending east-west across the floodplain. Figure 3-3 presents the December 2005 Cr(VI) results for additional floodplain monitoring wells on a cross-section oriented parallel to the Colorado River (see Figure 1-2 for locations of the cross-sections). For ongoing IM performance evaluation, Cr(VI) concentration trend graphs and hydrographs for key floodplain monitoring wells are presented in Appendix B, Figures B-1 (well MW-33-90), B-2 (MW-34-100), and B-3 (MW-36-100).

## 4.0 Hydraulic Gradient Results

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During the reporting period, water levels were recorded at intervals of 30 minutes with pressure transducers in 48 wells and two river monitoring stations (I-3 and RRB). The data are typically continuous, with only short interruptions for sampling or maintenance. The location of the wells monitored are shown on Figure 1-2 and listed in Section 1.0.

The average and the minimum and maximum daily average groundwater and river elevations have been calculated from the pressure transducer data for the December reporting period (December 1 to December 31, 2005) and are summarized in Appendix C, Table C-1. 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 December 2005) for all wells with transducers are included in Appendix C. The elevation of the Colorado River measured at the river gauge (I-3) Figure 1-2) during December 2005 is also shown on the hydrographs.

The December 2005 hydraulic data and groundwater gradient maps for the upper, middle, and lower depth intervals are shown on Figures 4-1, 4-2, and 4-3, respectively. The groundwater elevations for all depth intervals of the Alluvial Aquifer indicate strongly landward hydraulic gradients underlying the floodplain. To the west of the TW-2D and TW-3D pumping area, the hydraulic gradient in the upper depth interval is easterly and consistent with the regional gradient outside of the floodplain area. The landward gradients measured during December 2005 were slightly greater than in November 2005; this was a result of an increase in extraction rate(s) from 80.1 gpm in November to 111.5 gpm in December. The average monthly groundwater elevations are also presented and contoured in cross-section on Figure 4-4 (cross-section location shown on Figure 1-2).

Table 4-1 summarizes the estimated and actual dam discharges and river elevations since April 2004. The actual Davis Dam December 2005 average discharge of 6,745 cubic feet per second (cfs) was slightly less than the United States Bureau of Reclamation (USBR) projected discharge for the December-reporting period (6,900 cfs). The actual Colorado River elevation at I-3 (monthly average) was less (0.1 ft) than that predicted by using the multiple regression method with USBR projections for the December reporting period.

Gradients were measured between the three designated well pairs (MW-31-135/MW-33-150 MW-20-130/MW-34-80, and MW-20-130/MW-42-65) during December 2005. As shown in Table 4-2, the average gradients in the three well pairs were landward at magnitudes that were between 2 to greater than 3 times the target value of 0.0010 feet per foot (0.0020, 0.0028, and 0.0034 respectively). These gradients were slightly greater than the average gradients measured in November 2005.

## 5.0 Status of Operation and Monitoring

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Reporting of the IM extraction and monitoring activities will continue as described in the Performance Monitoring Plan. The next status report will be a monthly performance monitoring report submitted on February 15, 2006 covering the January 2006 reporting period. The first annual report, summarizing IM system operations and performance monitoring data and evaluation during the annual operations period February 2005 through January 2006, will be submitted on March 15, 2006.

PG&E will continue to operate both TW-2D and TW-3D at a target average monthly flow rate of 125 gpm during January 2006. Treated groundwater will be discharged into the IM-3 injection wells in accordance with Waste Discharge Requirements Order No. R7-2004-0103. Brine generated as a byproduct of the treatment process will continue to be transported offsite to U.S. Filter Corporation in Los Angeles for treatment and disposal.

Construction of conveyance piping and power supply for supplemental extraction well PE-1, located in the central floodplain, to the IM-3 system is in progress. Well PE-1 will be brought into full-time service in late-January/early-February 2006 as construction and testing is complete. PG&E will balance the pumping rates between TW-3D and PE-1 to target the average monthly pumping rate goal of 125 gpm, and maintain appropriate hydraulic gradients across the Alluvial Aquifer. TW-2D will serve as a back-up extraction well to TW-3D and PE-1.

As of January 13, 2006, USBR had not released their January 2006 projections. USBR projections from December 7, 2005, show that the average Davis Dam release for January 2006 (8,400 cfs) will be greater than in December 2005 (6,745 cfs). Based on December 7, 2005 USBR projections, it is anticipated that the Colorado River level at the I-3 gage location in January 2006 will increase (0.3 ft) compared to levels in December 2005. Future adjustments in pumping rates from the IM extraction system will be proposed based on expected river levels, observed groundwater gradients, potential system modifications, and other relevant factors.



**TABLE 2-1**

Pumping Rate and Extracted Volume for IM System through December 2005

*Interim Measures Performance Monitoring**PG&E Topock Compressor Station*

<b>Extraction Well</b>	<b>December 2005 Period<sup>a</sup></b>		<b>Project To Date<sup>b</sup></b>
	<b>Average Monthly Pumping Rate<sup>c</sup> (gpm)</b>	<b>Volume Pumped (gal)</b>	<b>Cumulative Volume Pumped (gal)</b>
TW-2S <sup>a</sup>	0	0	994,438
TW-2D	67.0	2,989,136	50,979,676
TW-3D	44.5	1,987,161	1,987,161
<b>Total</b>	111.5	4,976,297	53,961,275
Volume Pumped from the MW-20 Well Cluster			1,527,724
Total Volume Pumped (gal)			55,488,999
Total Volume Pumped (ac-ft)			170.3

gpm: gallons per minute.

gal: gallons.

ac-ft: acre-feet.

<sup>a</sup> Pumping results during the monthly period are based on readings collected between December 1, 2005 at 12:00 a.m. and December 31, 2005 at 11:59 p.m. (31 days).

<sup>b</sup> Interim Measure groundwater extraction at the Topock site was initiated in March 2004.

<sup>c</sup> 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, July 2005 through December 2005  
Interim Measures Performance Monitoring  
PG&E Topock Compressor Station

Well ID	Sample Date	Unfiltered Total Chromium mg/L	Hexavalent Chromium mg/L	Total Dissolved Solids mg/L
SC-100B	08-Aug-05	4.06	4.27	5980 J
SC-100B	11-Aug-05	4.83	4.21 J	6060
SC-100B	16-Aug-05	4.75	4.22	6170
SC-100B	18-Aug-05	3.96	3.88	5950
SC-100B	22-Aug-05	4.11	4.10	6000
SC-100B	25-Aug-05	3.74	4.27	6200
SC-100B	16-Sep-05	3.91	3.92	6090 J
SC-100B	21-Sep-05	4.15	3.99	6360
SC-100B	28-Sep-05	5.57	4.02	6250
SC-100B	05-Oct-05	3.79	3.96	6040
SC-100B	12-Oct-05	4.24	3.60	5950
SC-100B	19-Oct-05	3.68	3.79	6080
SC-100B	25-Oct-05	3.27	3.90	5880
SC-100B	02-Nov-05	3.63	3.75	5950
SC-100B	07-Dec-05	3.67	3.60	5840

**Notes:**

mg/L = concentration in milligrams per liter (mg/L)

FD = field duplicate sample

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

(---) = data not collected.

^ = Groundwater samples from IM extraction wells are analyzed by certified laboratory for operational monitoring purpose. Analytical data is reviewed for quality control but does not undergo full data validation; results flagged ^.

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

The analytical results after August 1, 2005 were obtained from a sample point (SC-100B) on the influent conveyance system at the IM3 treatment system.

**TABLE 4-1**

Predicted and Actual Monthly Average Davis Dam Discharge and Colorado River Elevation at I-3  
*Interim Measures Performance Monitoring*  
*PG&E Topock Compressor Station*

Month	Davis Dam Release			Colorado River Elevation at I-3		
	Projected (cfs)	Actual (cfs)	Difference (cfs)	Predicted (ft AMSL)	Actual (ft AMSL)	Difference (feet)
April 2004	17,400	17,354	-46	456.4	456.2	-0.2
May 2004	17,100	16,788	-312	456.3	456.3	-0.1
June 2004	15,800	16,869	1,069	455.8	456.6	0.7
July 2004	14,000	14,951	951	455.2	455.9	0.7
August 2004	12,100	12,000	-100	454.5	454.9	0.4
September 2004	11,200	10,979	-221	454.2	454.6	0.4
October 2004	8,600	7,538	-1,062	453.2	453.5	0.3
November 2004	9,500	8,075	-1,425	453.6	453.4	-0.2
December 2004	6,200	8,090	1,890	452.4	453.3	0.9
January 2005	8,800	4,900	-3,900	453.4	452.4	-1.0
February 2005	8,000	4,820	-3,180	453.1	452.6	-0.5
March 2005	15,600	7,110	-8,490	455.8	452.9	-2.9
April 2005	16,700	16,306	-394	455.9	456.0	0.1
May 2005	16,700	15,579	-1,121	456.2	456.1	-0.1
June 2005	14,600	15,223	623	455.8	456.1	0.3
July 2005	15,400	15,612	212	456.0	456.0	0.0
August 2005	11,700	11,544	-156	454.6	454.8	0.2
September 2005	12,400	12,335	-65	454.6	NA	NA
October 2005	12,300	11,201	-1,099	454.5	454.3	-0.2
November 2005	10,900	10,216	-684	454.3	454.3	0
December 2005	6,900	6,745	-155	452.8	452.7	-0.1
January 2006	8,400	----	----	453.0	----	----

**NOTES:**

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

Projected Davis Dam Releases, updated monthly, are reported by the US Department of Interior, Bureau of Reclamation at <http://www.usbr.gov/lc/region/g4000/24mo.pdf>; listed projections for April 2004 through July 2004 are from April 2004, and the remainder were from the beginning of each respective month.

January 2006 Projected monthly Davis Dam Releases were not available at the time of this report.

December 2005 projections were used for predicting Davis Dam Releases and the river elevation at I-3 for January 2006.

Colorado River levels at I-3 are predicted from a linear regression between historical dam releases and measured river levels at I-3 (updated monthly).

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



**TABLE 4-2**

Average Hydraulic Gradients Measured at Well Pairs, December 2005

*Interim Measures Performance Monitoring**PG&E Topock Compressor Station*

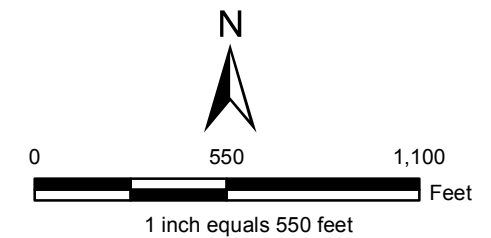
Well Pair	Mean Landward Hydraulic Gradient (feet/foot)	Measurement Dates 2005
Northern Gradient Pair MW-31-135 / MW-33-150	0.0020	December-1 through December-31
Central Gradient Pair MW-20-130 / MW-34-80	0.0028	December-1 through December-31
Southern Gradient Pair MW-20-130 / MW-42-65	0.0034	December-1 through December-31

**Notes:**

- 1) Refer to Figure 1-2 for location of well pairs
- 2) For IM pumping, the target landward gradient for the selected well pairs is 0.001 feet/foot

## Figures

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#### LEGEND



PG&E Property Line



Existing IM Extraction Well



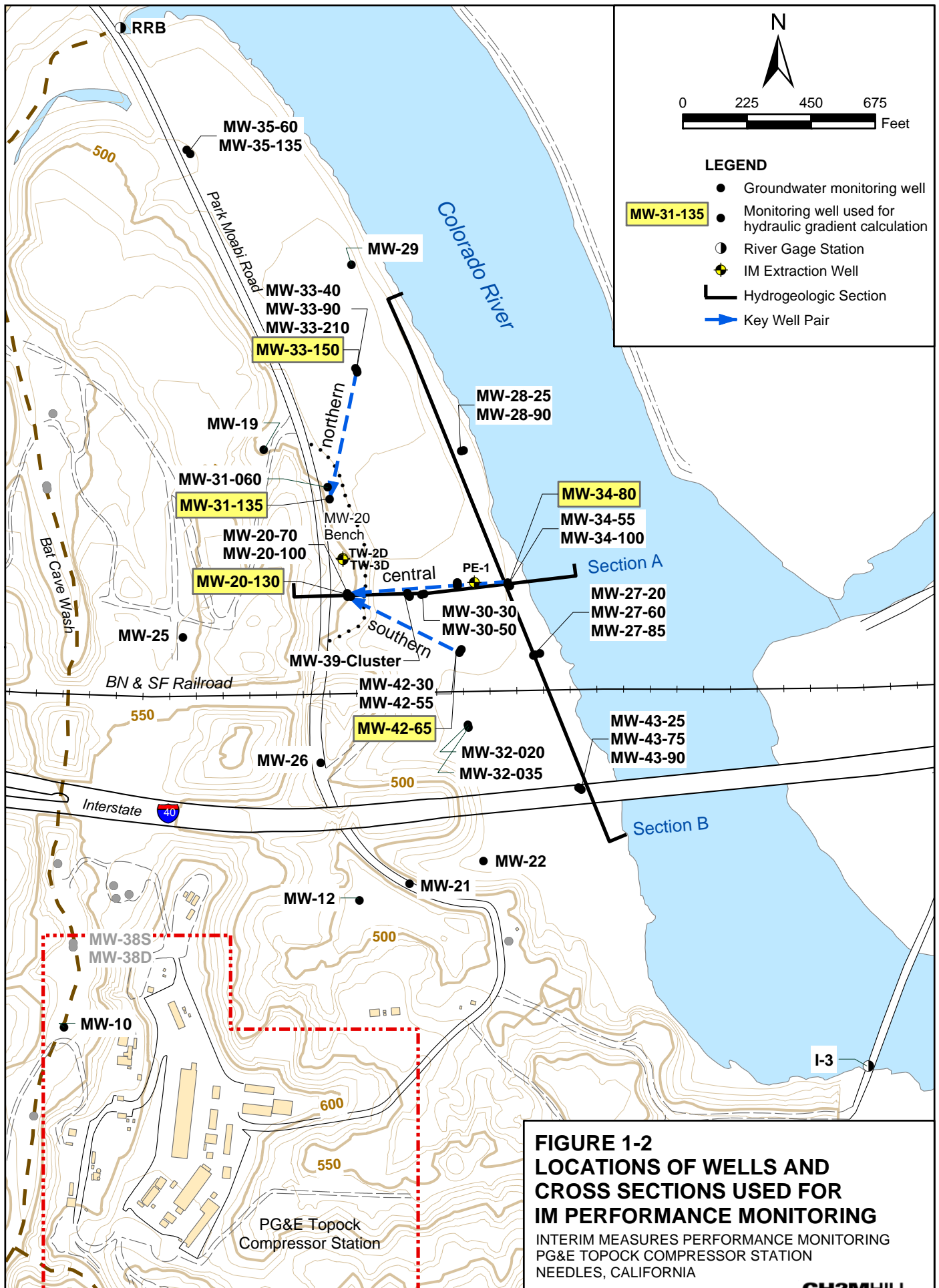
Existing IM Injection Well

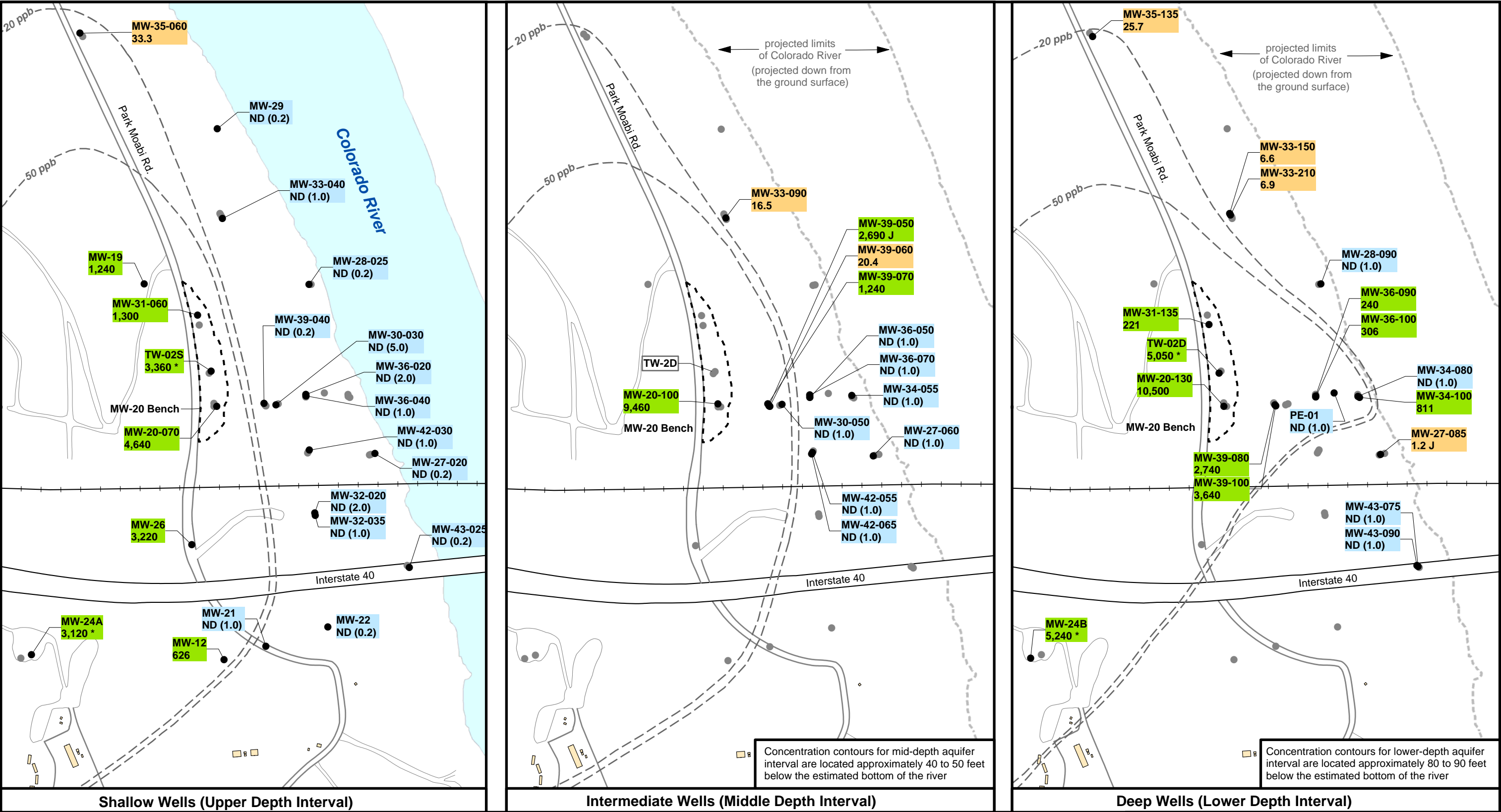
**Notes:** Location map shows Interim Measures No.3 (IM-3) wells as of November 2005. Aerial photography taken May 2005.

### FIGURE 1-1 LOCATIONS OF IM-3 GROUNDWATER EXTRACTION, CONVEYANCE, AND TREATMENT FACILITIES

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

**CH2MHILL**





**ND (1)** Not detected at listed reporting limit (ppb)

**41** Less than 50 ppb

**3,810** Greater than 50 ppb

— 50 — Inferred Cr(VI) concentration contour

**Notes:**  
All results marked \* are from June or October 2005 sampling events. All other results are from the December 2005 quarterly sampling event.  
J = Analyte is detected but the reported value may not be accurate or precise (estimated).

The Cr(VI) value at well MW-39-050 appears to be anomalous and is under review. This value was not used in contouring. See text for more information.

See Tables B-1 and B-2 for data and dates of sampling.

**Hexavalent Chromium Concentrations in Groundwater**  
**December 2005 Sampling Event**

Concentrations in micrograms per liter (µg/L)  
equivalent to parts per billion (ppb)  
ND = not detected at listed reporting limit.

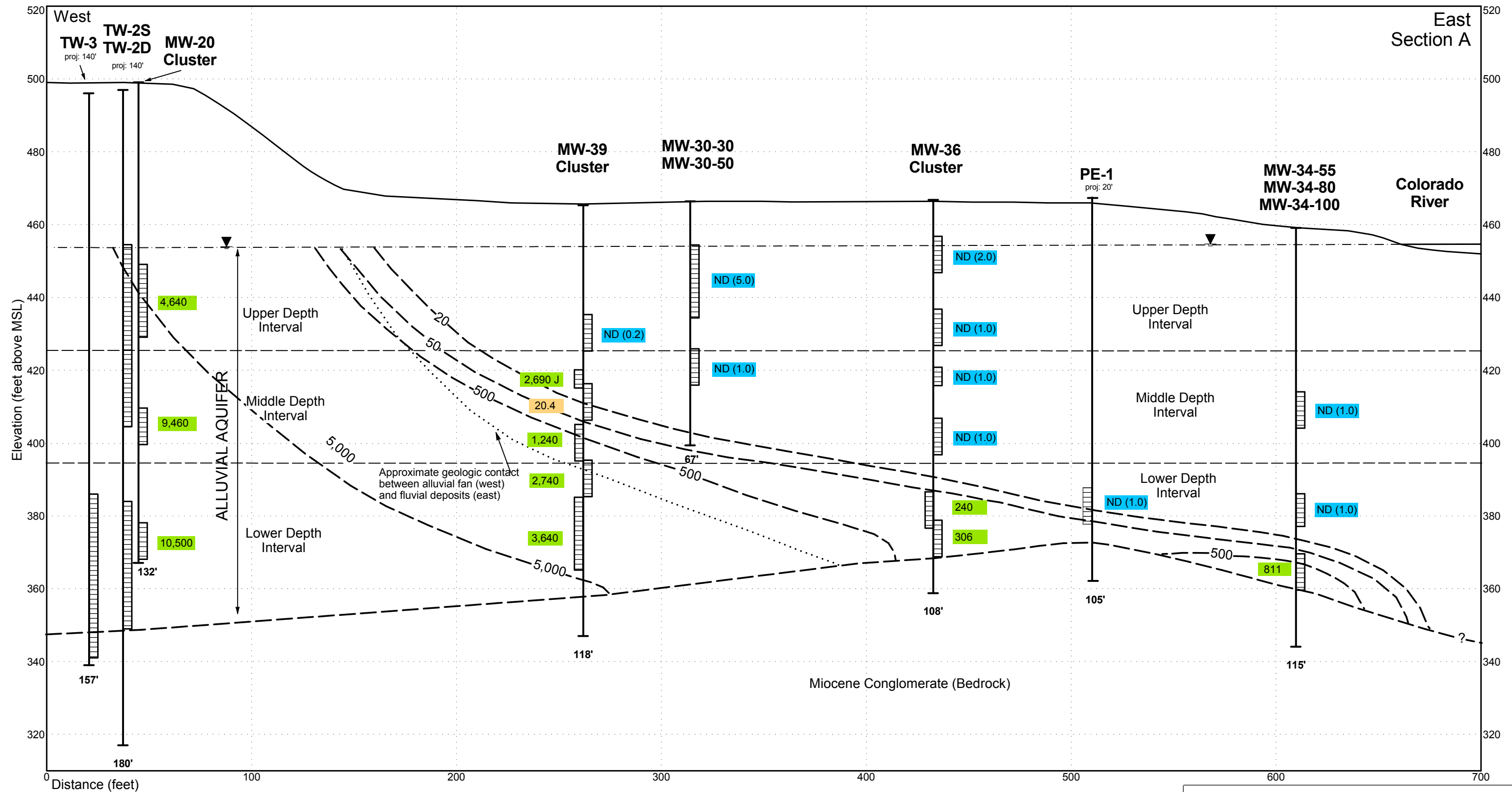
N

0 400 800 Feet

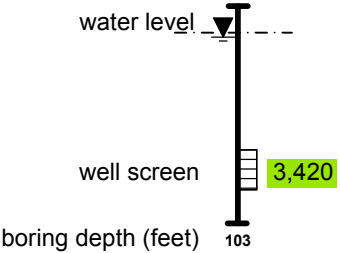
1 inch equals 400 feet

**FIGURE 3-1**  
**CR(VI) CONCENTRATIONS**  
**IN ALLUVIAL AQUIFER, DECEMBER 2005**

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



Notes:  
 Results are from the December 2005 quarterly sampling event.  
 J = Analyte is detected but the reported value may not be accurate or precise (estimated).  
 The Cr(VI) value at well MW-39-050 appears to be anomalous and is under review. This value was not used in contouring. See text for more information.  
 See Tables B-1 and B-2 for data and dates of sampling.



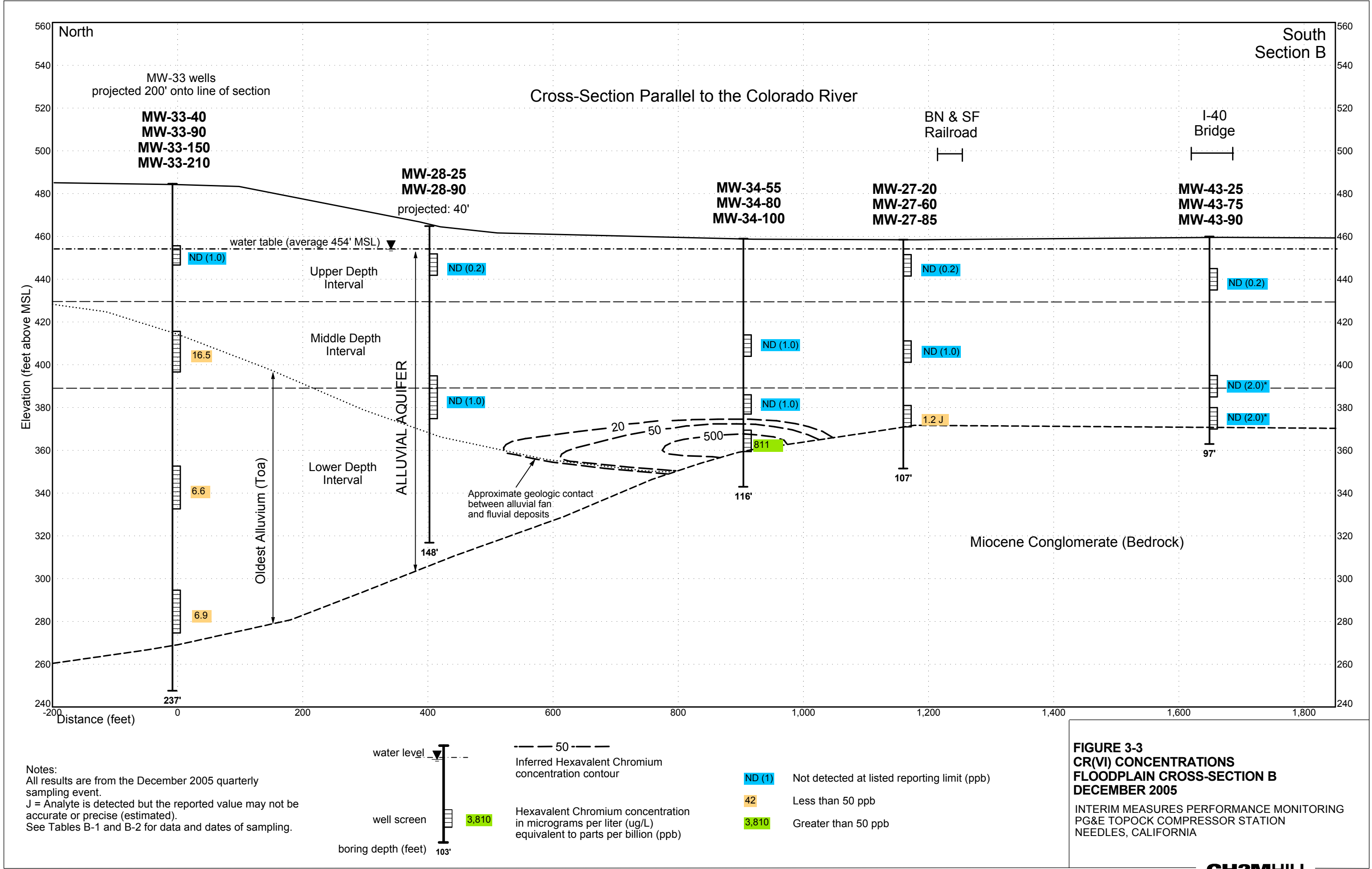
--- 50 ---  
 Inferred Hexavalent Chromium concentration contour

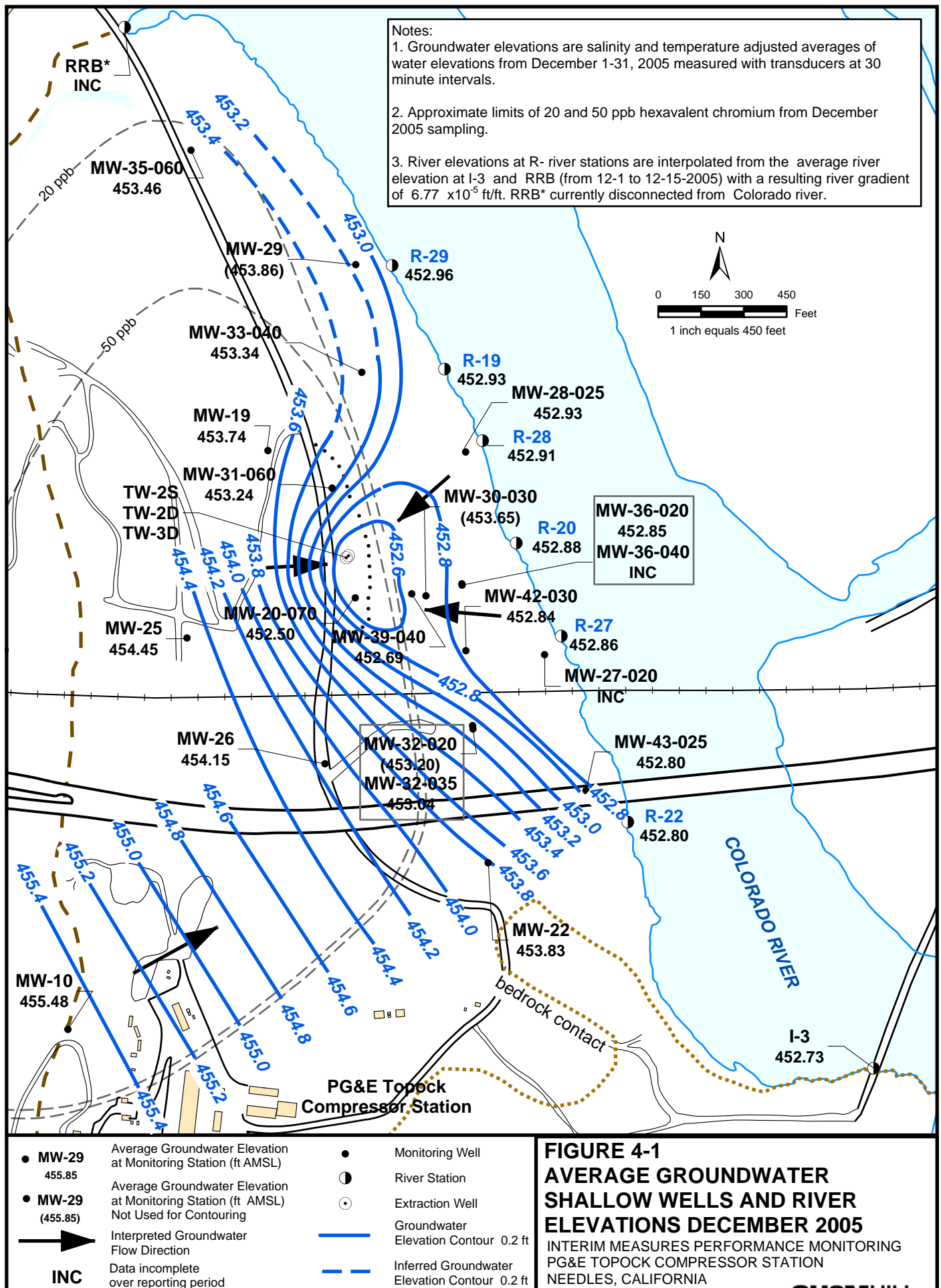
Hexavalent Chromium concentration in micrograms per liter (ug/L) equivalent to parts per billion (ppb)

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

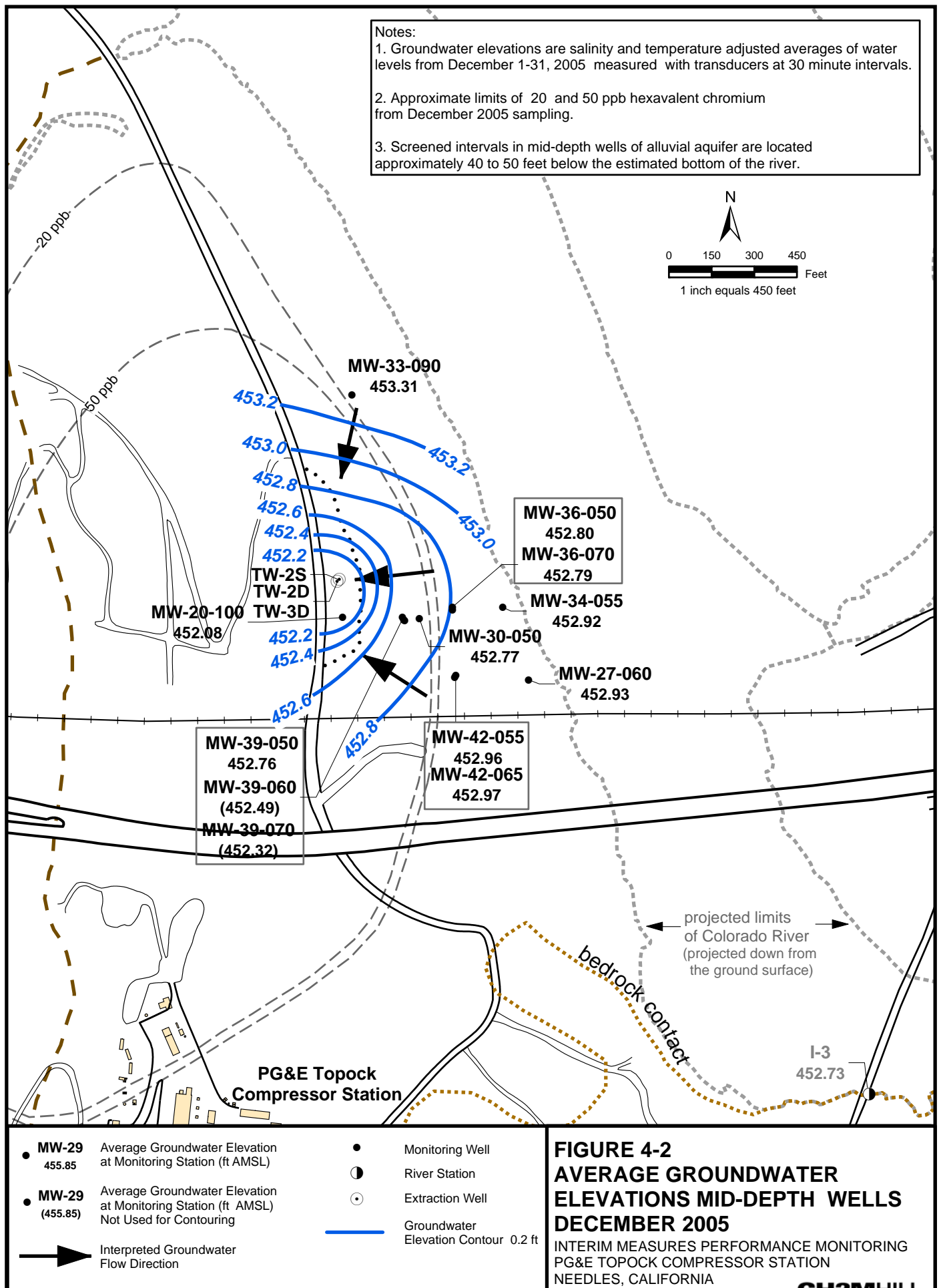
**FIGURE 3-2**  
**CR(VI) CONCENTRATIONS**  
**FLOODPLAIN CROSS-SECTION A**  
**DECEMBER 2005**  
 INTERIM MEASURES PERFORMANCE MONITORING  
 PG&E TOPOCK COMPRESSOR STATION  
 NEEDLES, CALIFORNIA

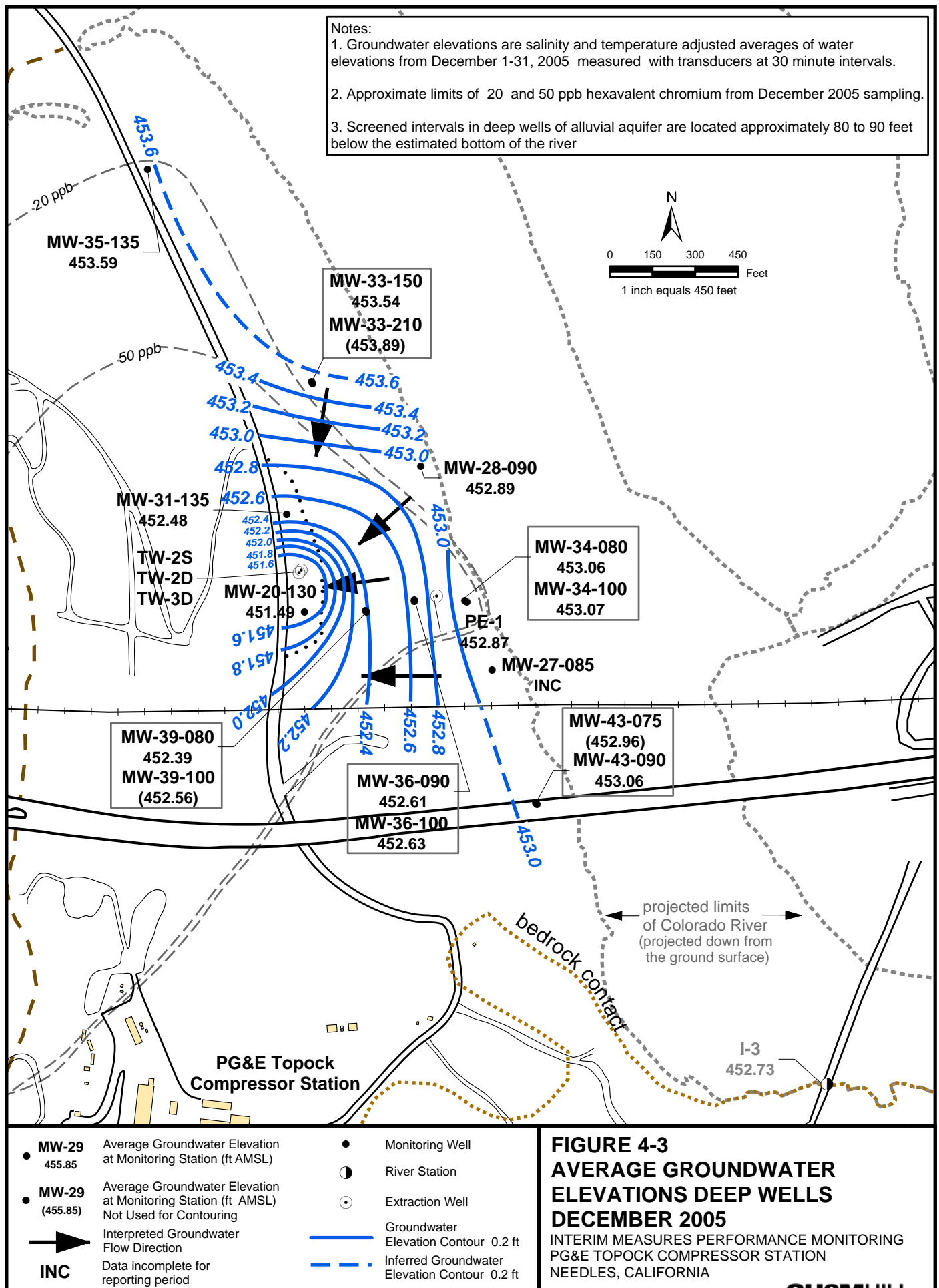


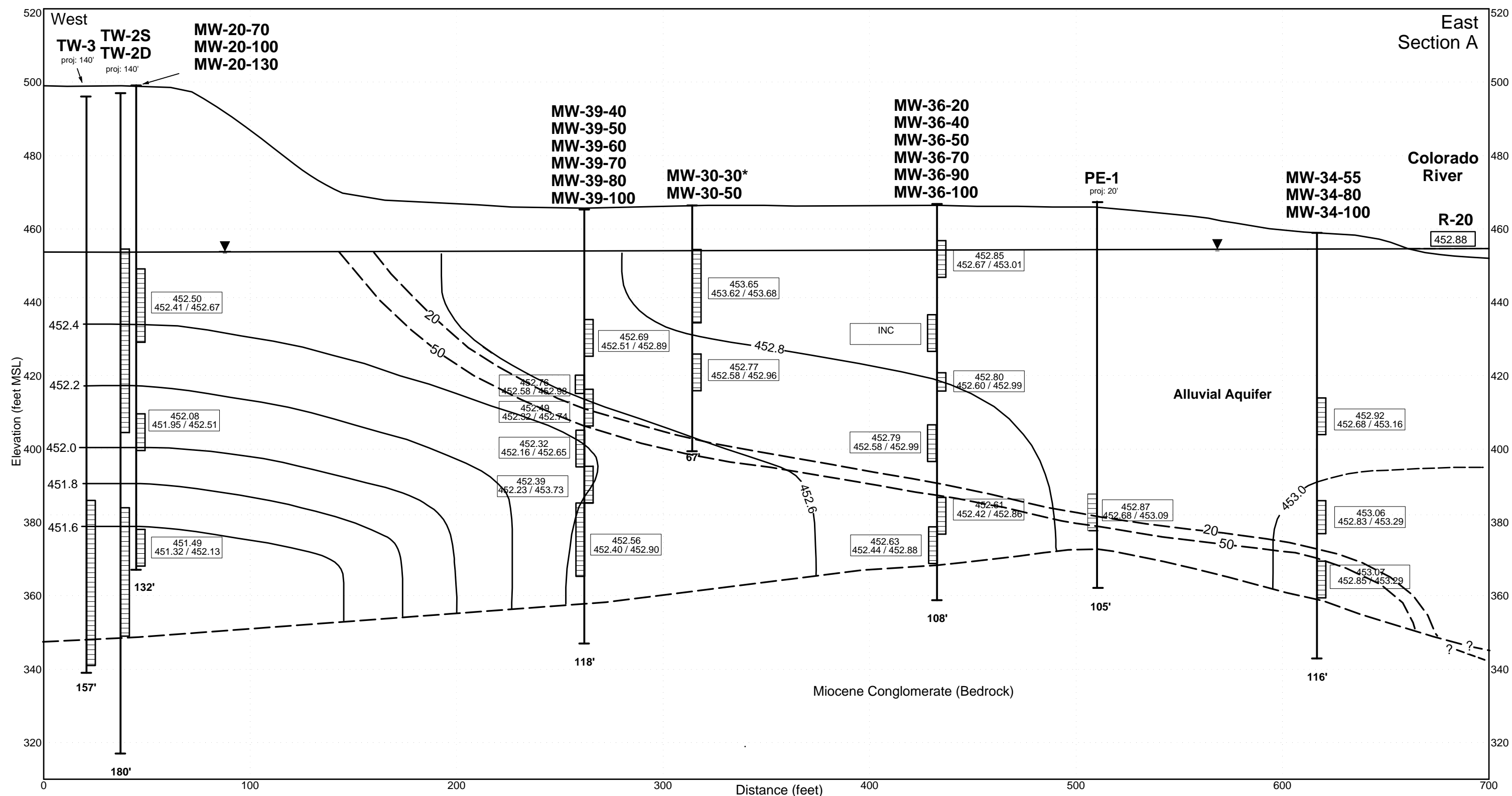












Notes:  
Results show average groundwater elevations for  
December 1-31, 2005  
measured with transducers at 30 minute intervals.  
Groundwater elevations adjusted for salinity and temperature.

\*Well MW-30-30, excluded from contouring.  
INC = data incomplete over reporting period.

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

**Legend:**

**MW-30-50**

Inferred water table

well screen

103 boring depth (feet)

Inferred hexavalent chromium contour (ppb) December 2005

Monthly average groundwater head (ft MSL)  
Minimum / Maximum average groundwater head (ft MSL)

———— 453.5 ————

Groundwater head contour

Inferred groundwater head contour

**FIGURE 4-4  
AVERAGE GROUNDWATER ELEVATIONS  
FLOODPLAIN CROSS-SECTION A  
DECEMBER 2005**

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

**CH2MHILL**

**Appendix A**  
**Extraction System Operations Log for November**  
**2005**

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## Appendix A

### Extraction System Operations Log for December 2005

#### PG&E Topock Interim Measures Performance Monitoring Program

During December 2005, the operational run time for the IM groundwater extraction system was 97 percent. From December 1 through December 15, extraction well TW-2D was operated at a target pump rate of at least 90 gpm. Between December 15 and December 19, a pump testing of extraction well TW-3D was conducted at rates between 90 and 130 gpm. On December 20, both extraction well TW-2D and TW-3D were brought online to begin operating in combination at a target pump rate of equal to the IM-3 treatment plant capacity of approximately 135 gpm. TW-2D and TW-3D will continue to operate in this manner to achieve an average monthly pump rate of 125 gpm until extraction well PE-1 is brought into service.

Periods of extraction system downtime during December 2005 are summarized below.

- **December 1 and 2, 2005:** Extraction well TW-2D was shut down to connect TW-3D piping in Valve Vault No. 1 and subsequently to repair a broken mixing shaft on the polymer feed system. Extraction system downtime for these events was 8 hours 30 minutes.
- **December 13, 2005:** Extraction well TW-2D was shut down for 27 minutes due to ferrous chloride meter testing at the IM-3 facility.
- **December 15, 2005.** Extraction well TW-2D was intentionally shut down at 2:40 pm to allow the groundwater levels in the Aquifer to return to ambient conditions before starting the TW-3D pump test at 7:39 pm. Extraction system downtime was approximately 4 hours 59 minutes.
- **December 18, 2005:** Extraction well TW-3D was shut down from 2:43 pm to 5:13 pm to a combination of power failure, high turbidity readings during system re-start, and changing out microfilter membrane modules. Extraction system downtime was approximately 2 hours 30 minutes.
- **December 29, 2005:** Extraction wells TW-2D and TW-3D were shut down from approximately 9:30 am to 2:29 pm to complete a partial chemical cleaning of the microfilter membranes. Extraction system downtime was approximately 4 hours 59 minutes.

**Appendix B**  
**Chromium Sampling Results for Monitoring**  
**Wells in Floodplain Area**

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TABLE B-1

Groundwater Sampling Results for Floodplain Monitoring Wells, July 2005 through December 2005  
Interim Measures Performance Monitoring  
PG&E Topock Compressor Station

Sample Date		Hexavalent Chromium µg/L	Dissolved Total Chromium 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 Wells								
MW-27-020	18-Jul-05	ND (0.2)	ND (1.0)	-190	1.1	1,040	456.4	456.3
	05-Oct-05	ND (0.21)	ND (1.0)	-158	1.8	1,170	454.7	454.4
	14-Dec-05	ND (0.2)	ND (1.0)	-171	2.2	1,120	453.2	452.5
MW-28-025	13-Jul-05	ND (0.2)	ND (1.0)	19	4.9	1,690	456.6	456.4
	06-Oct-05	ND (0.2)	ND (1.0)	-35	2.0	1,300	454.9	454.6
	16-Dec-05	ND (0.2)	ND (1.0)	-69	2.5	1,390	453.3	453.1
MW-29	04-Oct-05	ND (0.2)	ND (1.0)	-110	3.2	5,240	455.1	452.9
	12-Dec-05	ND (0.2)	ND (1.0)	-40	5.5	4,280	454.0	453.1
MW-30-030	07-Oct-05	ND (0.2)	ND (1.0)	-146	2.5	45,000	453.7	454.2
	15-Dec-05	ND (5.0)	ND (1.0)	-100	3.0	38,900	453.6	452.3
MW-32-020	04-Oct-05	ND (2.0)	ND (1.0) J	-115	2.3	36,000	454.4	452.9
	16-Dec-05	ND (2.0)	ND (1.0)	-107	2.7	33,900	453.3	452.7
MW-32-035	04-Oct-05	ND (1.0)	ND (1.0)	-159	2.1	11,600	454.4	452.9
	16-Dec-05	ND (1.0)	ND (1.0)	-141	2.4	11,200	453.1	452.7
MW-33-040	07-Oct-05	0.68	ND (1.0)	---	---	---	454.9	454.1
	12-Dec-05	ND (1.0)	1.70	45	4.8	14,500	453.6	452.7
MW-36-020	03-Oct-05	ND (1.0)	ND (1.0)	-165	3.0	13,000	454.3	M
	15-Dec-05	ND (2.0)	ND (1.0)	-112	2.4	---	452.7	452.3
MW-36-040	03-Oct-05	ND (1.0)	ND (1.0)	-162	3.8	10,800	454.6	M
	15-Dec-05	ND (1.0)	ND (1.0)	-190	2.7	15,400	452.7	452.5
MW-39-040	04-Oct-05	ND (0.2)	ND (1.0)	-203	2.9	5,640	454.5	452.9
	16-Dec-05	ND (0.2)	ND (1.0)	-177	2.1	5,680	---	453.1
MW-42-030	07-Oct-05	ND (1.0)	ND (1.0)	-139	2.9	16,700	454.6	454.7
	15-Dec-05	ND (1.0)	ND (1.0)	-129	2.4	14,500	452.6	452.3
MW-43-025	04-Oct-05	ND (0.2)	ND (1.0)	-159	2.0	1,220	454.6	452.9
	16-Dec-05	ND (0.2)	ND (1.0)	-184	2.5	1,420	453.0	452.7
Middle-Depth Wells								
MW-27-060	18-Jul-05	ND (1.0)	1.80	-125	2.6	13,500	456.8	456.6
	05-Oct-05	ND (1.0)	ND (1.0)	-97	3.2	13,200	454.9	454.6
	15-Dec-05	ND (1.0)	ND (1.0)	-134	2.9	10,000	452.8	452.4
MW-30-050	07-Oct-05	ND (1.0)	ND (1.0)	-236	2.8	12,300	454.5	454.3
	16-Dec-05	ND (1.0)	ND (1.0)	-263	2.5	8,840	453.1	453.0
MW-33-090	20-Jul-05	16.1	17.3	-23	0.6	8,440	456.5	456.0
	20-Jul-05 FD	16.5	17.3	FD	FD	FD	FD	FD
	06-Oct-05	15.5	13.0	-33	1.9	9,210	454.7	454.0
	13-Dec-05	16.4	21.8 J	-43	2.3	9,310	453.7	453.0
	13-Dec-05 FD	16.5	14.0 J	FD	FD	FD	FD	FD
MW-34-055	15-Jul-05	ND (1.0)	ND (1.3)	-77	3.6	9,180	457.1	456.9
	05-Oct-05	ND (1.0)	ND (1.0)	-93	1.7	8,610	454.2	453.5
	14-Dec-05	ND (1.0)	ND (1.0)	-124	2.1	6,610	453.2	452.8

Refer to table footnotes for data qualifier explanation.

TABLE B-1

Groundwater Sampling Results for Floodplain Monitoring Wells, July 2005 through December 2005  
Interim Measures Performance Monitoring  
PG&E Topock Compressor Station

Sample Date		Hexavalent Chromium µg/L	Dissolved Total Chromium 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-Depth Wells								
MW-36-050	03-Oct-05	ND (1.0)	ND (1.0)	-133	2.9	7,500	454.6	M
	15-Dec-05	ND (1.0)	ND (1.0)	-136	2.8	13,700	452.6	452.5
MW-36-070	03-Oct-05	ND (1.0)	ND (1.0)	-112	2.5	7,680	454.5	M
	15-Dec-05	ND (1.0)	ND (1.0)	-108	2.3	9,310	452.7	452.3
MW-39-050	04-Oct-05	ND (10)	4.70	-78	2.6	13,600	454.2	452.9
	16-Dec-05	2690 J	2440 J	-57	2.0	11,300	---	453.1
MW-39-060	04-Oct-05	72.3	79.6 J	-20	2.2	14,100	454.0	452.9
	16-Dec-05	20.4	20.4	-40	2.3	11,200	---	453.3
MW-39-070	04-Oct-05	840	754	31	2.7	13,800	454.0	452.9
	16-Dec-05	1240	1080	22	2.2	10,000	---	453.0
MW-42-055	07-Oct-05	ND (1.0)	ND (1.0)	-126	5.6	18,100	454.8	454.7
	15-Dec-05	ND (1.0)	ND (1.0)	-143	2.4	11,100	452.8	452.3
MW-42-065	07-Oct-05	ND (1.0)	ND (1.0)	-121	2.8	17,300	454.9	455.0
	15-Dec-05	ND (1.0)	ND (1.0)	-78	2.5	13,200	452.9	452.3
Deep Wells								
MW-27-085	19-Jul-05	ND (1.0)	3.00	-106	0.9	19,100	457.0	457.3
	16-Aug-05	ND (1.0)	ND (2.6)	-156	1.3	13,700	455.5	455.8
	08-Sep-05	ND (1.0)	ND (1.0)	-158	1.7	20,500	455.3	M
	05-Oct-05	ND (1.0)	ND (1.0)	-82	2.1	18,100	454.8	454.5
	03-Nov-05	ND (2.0) J	ND (1.0)	-150	1.1	23,100	454.5	454.2
	15-Dec-05	1.20 J	6.60	-124	2.8	14,300	452.9	452.5
MW-28-090	01-Jul-05	ND (1.0)	---	-174	1.8	12,700	456.4	456.1
	13-Jul-05	ND (1.0)	ND (1.0)	-142	4.3	8,850	456.3	456.0
	18-Aug-05	ND (1.0)	1.10	-178	1.1	9,740	455.9	455.9
	09-Sep-05	ND (1.0)	ND (1.0)	-190	1.7	8,190	455.6	M
	06-Oct-05	ND (1.0)	ND (1.0)	-138	2.0	9,070	454.9	454.7
	02-Nov-05	ND (1.0)	ND (1.0)	-183	1.4	9,720	454.0	453.7
	16-Dec-05	ND (1.0)	ND (1.0)	-176	2.5	8,430	453.3	453.3
MW-33-150	20-Jul-05	5.20	5.60	-59	0.7	16,100	456.5	456.6
	17-Aug-05	4.00	6.10	-72	1.3	17,000	455.6	455.3
	09-Sep-05	3.90	2.80	-108	1.7	17,000	455.7	M
	06-Oct-05	4.50	3.90	-41	2.0	15,800	454.6	453.5
	06-Oct-05 FD	5.30	4.90	FD	FD	FD	FD	FD
	02-Nov-05	5.50	4.70	-81	1.4	20,800	454.4	453.7
	12-Dec-05	6.60	5.70	21	3.9	19,200	453.7	452.8
MW-33-210	20-Jul-05	5.60	6.70	-40	0.8	19,200	456.7	456.9
	17-Aug-05	2.50	8.00	-88	1.2	19,900	456.0	455.5
	06-Sep-05	3.50	2.90	-109	1.7	22,600	455.7	M
	06-Oct-05	4.00	4.20	-30	1.8	18,800	454.8	453.8
	02-Nov-05	6.50	5.40	-73	1.4	24,900	454.7	453.8
	12-Dec-05	6.90	5.60	40	3.6	21,900	454.1	452.9

Refer to table footnotes for data qualifier explanation.



TABLE B-1

Groundwater Sampling Results for Floodplain Monitoring Wells, July 2005 through December 2005  
Interim Measures Performance Monitoring  
PG&E Topock Compressor Station

		Hexavalent Chromium µg/L	Dissolved Total Chromium 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-34-080	14-Jul-05	ND (1.0)	2.00	-104	1.2	17,900	456.9	455.9
	15-Aug-05	ND (1.0)	2.40	-137	1.5	14,600	455.4	454.7
	07-Sep-05	ND (1.0)	ND (1.0)	-148	1.5	17,100	455.9	M
	05-Oct-05	ND (1.0)	ND (1.0)	-58	2.2	13,800	454.4	453.1
	03-Nov-05	ND (1.0)	ND (1.0)	-117	1.1	16,300	454.9	454.4
	14-Dec-05	ND (1.0)	ND (1.0)	-88	2.3	10,400	453.6	453.2
MW-34-100	07-Jul-05	583	---	-88	3.8	18,800	456.5	455.7
	14-Jul-05	617	701	-26	1.9	20,200	456.9	456.6
	27-Jul-05	597	504	-2	1.1	17,800	456.1	456.5
	10-Aug-05	574	589	-83	1.4	19,700	455.7	455.5
	10-Aug-05 FD	571	597	FD	FD	FD	FD	FD
	15-Aug-05	633	660	-17	1.2	16,600	455.3	455.0
	31-Aug-05	649	693	-42	1.9	16,900	455.7	455.4
	31-Aug-05 FD	658	604	FD	FD	FD	FD	FD
	07-Sep-05	673	868	-60	1.5	19,500	455.5	M
	20-Sep-05	675	891	-28	2.0	14,000	455.9	M
	05-Oct-05	732	732	-13	1.9	15,900	454.6	453.8
	05-Oct-05 FD	708	703	FD	FD	FD	FD	FD
	25-Oct-05	752	628	-29	1.4	20,100	454.2	453.7
	25-Oct-05 FD	752	650	FD	FD	FD	FD	FD
	03-Nov-05	748 J	897	-49	1.1	19,900	454.8	454.3
	16-Nov-05	759	762	-2	4.6	16,100	---	M
	16-Nov-05 FD	763	725	FD	FD	FD	FD	FD
	30-Nov-05	791	797	-55	2.6	19,900	454.3	453.9
	30-Nov-05 FD	802	721	FD	FD	FD	FD	FD
	14-Dec-05	808	751	-26	2.3	12,400	453.3	452.6
	14-Dec-05 FD	811	791	FD	FD	FD	FD	FD
	28-Dec-05	804	824	---	---	---	---	452.3
MW-36-090	25-Jul-05	344	343	129	1.1	18,400	455.8	455.7
	17-Aug-05	346	336	152	1.3	16,600	455.3	455.7
	08-Sep-05	267	301	49	1.6	17,500	455.3	M
	03-Oct-05	302	286	174	3.4	12,700	460.7	M
	02-Nov-05	256	247	69	1.4	19,300	453.8	453.9
	15-Dec-05	240	219	34	2.5	18,000	452.5	452.4
MW-36-100	19-Jul-05	398	635	17	1.0	17,700	456.4	456.6
	15-Aug-05	391	410	-15	1.6	16,800	455.2	454.6
	15-Aug-05 FD	390	392	FD	FD	FD	FD	FD
	08-Sep-05	396 J	380	21	1.7	18,300	455.4	M
	08-Sep-05 FD	397	454	FD	FD	FD	FD	FD
	05-Oct-05	383	370	4	2.8	16,500	454.7	454.2
	03-Nov-05	315	368	-19	1.3	21,100	454.6	454.0
	13-Dec-05	306	333	5	2.2	16,500	453.0	452.9
MW-39-080	25-Jul-05	2060	1990	169	1.2	17,400	455.6	456.1
	17-Aug-05	2370	2460	164	1.3	15,600	454.9	455.8

Refer to table footnotes for data qualifier explanation.

TABLE B-1

Groundwater Sampling Results for Floodplain Monitoring Wells, July 2005 through December 2005

Interim Measures Performance Monitoring

PG&amp;E Topock Compressor Station

Sample Date		Hexavalent Chromium µg/L	Dissolved Total Chromium 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-39-080	06-Sep-05	2990	4880	149	2.0	17,700	454.8	M
	04-Oct-05	3000	2770	76	2.7	15,900	454.0	452.9
	02-Nov-05	3200	3020	148	1.4	17,600	453.7	454.2
	15-Dec-05	2740	2570	78	2.2	15,400	452.5	452.3
MW-39-100	19-Jul-05	5500	5490	80	1.3	18,400	456.2	457.0
	19-Jul-05 FD	5450	5450	FD	FD	FD	FD	FD
	17-Aug-05	4230	4050	170	1.5	18,600	455.3	455.9
	06-Sep-05	4540	6480	134	2.2	21,000	455.1	M
	04-Oct-05	4010	3950	73	2.3	15,900	453.7	452.9
	02-Nov-05	3580	3480	168	1.7	23,000	453.9	454.4
	02-Nov-05 FD	3650	3410	FD	FD	FD	FD	FD
	13-Dec-05	3640	3440	139	3.0	20,100	452.9	452.8
MW-43-075	26-Jul-05	ND (1.0)	ND (1.0)	-160	1.1	15,600	456.0	455.5
	16-Aug-05	ND (1.0)	5.40	-168	1.3	13,800	455.6	455.5
	08-Sep-05	ND (1.0)	ND (1.0)	-176	1.7	16,400	455.0	M
	04-Oct-05	ND (1.0)	ND (1.0) J	-126	2.3	12,900	454.8	452.9
	03-Nov-05	ND (2.0)	ND (1.0)	-168	1.4	16,700	454.3	453.9
	16-Dec-05	ND (1.0)	ND (1.0)	-179	2.4	15,900	453.1	452.7
MW-43-090	26-Jul-05	ND (2.0)	ND (1.6)	-129	2.1	23,800	456.9	456.0
	16-Aug-05	ND (2.0)	ND (5.2)	-136	1.3	19,400	455.7	455.3
	08-Sep-05	ND (1.0)	ND (1.0)	-152	1.7	23,100	455.3	M
	04-Oct-05	ND (1.0)	ND (1.0)	-78	4.8	18,400	454.9	452.9
	03-Nov-05	ND (2.0)	ND (1.0)	-127	1.1	27,700	454.3	453.8
	16-Dec-05	ND (1.0)	ND (1.0)	-127	2.5	22,300	453.2	452.8

Refer to table footnotes for data qualifier explanation.

TABLE B-1

Groundwater Sampling Results for Floodplain Monitoring Wells, July 2005 through December 2005  
Interim Measures Performance Monitoring  
PG&E Topock Compressor Station

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**NOTES:**

ND = not detected at listed reporting limit (RL)

FD = field duplicate

J = concentration or RL estimated by laboratory or data validation

T = data from the downhole transducers to fill groundwater elevation data gaps at some locations

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

M = I-3 Transducer damaged

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 pressure transducer record at I-3.

The December 2005 hexavalent chromium and total chromium concentrations for MW-39-50 appear anomalous. Review of results is in progress; refer to text for discussion.

TABLE B-2

Groundwater Sampling Results for Other Monitoring Wells in PMP Area, July 2005 through December 2005  
Interim Measures Performance Monitoring  
PG&E Topock Compressor Station

Well ID	Sample Date	Hexavalent Chromium µg/L	Dissolved Total Chromium µg/L	Selected Field Parameters		
				ORP mV	Dissolved Oxygen mg/L	Specific Conductance µS/cm
Shallow Wells						
MW-12	16-Sep-05	698	618	---	6.58	3290
	04-Oct-05	660	644	55.0	6.13	3040
	04-Oct-05 FD	670	613	FD	FD	FD
	13-Dec-05	626	602	97.0	6.99	3260
MW-19	04-Oct-05	1060	996	30.0	6.87	2150
	12-Dec-05	1240	1270	153	7.68	2140
MW-20-070	11-Oct-05	6060	5930	151	6.90	3330
	15-Dec-05	4640	4310	149	7.97	3210
MW-21	05-Oct-05	ND (1.0) J	ND (1.0) J	-149	2.42	11400
	14-Dec-05	ND (1.0)	ND (1.0)	-90	5.35	12100
MW-22	04-Oct-05	ND (2.0)	ND (1.0) J	-86	2.51	35500
	16-Dec-05	ND (0.2)	ND (1.0)	-90	2.31	31200
MW-24A	03-Oct-05	3120	2930	157	3.26	3040
	03-Oct-05 FD	3040	2630	FD	FD	FD
MW-26	04-Oct-05	3040	2990	45.0	8.79	3380
	12-Dec-05	3220	3160	161	9.93	3440
MW-31-060	06-Oct-05	1430	1470	54.0	6.36	2990
	13-Dec-05	1300	1250	119	6.75	2870
MW-35-060	07-Oct-05	32.5	28.0	-1.0	1.90	7560
	07-Oct-05 FD	35.1 J	32.0	FD	FD	FD
	14-Dec-05	32.5	32.5	95.0	3.97	5800
	14-Dec-05 FD	33.3	28.6	FD	FD	FD
TW-02S	07-Oct-05	3360	3340	204	8.57	3320
Middle-Depth Wells						
MW-20-100	11-Oct-05	10200	9430	157	1.54	4140
	15-Dec-05	9460	9010	140	3.03	3980
Deep Wells						
MW-20-130	07-Oct-05	9590	10700	53.0	2.46	12300
	16-Dec-05	10500	9340	123	3.32	11700
MW-24B	03-Oct-05	5240	4930	153	3.19	14000
MW-31-135	06-Oct-05	271	251	-4.0	2.02	10100
	14-Dec-05	221	198	124	4.13	7980
MW-35-135	07-Oct-05	21.2	17.8	-55	1.29	10800
	14-Dec-05	25.7	22.8	38.0	3.17	8480
PE-01	03-Oct-05	ND (1.0)	ND (1.0)	-202	0.77	11600
	13-Dec-05	ND (1.0)	---	-148	2.19	12400

**TABLE B-2**

Groundwater Sampling Results for Other Monitoring Wells in PMP Area, July 2005 through December 2005  
Interim Measures Performance Monitoring  
PG&E Topock Compressor Station

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**NOTES:**

Analytical results are validated.

ND = not detected at listed reporting limit (RL)

FD = field duplicate

J = concentration or RL estimated by laboratory or data validation

(---) = data not collected, available, or field instrumentation malfunctioned

µg/L = micrograms per liter

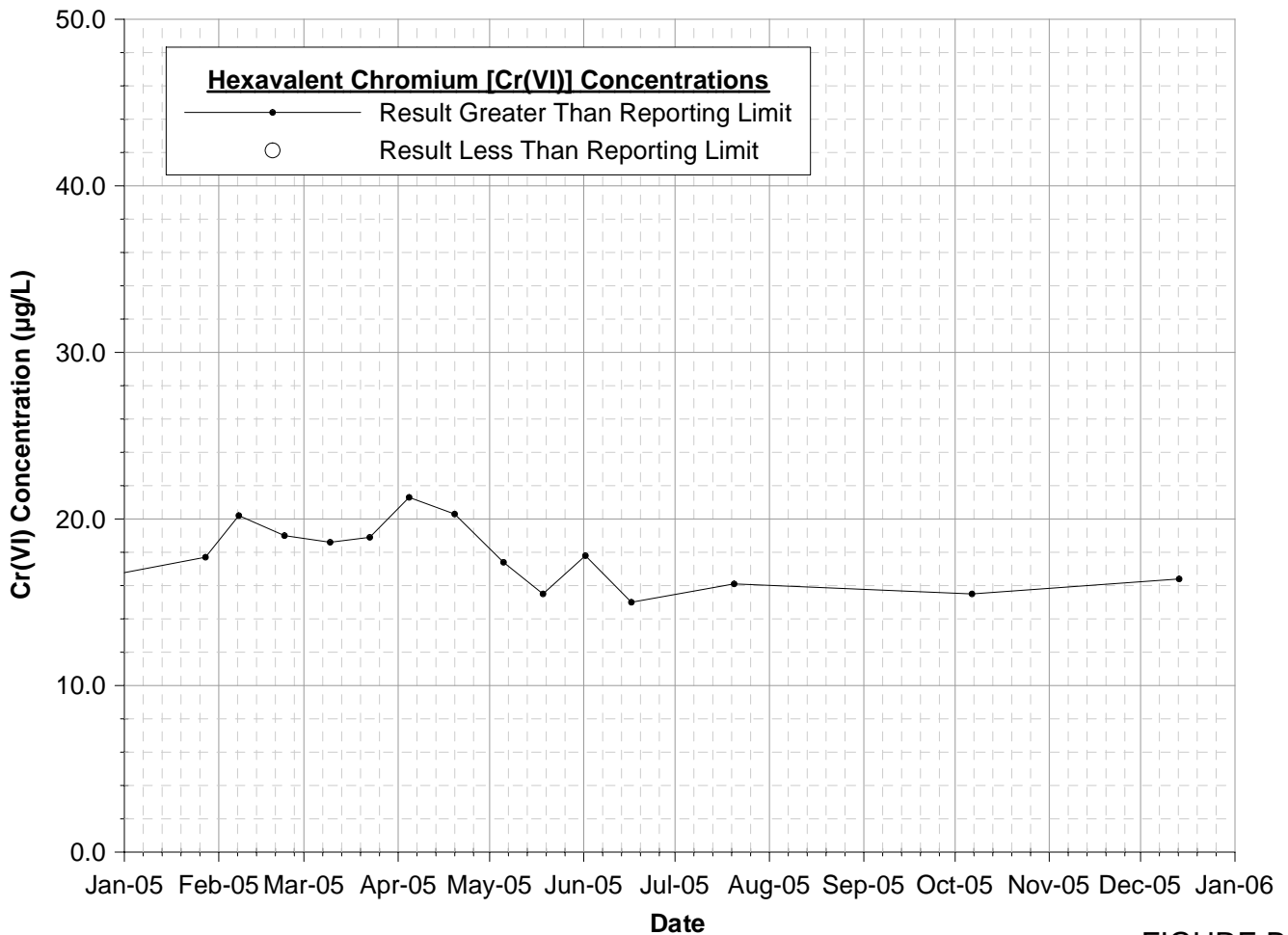
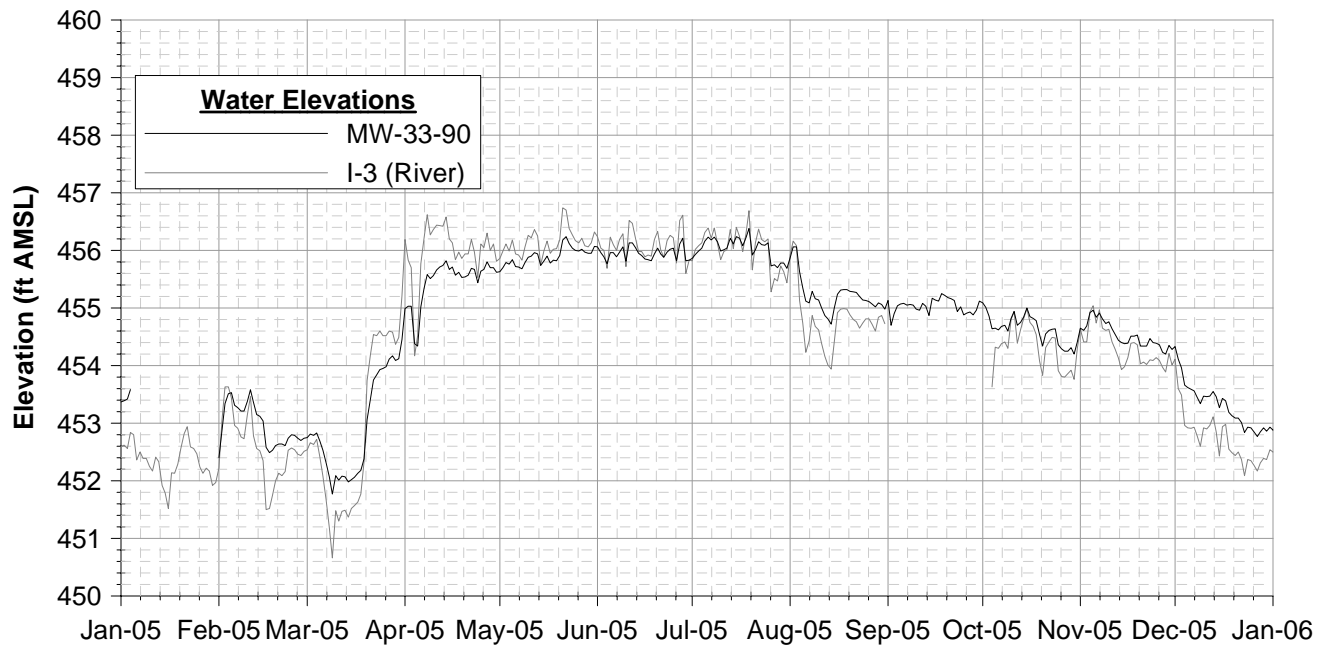
mg/L = milligrams per liter

mV = oxidation-reduction potential (ORP)

µS/cm = microSiemens per centimeter

PMP = Interim Measure Performance Monitoring Program

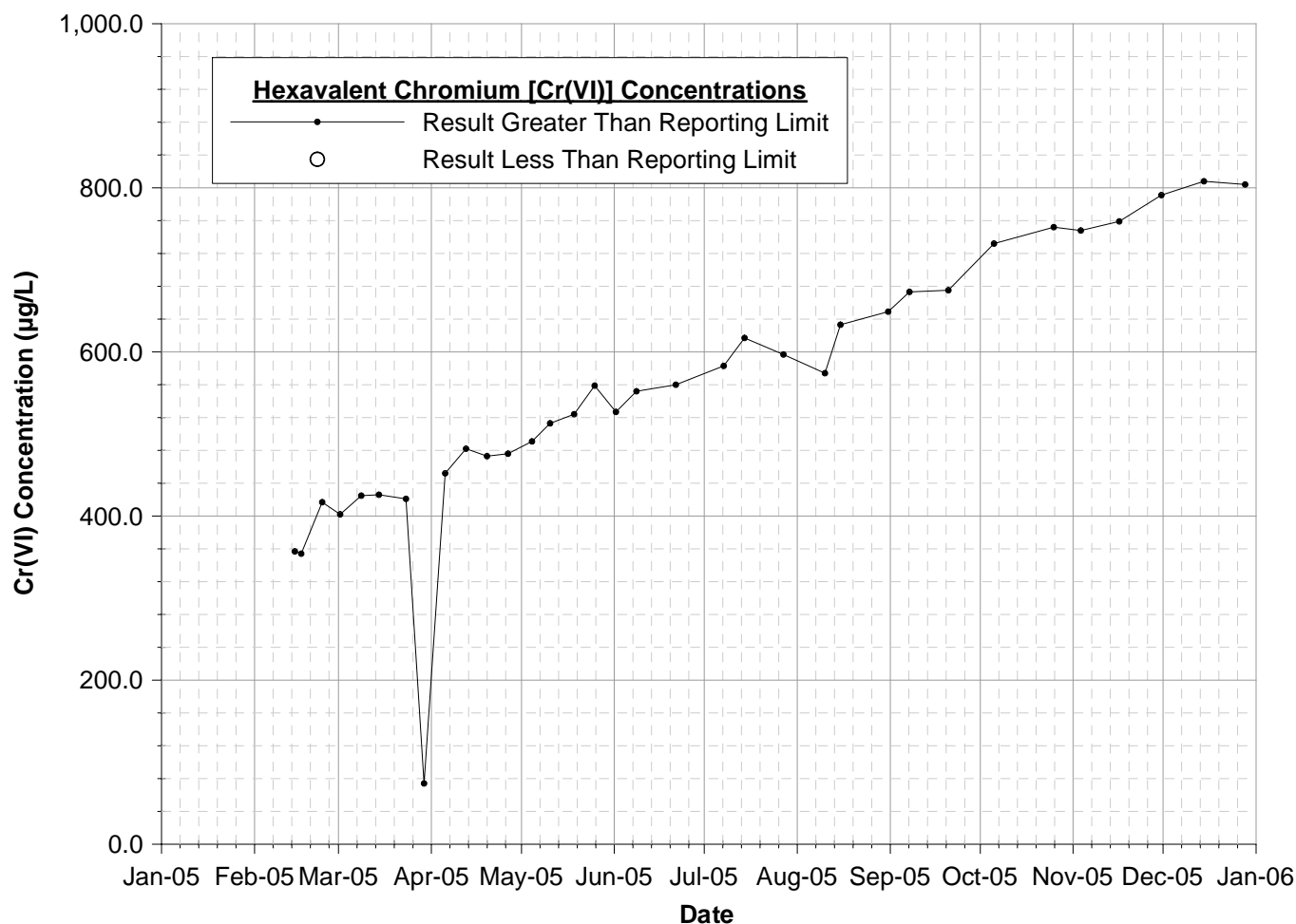
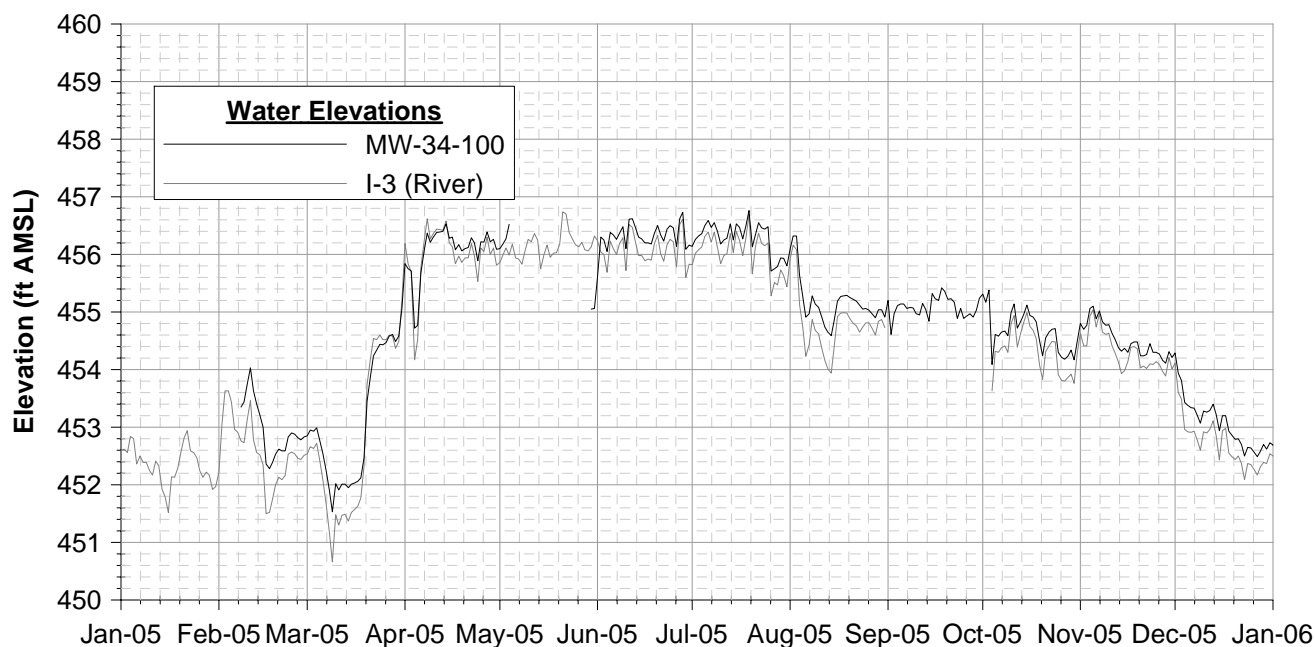
Samples analyzed for total chromium by EPA Method 6010B or 6020 were filtered and preserved in the field after sample collection, as per DTSC's June 30, 2005 letter.



**FIGURE B-1**  
**MW-33-90 CR(VI) CONCENTRATION &**  
**HYDROGRAPH - THROUGH 12/13/05**  
 INTERIM MEASURES PERFORMANCE MONITORING  
 PG&E TOPOCK COMPRESSOR STATION  
 NEEDLES, CALIFORNIA

**Notes**

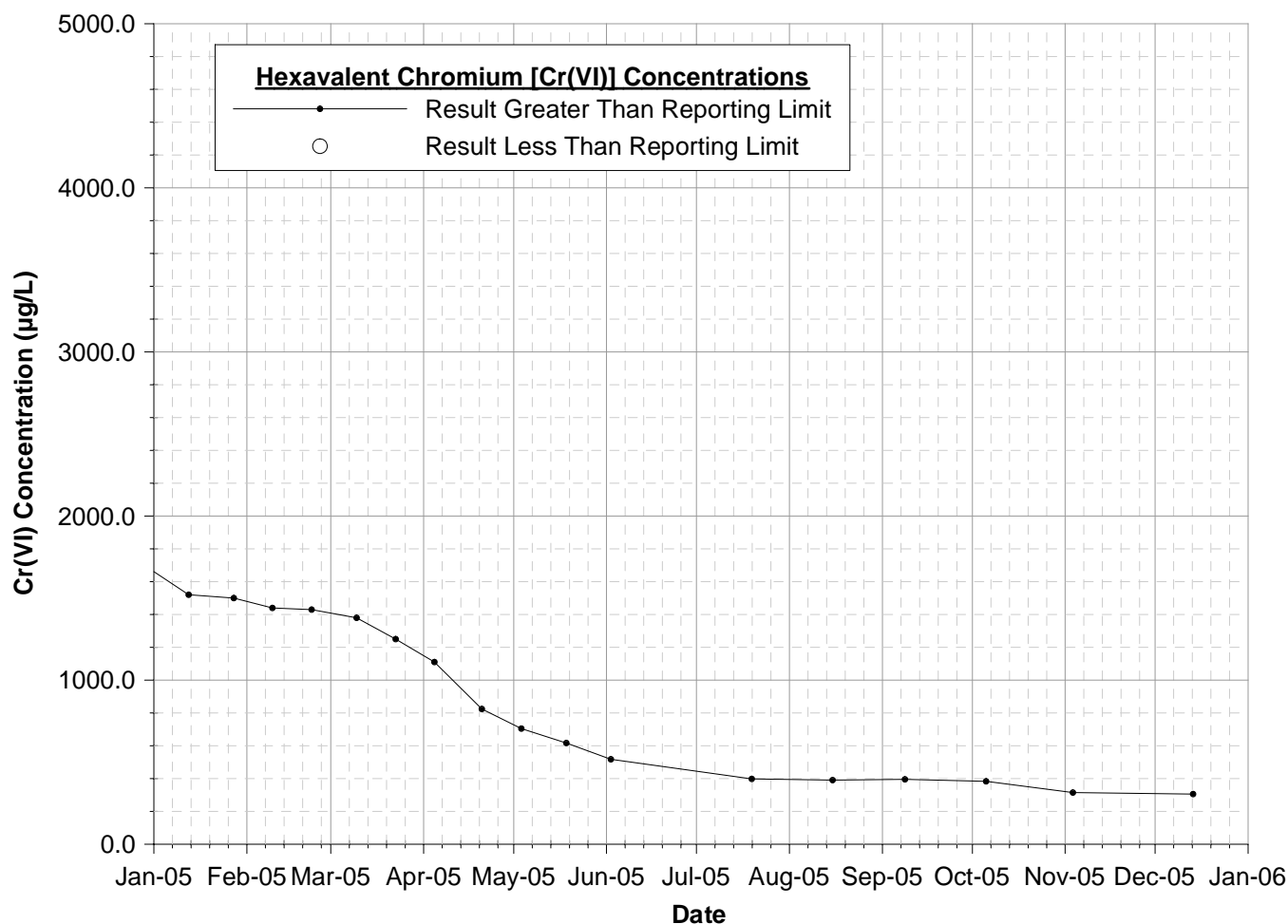
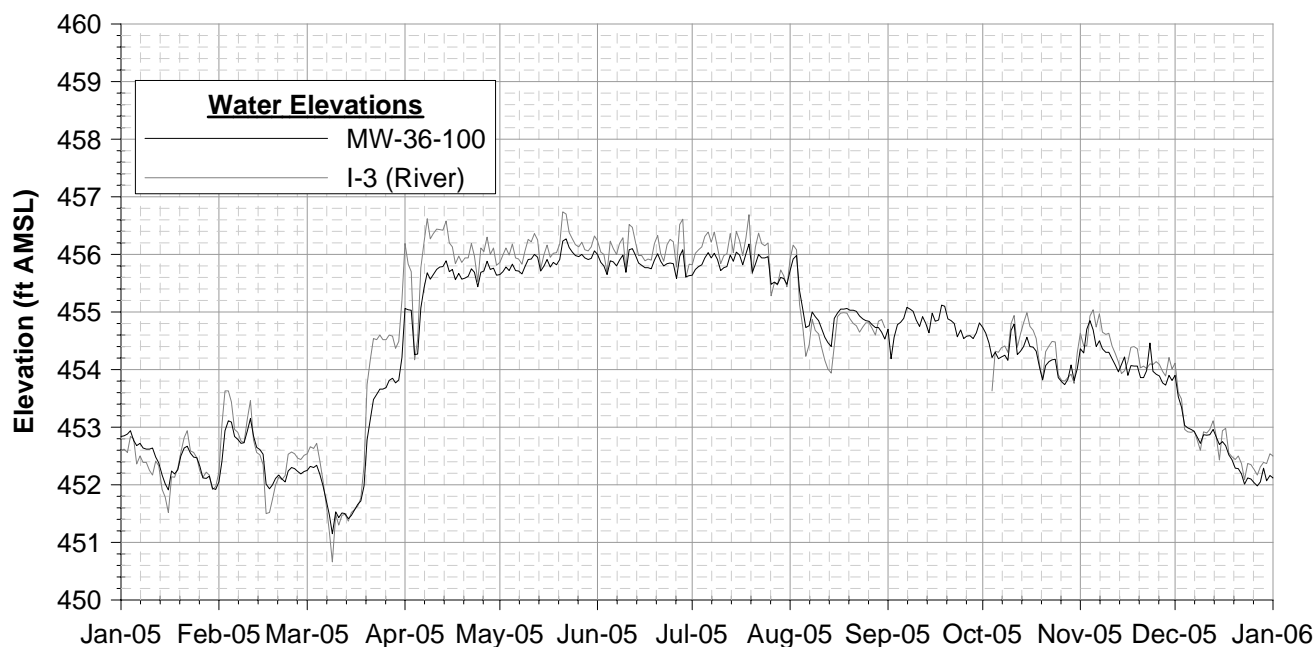
1. Chromium results in micrograms per liter (µg/L), equivalent to parts per billion (ppb).
2. Data subject to review.
3. Results plotted are from primary samples; see Table B-1 for complete results.
4. I-3 data unavailable 9/1/05 through 10/4/05 due to river damage.



**FIGURE B-2**  
**MW-34-100 CR(VI) CONCENTRATION &**  
**HYDROGRAPH - THROUGH 12/28/05**  
 INTERIM MEASURES PERFORMANCE MONITORING  
 PG&E TOPOCK COMPRESSOR STATION  
 NEEDLES, CALIFORNIA

**Notes**

1. Chromium results in micrograms per liter (µg/L), equivalent to parts per billion (ppb).
2. No groundwater elevation data available during May 2005 due to transducer malfunction.
3. Data subject to review.
4. Results plotted are from primary samples; see Table B-1 for complete results.
5. I-3 data unavailable 9/1/05 through 10/4/05 due to river damage.



**FIGURE B-3**  
**MW-36-100 CR(VI) CONCENTRATION & HYDROGRAPH - THROUGH 12/13/05**  
INTERIM MEASURES PERFORMANCE MONITORING  
PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

**Notes**  
1. Chromium results in micrograms per liter (µg/L), equivalent to parts per billion (ppb).  
2. Data subject to review.  
3. Results plotted are from primary samples; see Table B-1 for complete results.  
4. I-3 data unavailable 9/1/05 through 10/4/05 due to river damage.



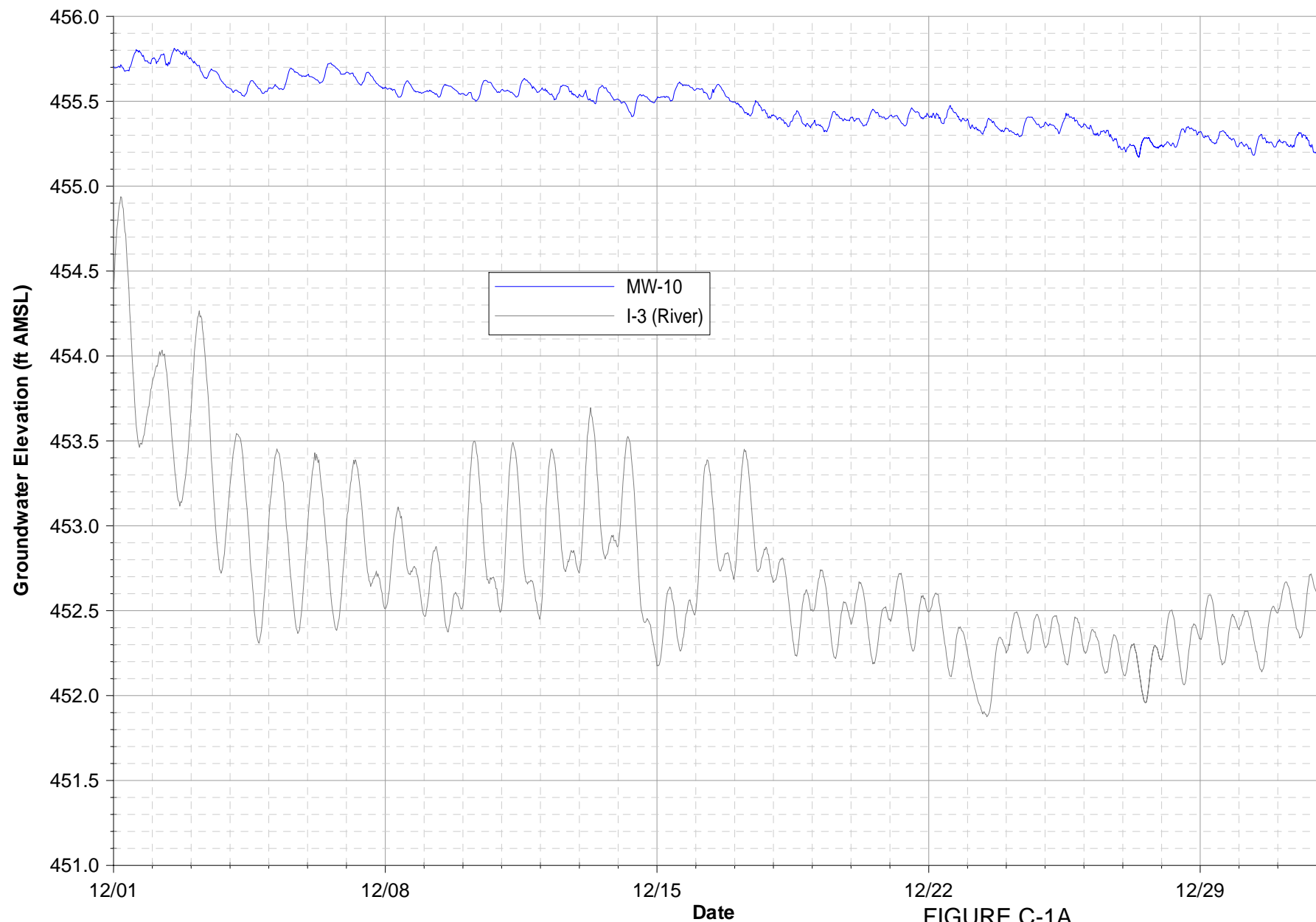
**Appendix C**  
**Hydraulic Monitoring Data for Reporting Period**

**TABLE C-1**

Monthly Average, Minimum, and Maximum Groundwater Elevations, December 2005  
 Interim Measures Performance Monitoring  
 PG&E Topock Compressor Station

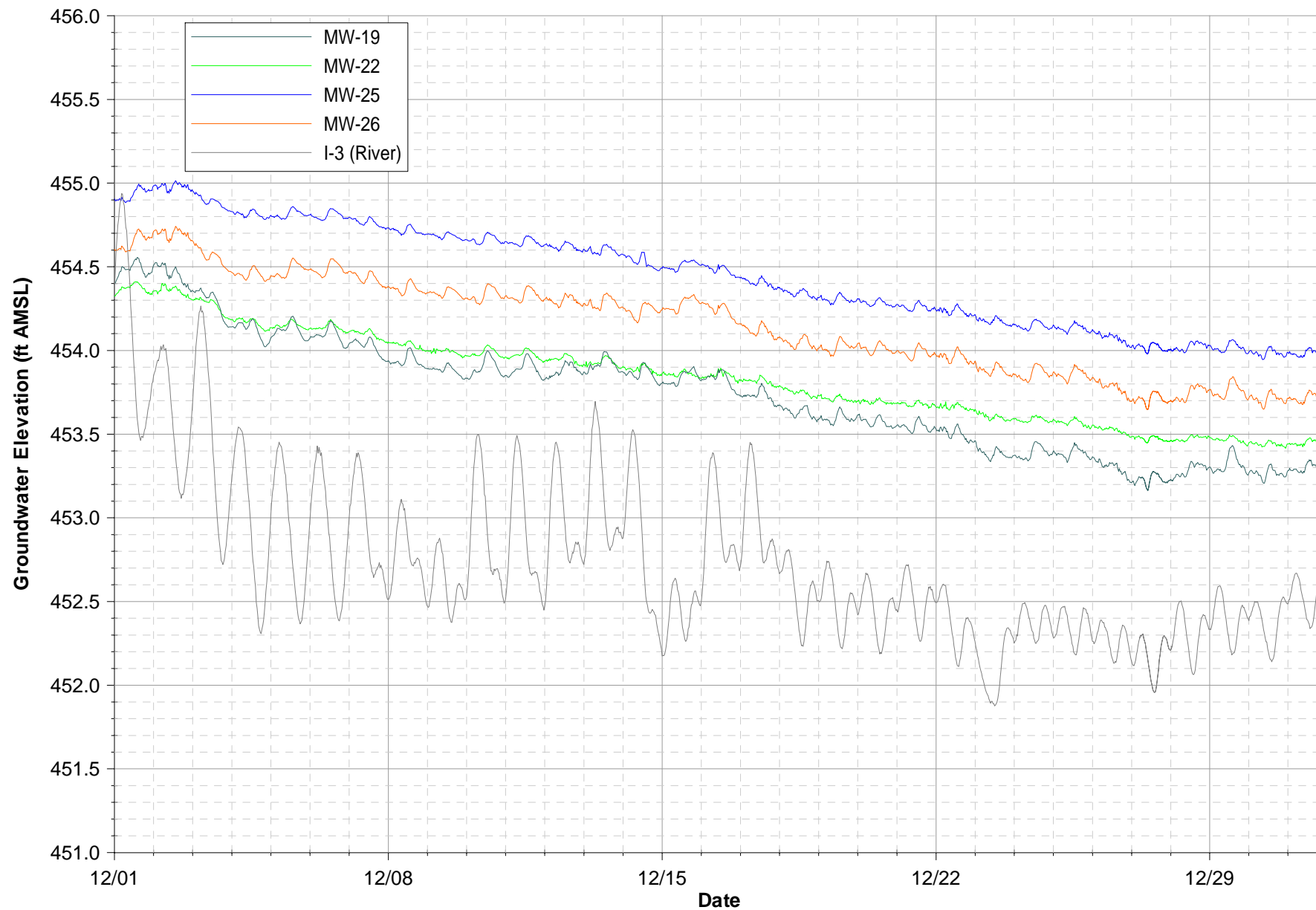
Well	Average (ft AMSL)	Minimum (ft AMSL)	Maximum (ft AMSL)	Aquifer Depth
I-3	452.73	452.37	453.10	River Station
RRB	INC	INC	INC	River Station
MW-10	455.48	455.42	455.53	Upper
MW-19	453.74	453.67	453.81	Upper
MW-20-070	452.50	452.41	452.67	Upper
MW-20-100	452.08	451.95	452.51	Upper
MW-20-130	451.49	451.32	452.13	Upper
MW-22	453.83	453.80	453.87	Upper
MW-25	454.45	454.41	454.49	Upper
MW-26	454.15	454.09	454.21	Upper
MW-27-020	INC	INC	INC	Upper
MW-27-060	452.93	452.73	453.11	Upper
MW-27-085	INC	INC	INC	Upper
MW-28-025	452.93	452.76	453.09	Upper
MW-28-090	452.89	452.64	453.13	Upper
MW-29	453.86	453.83	453.88	Upper
MW-30-030	453.65	453.62	453.68	Upper
MW-30-050	452.77	452.58	452.96	Upper
MW-31-060	453.24	453.17	453.32	Upper
MW-31-135	452.48	452.35	452.80	Upper
MW-32-020	453.20	453.15	453.24	Upper
MW-32-035	453.04	452.94	453.14	Upper
MW-33-040	453.34	453.22	453.44	Middle
MW-33-090	453.31	453.18	453.44	Middle
MW-33-150	453.54	453.40	453.69	Middle
MW-33-210	453.89	453.77	454.04	Middle
MW-34-055	452.92	452.68	453.16	Middle
MW-34-080	453.06	452.83	453.29	Middle
MW-34-100	453.07	452.85	453.29	Middle
MW-35-060	453.46	453.36	453.55	Middle
MW-35-135	453.59	453.51	453.65	Middle
MW-36-020	452.85	452.67	453.01	Middle
MW-36-040	INC	INC	INC	Middle
MW-36-050	452.80	452.60	452.99	Middle
MW-36-070	452.79	452.58	452.99	Lower
MW-36-090	452.61	452.42	452.86	Lower
MW-36-100	452.63	452.44	452.88	Lower
MW-39-040	452.69	452.51	452.89	Lower
MW-39-050	452.76	452.58	452.98	Lower
MW-39-060	452.49	452.32	452.74	Lower
MW-39-070	452.32	452.16	452.65	Lower
MW-39-080	452.39	452.23	452.73	Lower
MW-39-100	452.56	452.40	452.90	Lower
MW-42-030	452.84	452.72	452.97	Lower
MW-42-055	452.96	452.82	453.09	Lower
MW-42-065	452.97	452.83	453.10	Lower
MW-43-025	452.80	452.39	452.99	Lower
MW-43-075	452.96	452.76	453.15	Lower
MW-43-090	453.06	452.86	453.26	Lower
PE-01	452.87	452.68	453.09	Lower

**Notes:** INC = Incomplete for reporting period



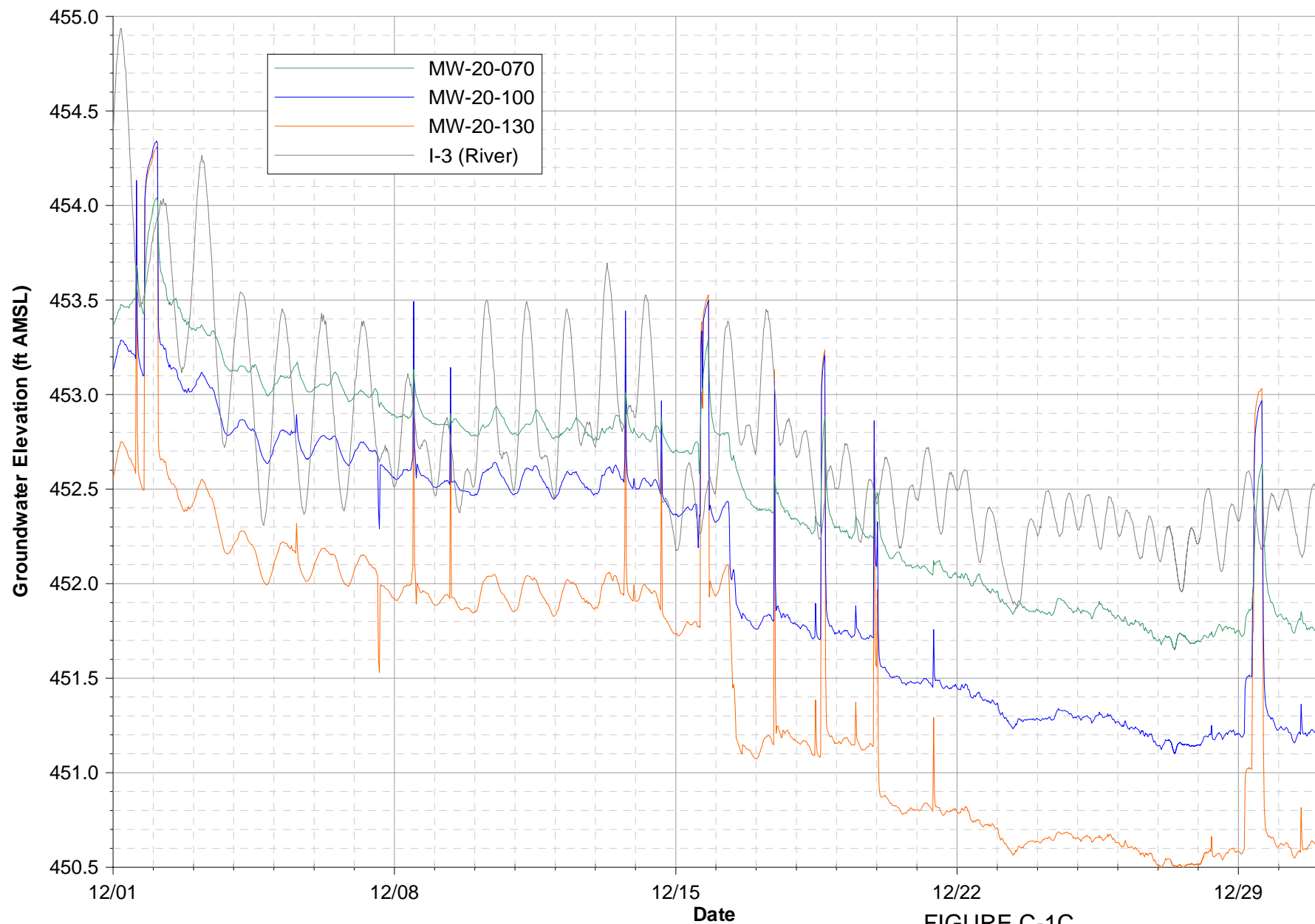
Note: Data subject to review.

**FIGURE C-1A**  
**MW-10 HYDROGRAPH**  
INTERIM MEASURES PERFORMANCE MONITORING  
PG & E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA



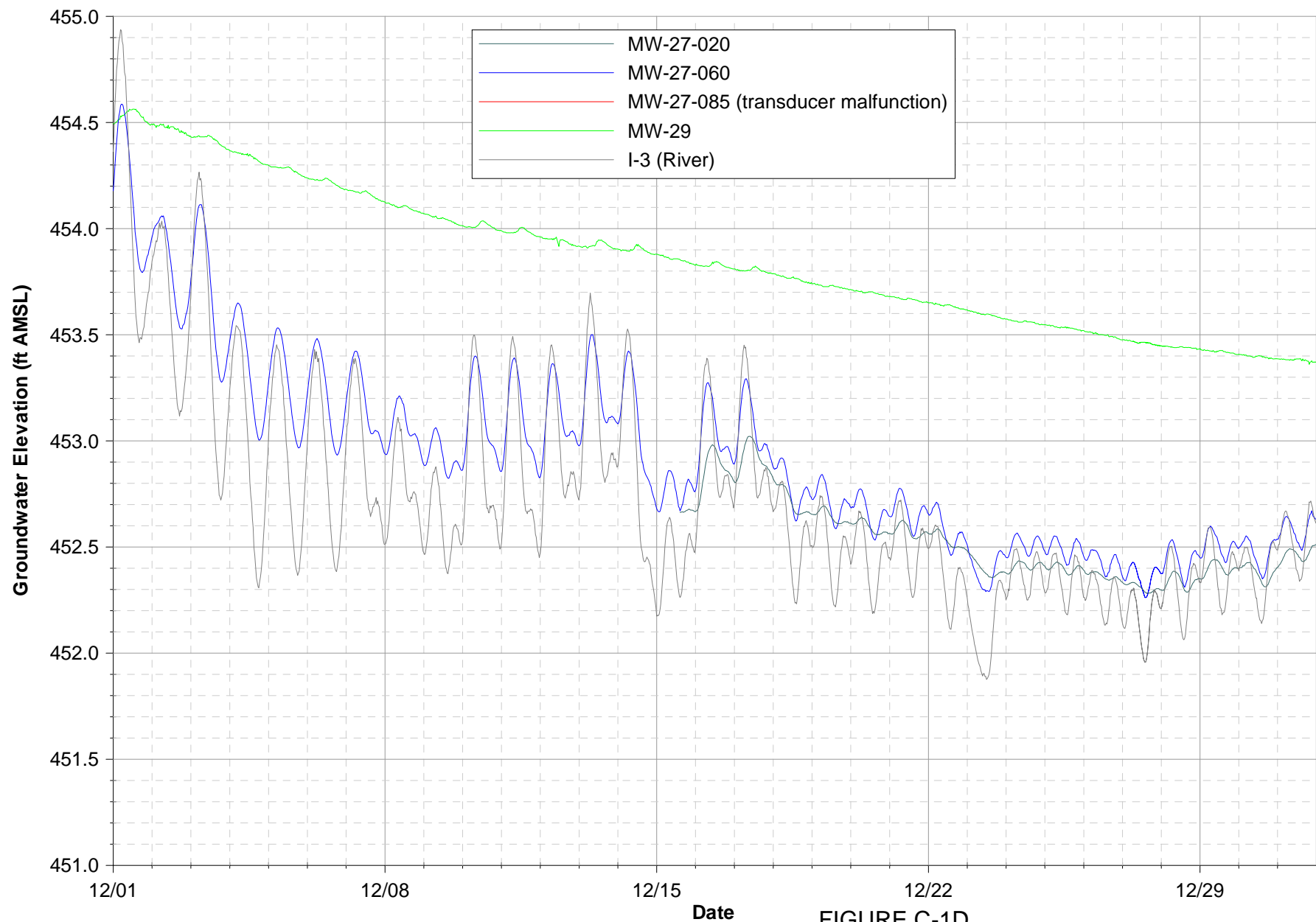
Note: Data subject to review.

**FIGURE C-1B**  
MW-19, MW-22, MW-25, AND MW-26 HYDROGRAPHS  
INTERIM MEASURES PERFORMANCE MONITORING  
PG & E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA



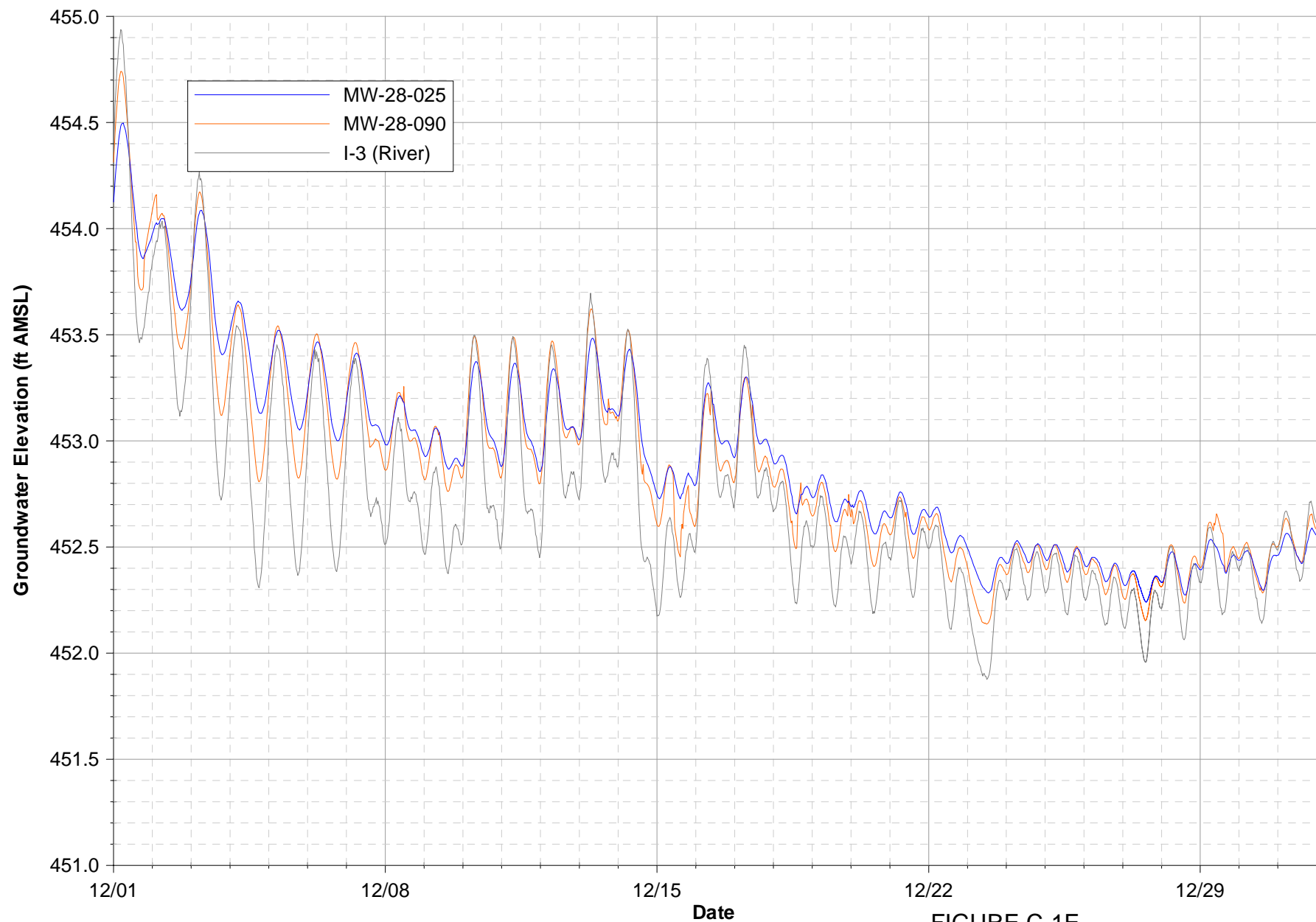
Note: Data subject to review.

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



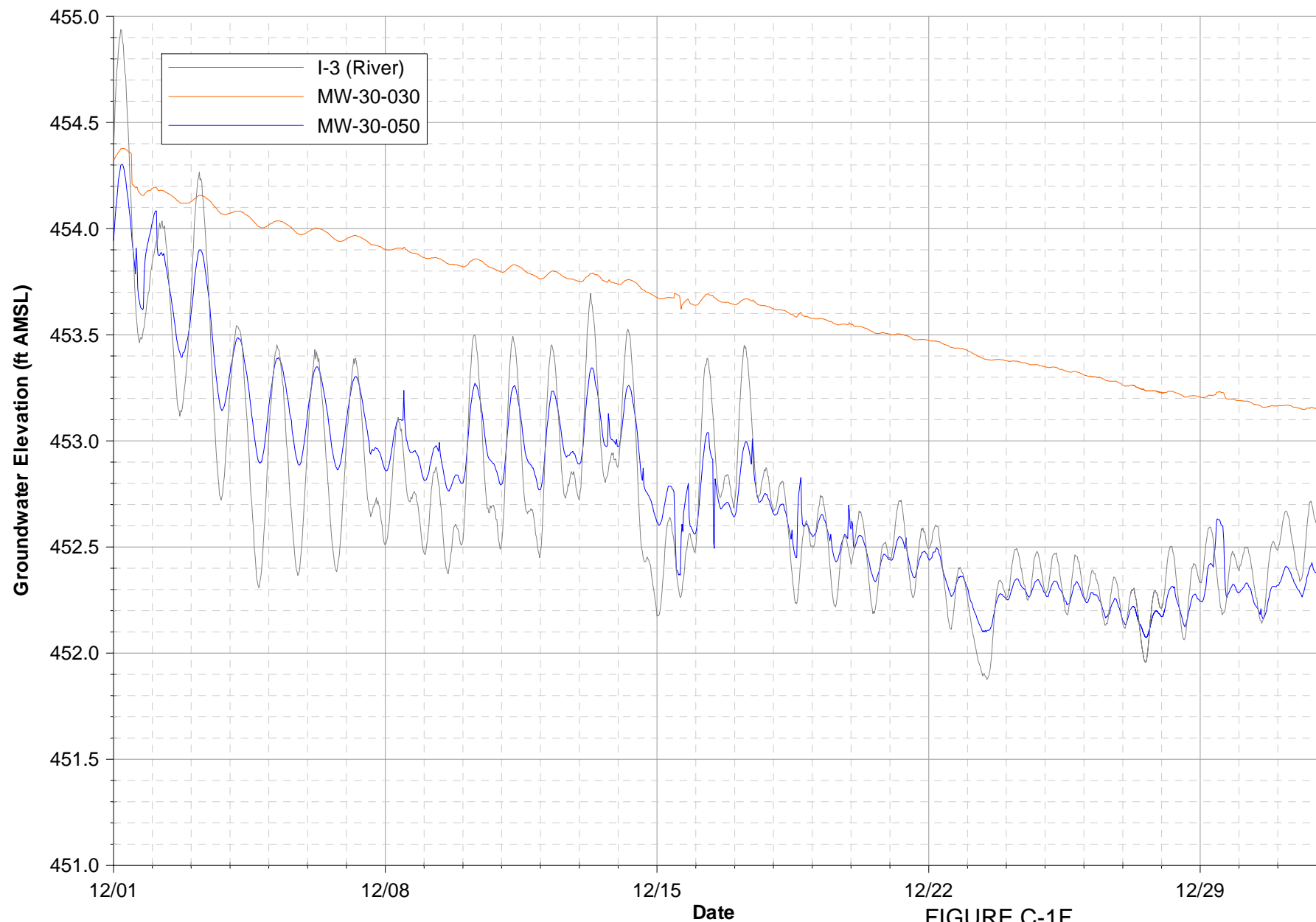
Note: Data subject to review.  
 MW-27-20 data unavailable 12/1/05 through 12/15/05.  
 MW-27-85 data unavailable for the month of December.

**FIGURE C-1D**  
**MW-27 CLUSTER AND MW-29 HYDROGRAPHS**  
 INTERIM MEASURES PERFORMANCE MONITORING  
 PG & E TOPOCK COMPRESSOR STATION  
 NEEDLES, CALIFORNIA



Note: Data subject to review.

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



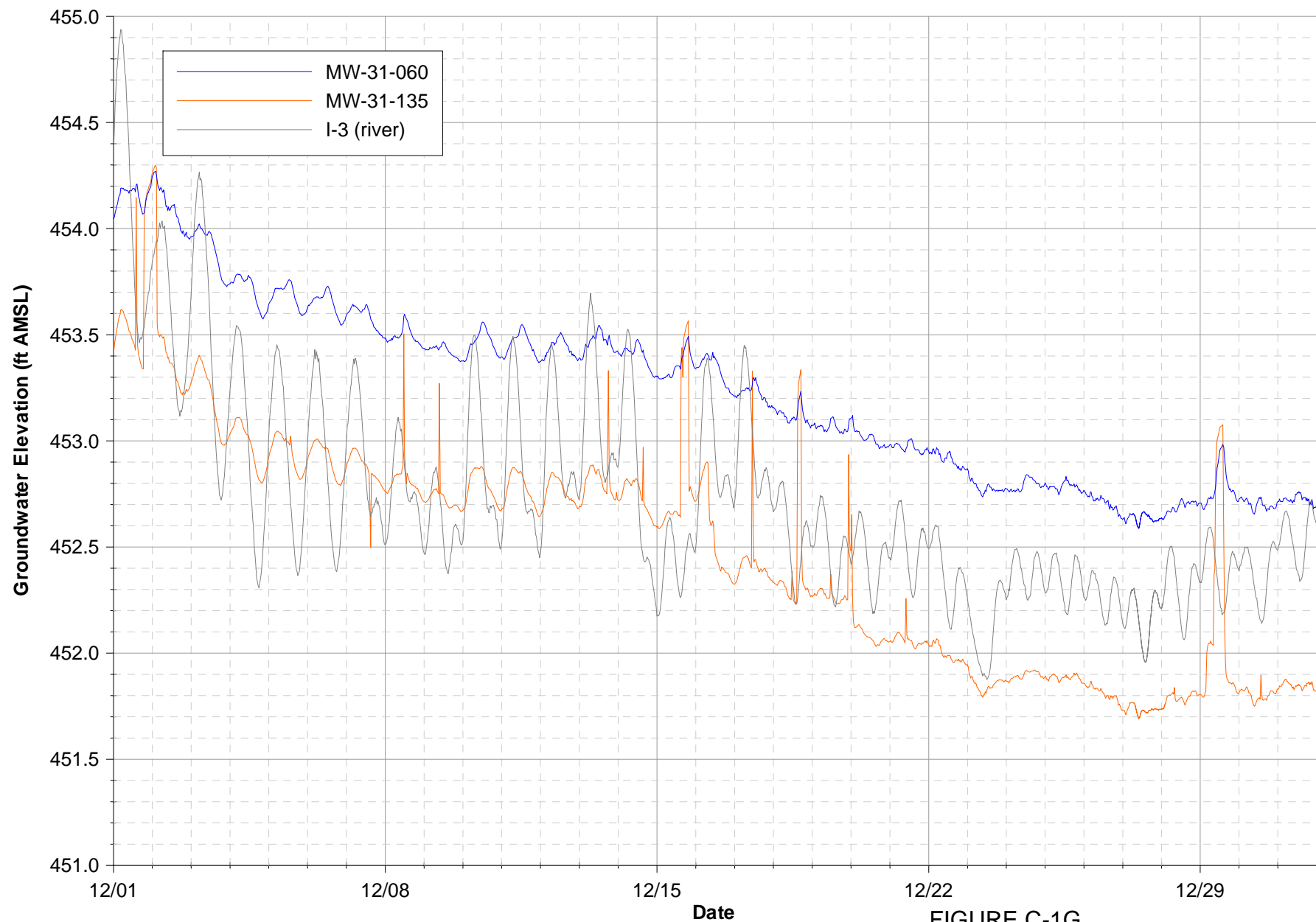
Note: Data subject to review.

FIGURE C-1F

MW-30 WELL HYDROGRAPHS

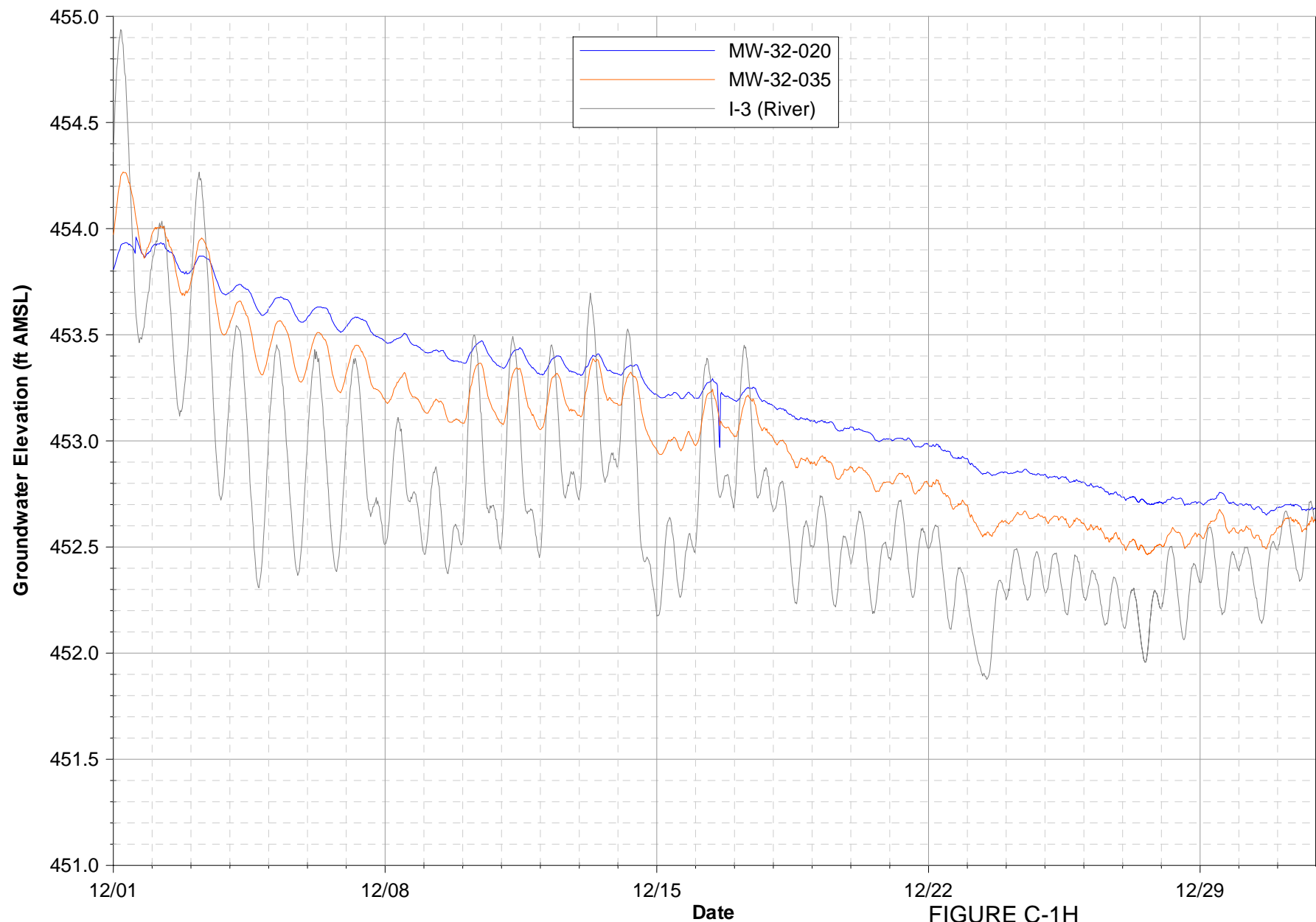
INTERIM MEASURES PERFORMANCE MONITORING  
PG & E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA





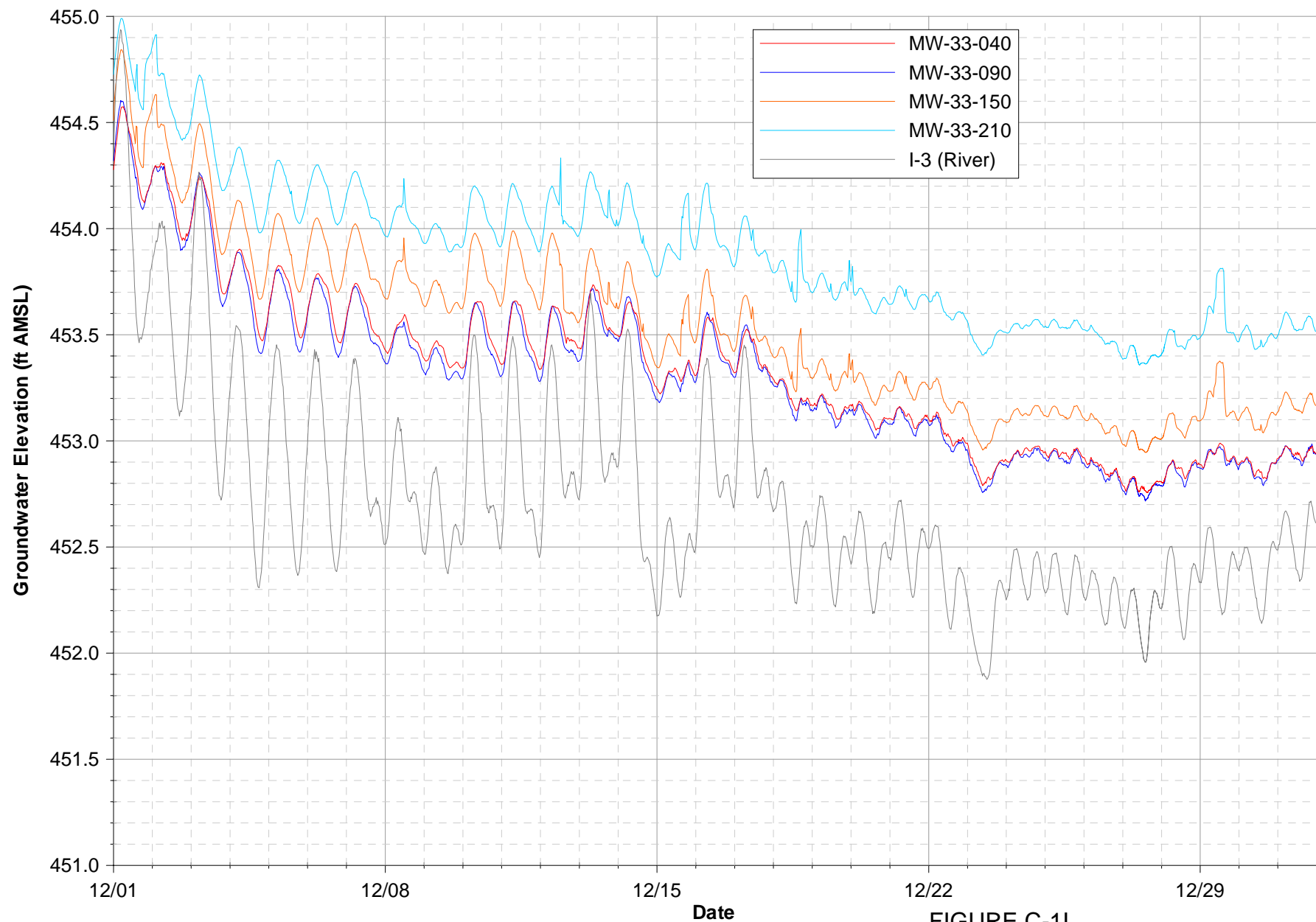
Note: Data subject to review.

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



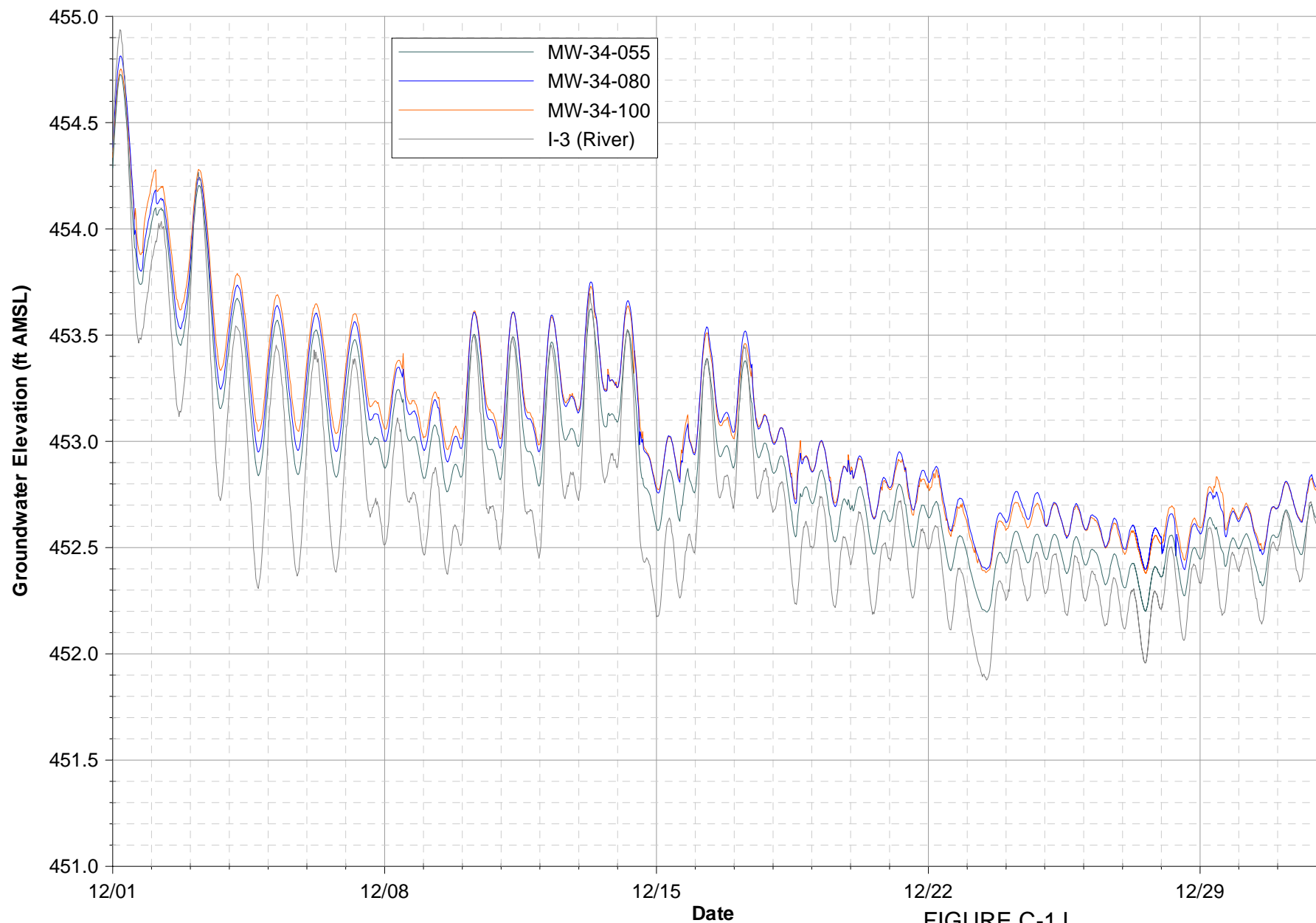
Note: Data subject to review.

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



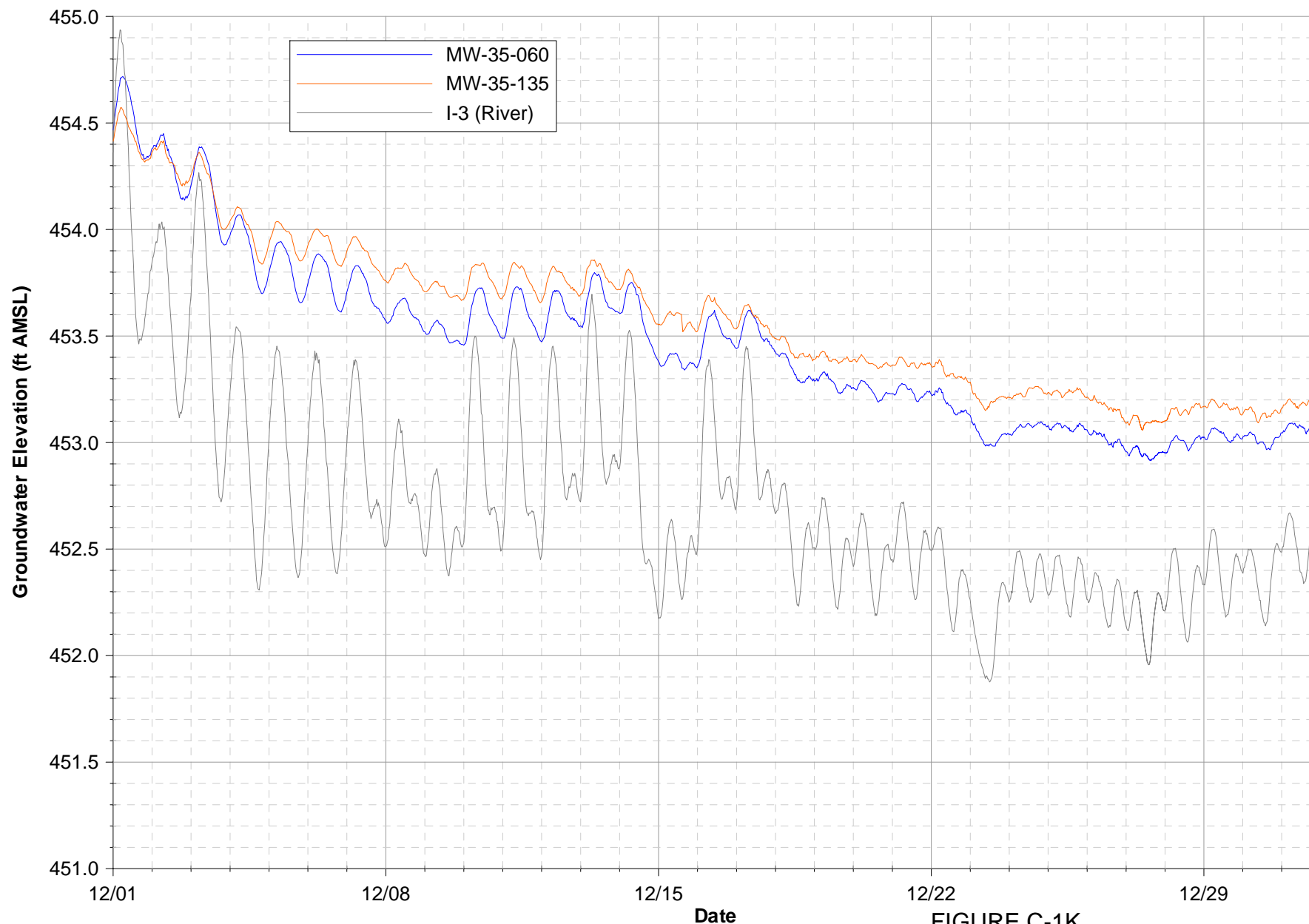
Note: Data subject to review.

**FIGURE C-11**  
**MW-33 CLUSTER HYDROGRAPHS**  
INTERIM MEASURES PERFORMANCE MONITORING  
PG & E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA



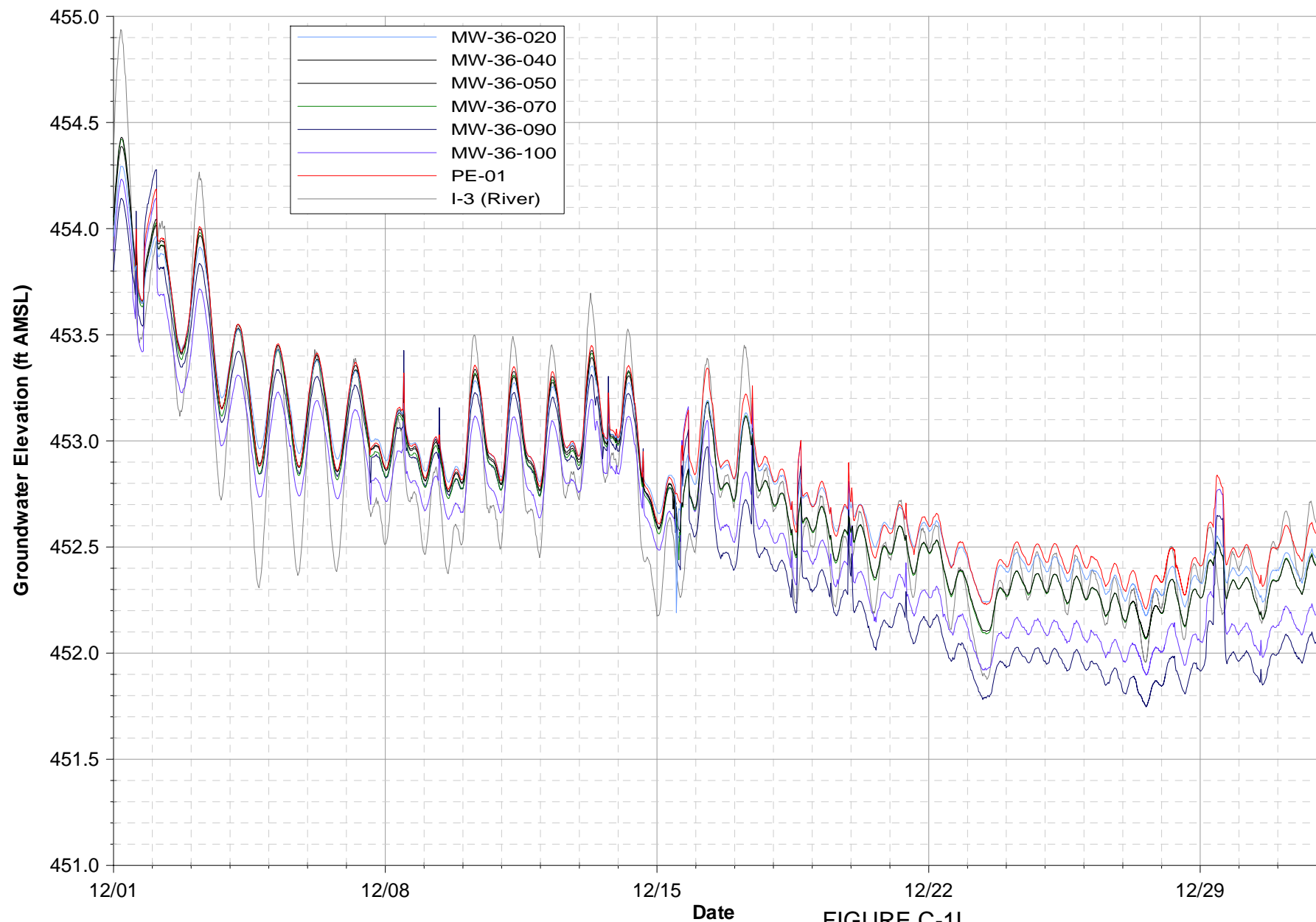
Note: Data subject to review.

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



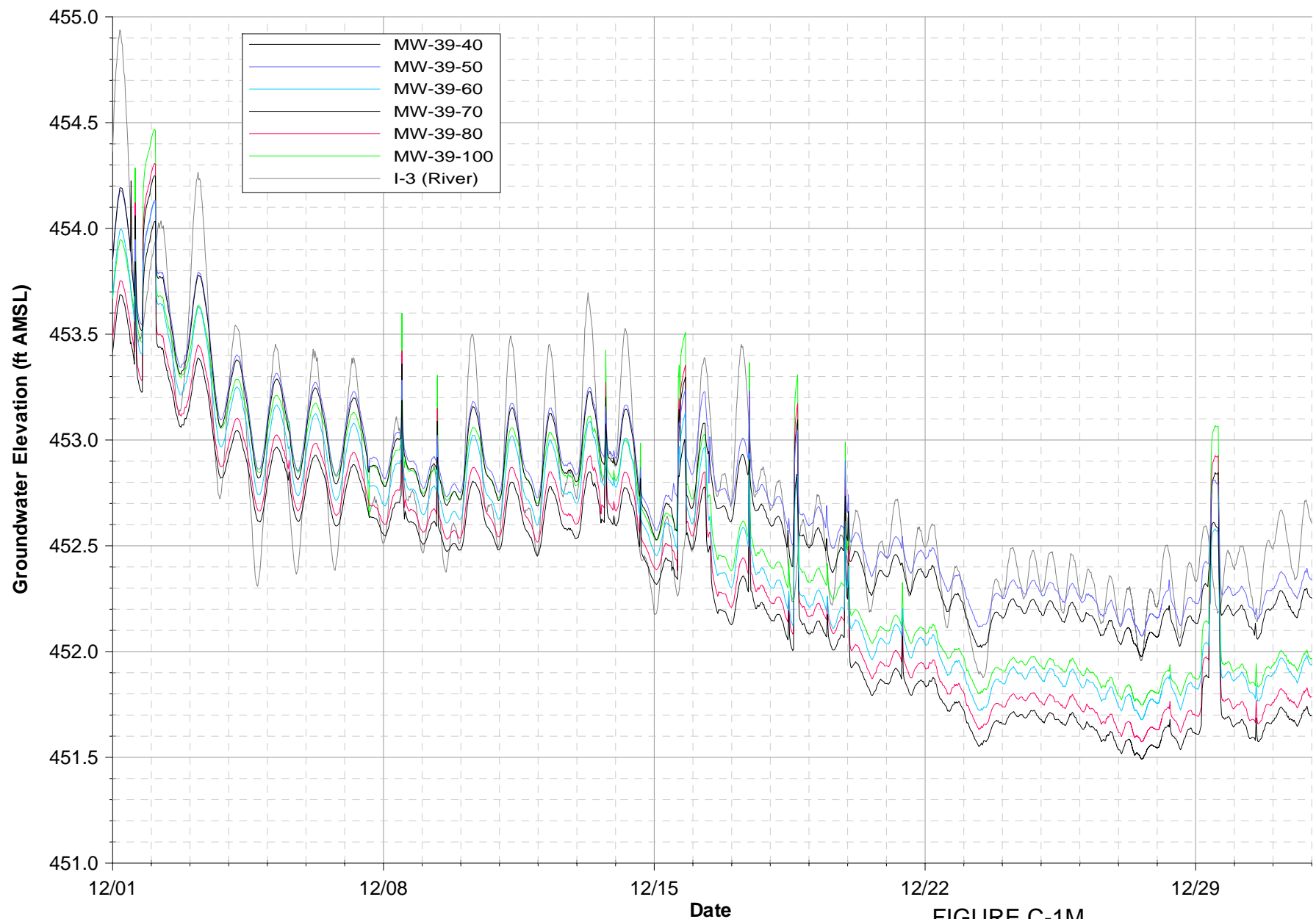
Note: Data subject to review.

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



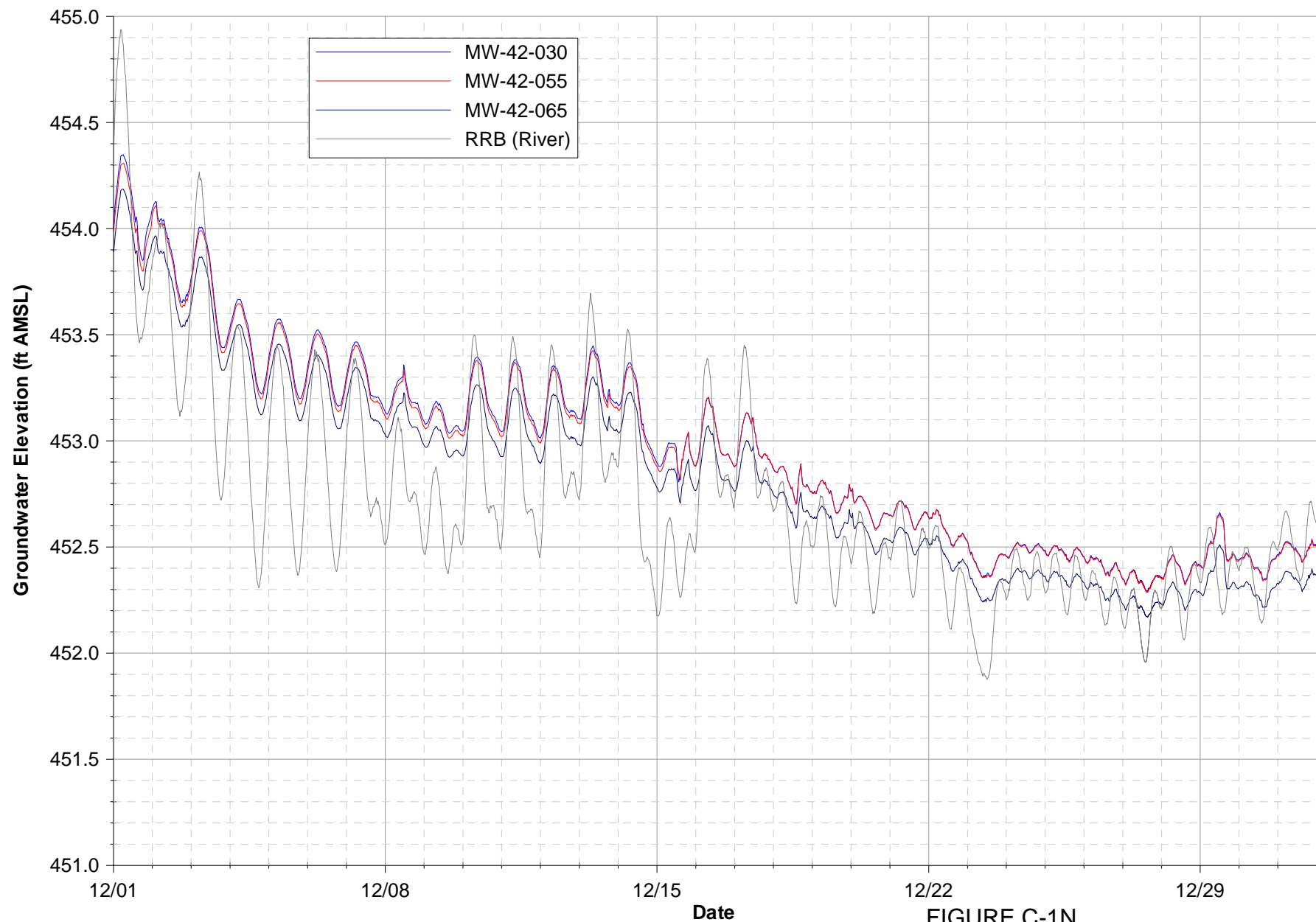
Note: Data subject to review.  
MW-36-40 data unavailable 12/16/2005 through 12/31/2005.

**FIGURE C-1L**  
**MW-36 CLUSTER AND PE-01 HYDROGRAPHS**  
 INTERIM MEASURES PERFORMANCE MONITORING  
 PG & E TOPOCK COMPRESSOR STATION  
 NEEDLES, CALIFORNIA



Note: Data subject to review.

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

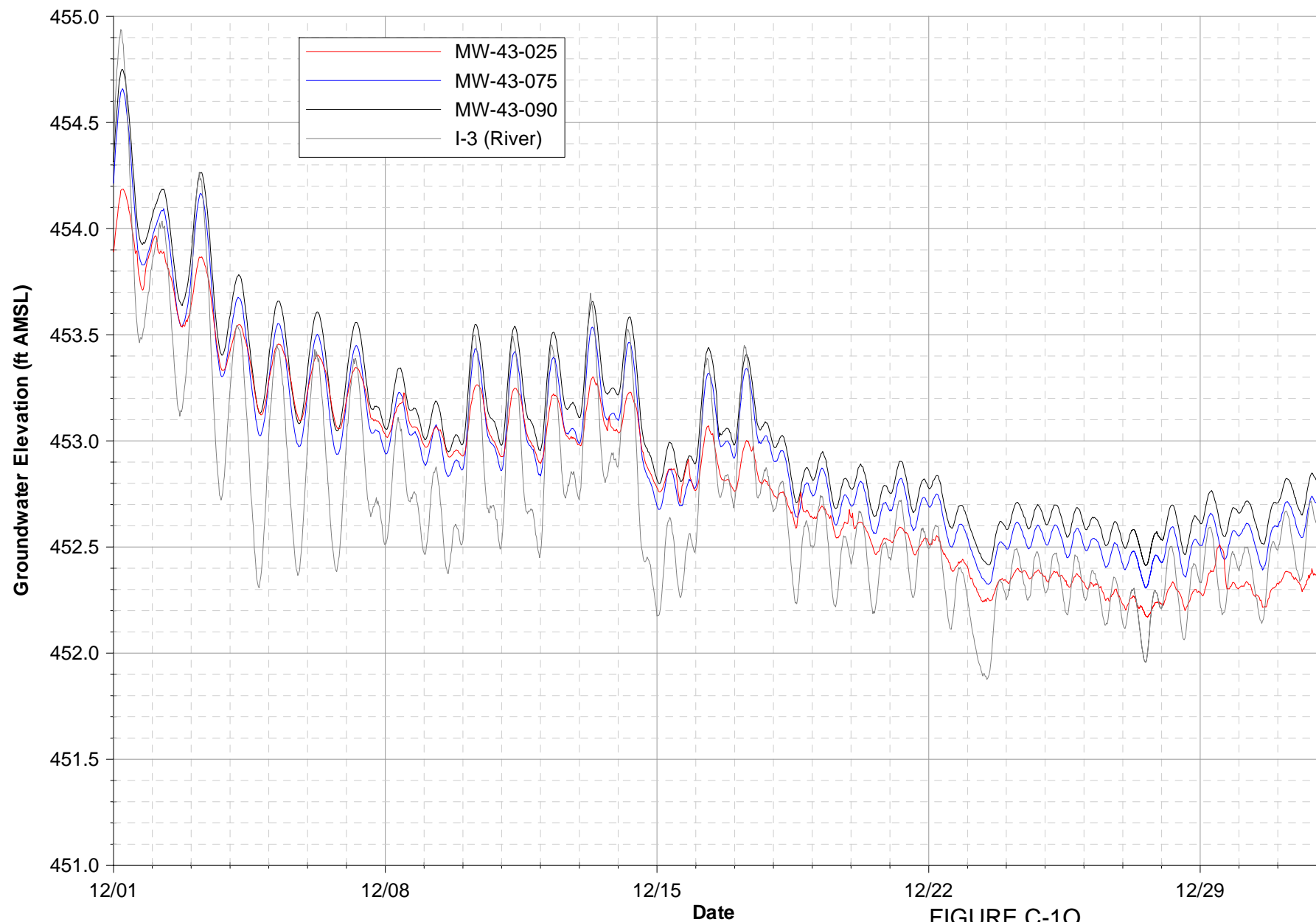


Note: Data subject to review.

FIGURE C-1N

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





Note: Data subject to review.

**FIGURE C-10**  
**MW-43 CLUSTER HYDROGRAPHS**  
INTERIM MEASURES PERFORMANCE MONITORING  
PG & E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA