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February 15, 2007

Mr. Aaron Yue  
Project Manager  
California Department of Toxic Substances Control  
5796 Corporate Avenue  
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Subject: January 2007 Performance Monitoring Report  
Interim Measures Performance Monitoring Program  
PG&E Topock Compressor Station, Needles, California

Dear Mr. Yue:

Enclosed is the *Performance Monitoring Report for January 2007* for the Interim Measure Performance Monitoring Program at the PG&E Topock Compressor Station. This monitoring report documents the performance monitoring results for January 1 through 31, 2007, 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,

*Paul Beilmer* for Yvonne Meeks

Enclosure  
Cc: Chris Guerre/DTSC

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# **Performance Monitoring Report for January 2007**

## **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**

February 15, 2007

**CH2MHILL**  
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Oakland, California 94612

**Performance Monitoring Report  
for January 2007**

**Interim Measures Performance Monitoring Program**

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

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**February 15, 2007**

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



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



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# Acronyms and Abbreviations

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µg/L	micrograms per liter (essentially the same as parts per billion [ppb])
cfs	cubic feet per second
Cr(T)	total chromium
Cr(VI)	hexavalent chromium
DTSC	California Department of Toxic Substances Control
gpm	gallons per minute
IM	Interim Measure
PG&E	Pacific Gas and Electric Company
PMP	Performance Monitoring Program
TDS	total dissolved solids
USBR	United States Bureau of Reclamation

# 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. Collectively, the groundwater extraction, treatment, and injection systems are 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.

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” (DTSC 2005). 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* (CH2M HILL 2005) 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 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 January 1 through January 31, 2007. The results and status of IM performance monitoring during February 2007 will be reported in the next monthly performance monitoring report.

Figure 2-1 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 2007 are defined as:

- **Floodplain Wells** (monitoring wells on the Colorado River floodplain): MW-22, MW-27 cluster (three), MW-28 cluster (two), MW-29, MW-30 cluster (two), MW-32 cluster (two), MW-33 cluster (four), MW-34 cluster (three), MW-36 cluster (six), MW-39 cluster (six), MW-42 cluster (three), MW-43 cluster (three), MW-44 cluster (three), MW-45, MW-46 cluster (two), MW-49 cluster (three).
- **Intermediate Wells** (monitoring wells located immediately north, west, and southwest of the floodplain): MW-12, MW-19, MW-20 cluster (three), MW-21, MW-26, MW-31 cluster (two), MW-35 cluster (two), MW-47 cluster (two), MW-50 cluster (two), and MW-51.

- **Interior Wells** (monitoring wells located upgradient of IM pumping): MW-10 and MW-25.

Three 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 well PE-1 was completed in January. Testing and commissioning of well PE-1 began on January 25, 2006, with full-time operation of the well beginning on January 26, 2006. Currently, both TW-3D and PE-1 are in full-time operation.

The wells screened in the unconsolidated alluvial fan and fluvial deposits that 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 distinct 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 January 1 through January 31, 2007 are shown in Table 2-1. During the reporting period, extraction wells TW-3D and PE-1 operated at a combined target pump rate of 135 gallons per minute (gpm), excluding periods of planned and unplanned downtime.

The January 2007 monthly average pumping rate was 132.1 gpm. A total of 5,898,619 gallons of groundwater was extracted and treated by the IM No. 3 treatment plant during January 2007. Approximately 1,500 gallons of purge water from the groundwater monitoring program were also treated at the IM No. 3 facility during January 2007. The operational run time for the IM extraction system was over 99 percent during this reporting period. An operations log for the extraction system during January 2007, including downtime, is included in Appendix A.

The concentrate (i.e., brine) 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. One container of solids (approximately 12 cubic yards) from the IM No. 3 facility was transported to the Chemical Waste Management at the Kettleman Hills facility during January 2007.

Daily inspections included general facility inspections, process control monitoring, and site security monitoring. Daily logs with documentation of inspections are maintained onsite.

Table 2-2 summarizes the analytical results of groundwater samples collected from the extraction well system during the January reporting period and prior months.



## 3.0 Chromium Sampling Results

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During January 2007, the groundwater monitoring wells in the floodplain area were sampled for Cr(VI), total chromium [Cr(T)], and field water quality parameters under newly updated monthly and biweekly schedules, in accordance with the approved groundwater monitoring plan and DTSC directives. Refer to PG&E's *Topock Groundwater and Surface Water Monitoring Report, Third Quarter 2006* (CH2M HILL 2006) and DTSC (2006) for the prior and current sampling plan and frequencies for groundwater wells in the performance monitoring 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 January 2007 and the previous months. Table B-2 (Appendix B) presents the groundwater sampling data for the other wells monitored in the Performance Monitoring Program area during January 2007 and the previous months.

Figure 3-1 presents the Cr(VI) results distribution for January 2007, in plan view, for the groundwater wells monitoring the upper, middle, and lower depth intervals of the Alluvial Aquifer in the floodplain area. Interpretations of Cr(VI) contours at each depth interval are also provided on this figure. The actual locations of contours beyond well data points are not certain but are inferred using available site investigation and monitoring data (bedrock structure, hydraulic gradients, observed distribution of geochemically-reducing conditions, and Cr(VI) concentration gradients). The aquifer depth intervals, well screens, and January 2007 Cr(VI) sampling results and interpreted contours are also shown on Figure 3-1 in a vertical cross-section extending east-west across the floodplain. The California drinking water standard for Cr(T) is 50 µg/L.

Figure 3-2 presents the January 2007 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 on Figures B-1 (well MW-33-90), B-2 (well MW-34-100), and B-3 (well MW-36-100) in Appendix B.

## 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 61 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 monthly average and the minimum and maximum daily average groundwater and river elevations have been calculated from the pressure transducer data for the January reporting period (January 1 through January 31, 2007) and are summarized in Appendix C, Table C-1.

Due to the variation in groundwater salinity at the site, the water level measurements need to be adjusted (density-corrected) to equivalent freshwater hydraulic heads prior to calculating groundwater elevations and gradients (Fetter 1994). The methods and procedures used for adjusting the performance monitoring water level data for salinity and temperature differences are described in the Performance Monitoring Plan. Groundwater elevation hydrographs (for January 2007) 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 January 2007 is also shown on the hydrographs.

The January 2007 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 strong landward hydraulic gradients within the IM No. 3 capture zone throughout the floodplain. To the west of the TW-3D and PE-1 pumping area, the hydraulic gradient in the upper depth interval is easterly and consistent with the regional gradient outside of the floodplain area. The average groundwater elevations measured in the IM monitoring wells during January 2007 are presented on the middle and lower depth interval gradient maps (Figures 4-2 and 4-3, respectively). Note that several monitoring wells are significantly deeper than other wells in the lower aquifer zone. 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 zone wells exhibit water levels that are not contoured in the plan view on Figure 4-3.

The landward gradients measured during January 2007 were slightly greater than those measured in December 2006, due to rising river levels over the reporting period. The January 2007 average monthly groundwater elevations are also presented and contoured in cross-section on Figure 4-4 (cross-section location shown on Figure 1-2). The groundwater elevation contours on this cross-section show the strong downward and landward hydraulic gradients produced by the combined pumping from IM extraction wells TW-3D and PE-1.

Table 4-1 summarizes the estimated and actual dam discharges and river elevations since April 2004. The actual Davis Dam average discharge for January 2007 of 8,796 cubic feet per second (cfs) was more than the United States Bureau of Reclamation (USBR) projected discharge of 8,600 cfs for the current reporting period. As a result, the actual Colorado River

elevation at I-3 (monthly average) was greater (0.4 ft) than the level predicted during the previous month by using the multiple regression method with USBR projections for the January reporting period.

Table 4-2 summarizes gradients 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 January 2007. Pumping from extraction well PE-1 began on January 26, 2006. Since that time, the central well pair has been affected by PE-1 pumping. Pumping at well PE-1 would tend to lower the water level in well MW-34-80 and decrease the apparent gradient in the central well pair. Nevertheless, average gradients in the three well pairs were landward at magnitudes that were two to four times the target value of 0.001 feet per foot (0.0021, 0.0033, and 0.0037, respectively). These gradients are slightly greater than the average gradients for these well pairs measured in December 2006 due to the gradually rising river levels and steady pumping rates over the reporting period.

Data from the central well pair well MW-34-80 were limited to 19 days of the reporting period due to incomplete installation of the transducer in the beginning of the month. This pressure transducer and the transducer in MW-34-100 were reinstalled on January 16, 2007.

## 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 monthly monitoring report for the February 2007 reporting period will be submitted by March 15, 2007, in conjunction with the combined fourth quarter and 2006 annual performance monitoring report.

Per DTSC direction, PG&E will continue to operate both TW-3D and PE-1 at a target combined pumping rate of 135 gpm during February 2007, except for periods when planned and unplanned downtime occurs. Treated groundwater will be discharged into the IM No. 3 injection wells in accordance with Waste Discharge Requirements Order No. R7-2006-0060. Brine generated as a byproduct of the treatment process will continue to be transported offsite.

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

Current USBR projections show that the average Davis Dam release for February 2007 (9,800 cfs) will increase compared to January 2007 (8,796 cfs) (Table 4-1). Based on February 12, 2007 USBR projections, it is anticipated that the Colorado River level at the I-3 gage location during February 2007 will be the same compared to the average river level in January 2007. The reason that I-3 elevation is not predicted to increase, although Davis Dam releases are predicted to increase, is a result of a projected decrease in Lake Havasu elevations downstream of the I-3 gage station in February 2007.

With the initiation of pumping from PE-1 (late January 2006) and expansion of the IM monitoring well network, new gradient control well pairs will be defined by DTSC to account for the more complex gradient caused by pumping at both TW-3D and PE-1. Modifications and updates to the IM performance monitoring program will be incorporated pending DTSC approval and direction.

## 6.0 References

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

\_\_\_\_\_. 2006. Letter to PG&E. "Modification of Groundwater and Shoreline Surface Water Sampling Frequencies at Pacific Gas & Electric Company, Topock Compressor Station, Needles, California" October 26.

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

\_\_\_\_\_. 2006. *Groundwater and Surface Water Monitoring Report, Third Quarter 2006, PG&E Topock Compressor Station*. December 22.

Fetter, C.W. 1994. *Applied Hydrogeology*. Third Edition. Prentice-Hall.



**TABLE 2-1**

Pumping Rate and Extracted Volume for IM System through January 2007

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

<b>Extraction Well</b>	<b>January 2007 Period<sup>a</sup></b>		<b>Project To Date<sup>b</sup></b>
	<b>Average Pumping Rate<sup>c</sup> (gpm)</b>	<b>Volume Pumped (gal)</b>	<b>Cumulative Volume Pumped (gal)</b>
TW-2S	0	0	994,438
TW-2D	0	0	53,015,001
TW-3D	99.2	4,428,337	56,555,262
PE-1	32.9	1,470,282	18,350,117
<b>Total</b>	132.1	5,898,619	128,914,818
Volume Pumped from the MW-20 Well Cluster			1,527,724
Total Volume Pumped <sup>b</sup> (gal)			130,442,542
Total Volume Pumped (ac-ft)			400.3

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 January 1, 2007 at 12:00 a.m. and January 31, 2007 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, August 2006 through January 2007  
Interim Measures Performance Monitoring  
PG&E Topock Compressor Station

Well ID	Sample Date	Dissolved Total Chromium mg/L	Hexavalent Chromium mg/L	Total Dissolved Solids mg/L
TW-3D	09-Aug-06	3.06	2.66	5860
TW-3D	07-Sep-06	2.44	2.38	5700
TW-3D	04-Oct-06	2.46	2.47	5350 J
TW-3D	01-Nov-06	3.18	2.49	4920
TW-3D	06-Dec-06	2.09	2.50	5420
TW-3D	10-Jan-07	2.58	2.44	5520
PE-1	09-Aug-06	0.0834	0.0959	5270
PE-1	07-Sep-06	0.0905	0.0854	5920
PE-1	04-Oct-06	0.0839	0.0901	5950 J
PE-1	01-Nov-06	0.0833	0.0925	5010
PE-1	06-Dec-06	0.0858	0.0972	5650
PE-1	10-Jan-07	0.103	0.0889	5320

**NOTES:**

mg/L = concentration in milligrams per liter

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

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

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



**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	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	----	----	453.6	----	----

**NOTES:**

1) Predicted Colorado River elevations (river levels) at I-3 are based upon BOR 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). This data is reported monthly by the US Department of Interior, at <http://www.usbr.gov/lc/region/g4000/24mo.pdf>

2) Listed projections for April 2004 through July 2004 are from April 2004, and the remainder were from the beginning of each respective month.

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 BOR projections and actual dam releases/Havasu reservoir levels, rather than the multiple regression error.

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

5) I-3 elevation for the month of October 2006 limited to average of data from 10/4/2006 through 10/31/2006.

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

**TABLE 4-2**

Average Hydraulic Gradients Measured at Well Pairs, January 2007

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

<b>Well Pair<sup>1</sup></b>	<b>Mean Landward Hydraulic Gradient (feet/foot)<sup>2</sup></b>	<b>Measurement Dates 2007</b>
Northern Gradient Pair MW-31-135 / MW-33-150	0.0021	January 1 through 31
Central Gradient Pair <sup>3</sup> MW-20-130 / MW-34-80	0.0032 0.0033	January 1 through 3 January 16 through 31
Southern Gradient Pair MW-20-130 / MW-42-65	0.0037	January 1 through 31

**Notes:**

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

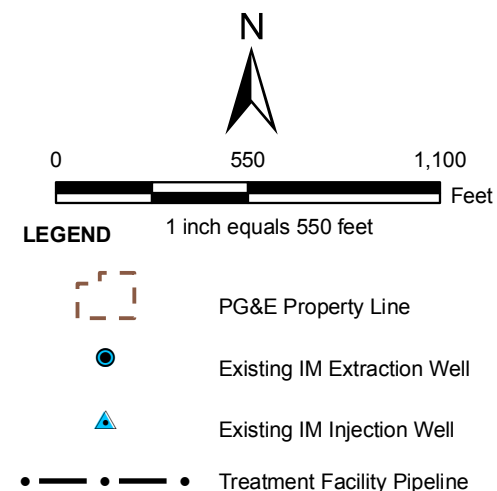
2) For IM pumping, the target landward gradient for the selected well pairs is 0.001 feet/foot

3) Extraction well PE-1 began pumping on 1/26/06. As a result, the gradient reported for the central well pair is affected by having an additional pumping well between wells used for gradient calculation.

The MW-34-080 transducer data was incomplete from January 3-16. This transducer was re-installed on January 16, 2007.

## Figures

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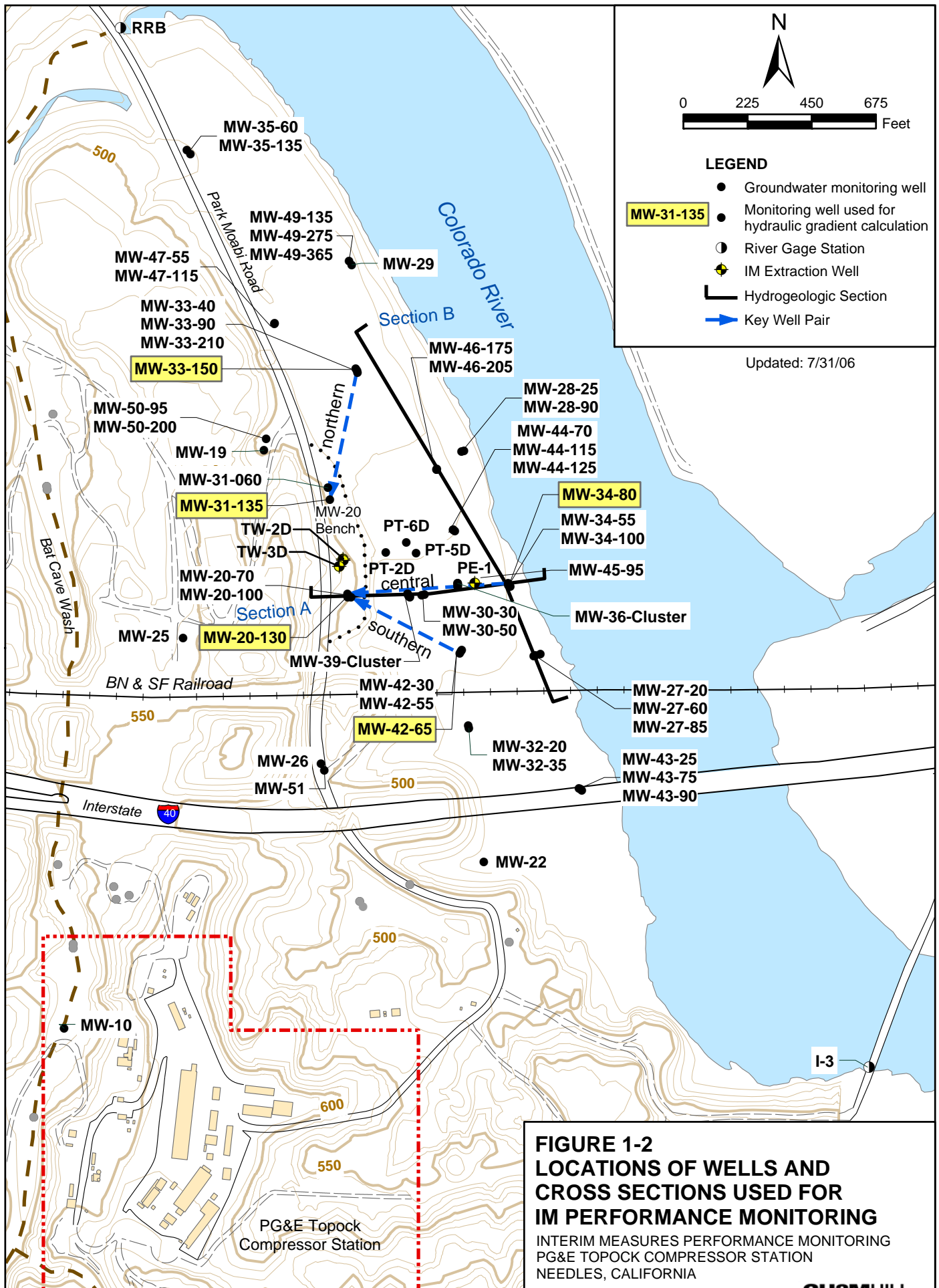


**Notes:** Location map shows Interim Measures No.3 (IM-3) facilities as of January 2006.  
Aerial photography taken May 2005.

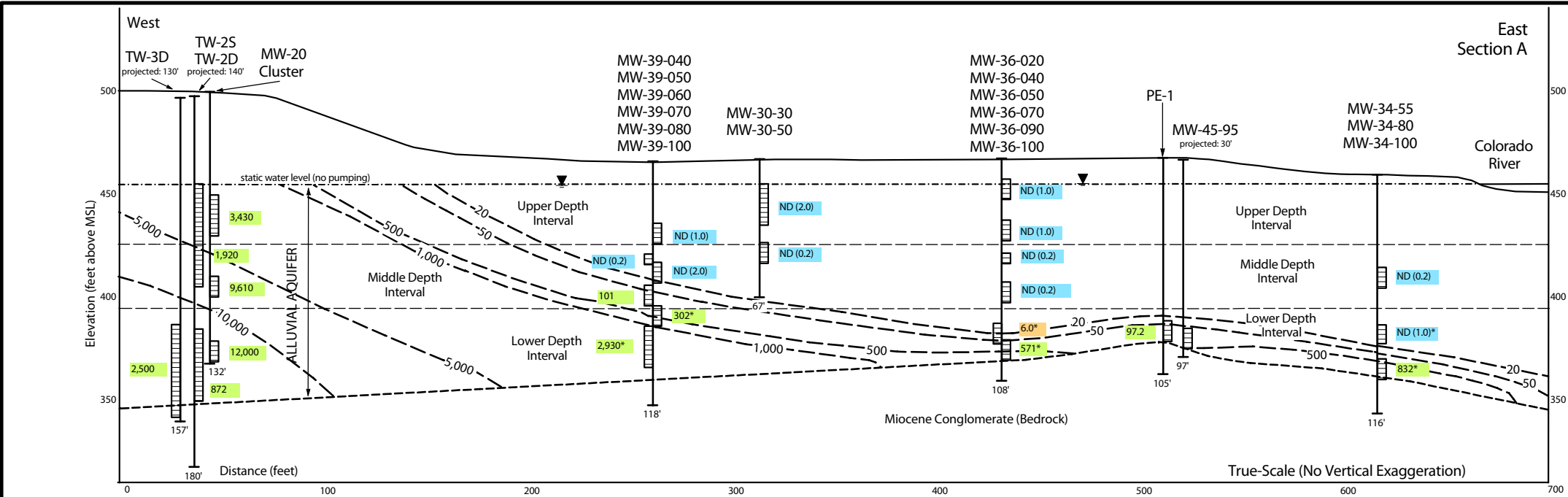
## FIGURE 1-1 LOCATIONS OF IM NO. 3 GROUNDWATER EXTRACTION, CONVEYANCE, AND TREATMENT FACILITIES

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

**CH2MHILL**







**LEGEND**  
**Maximum Hexavalent Chromium [Cr(VI)]**  
**Concentrations in Groundwater,**  
**January 2007 Monitoring**

Concentrations in micrograms per liter (µg/L)  
equivalent to parts per billion (ppb)

ND = not detected at listed reporting limit  
J = Concentration estimated by laboratory or data validation

Samples with \* are from January 2007 sampling, all other  
samples are from October or December 2006.

Results posted are maximum concentrations from primary and  
duplicate samples.  
See Tables B-1 and B-2 for sampling data and other results.

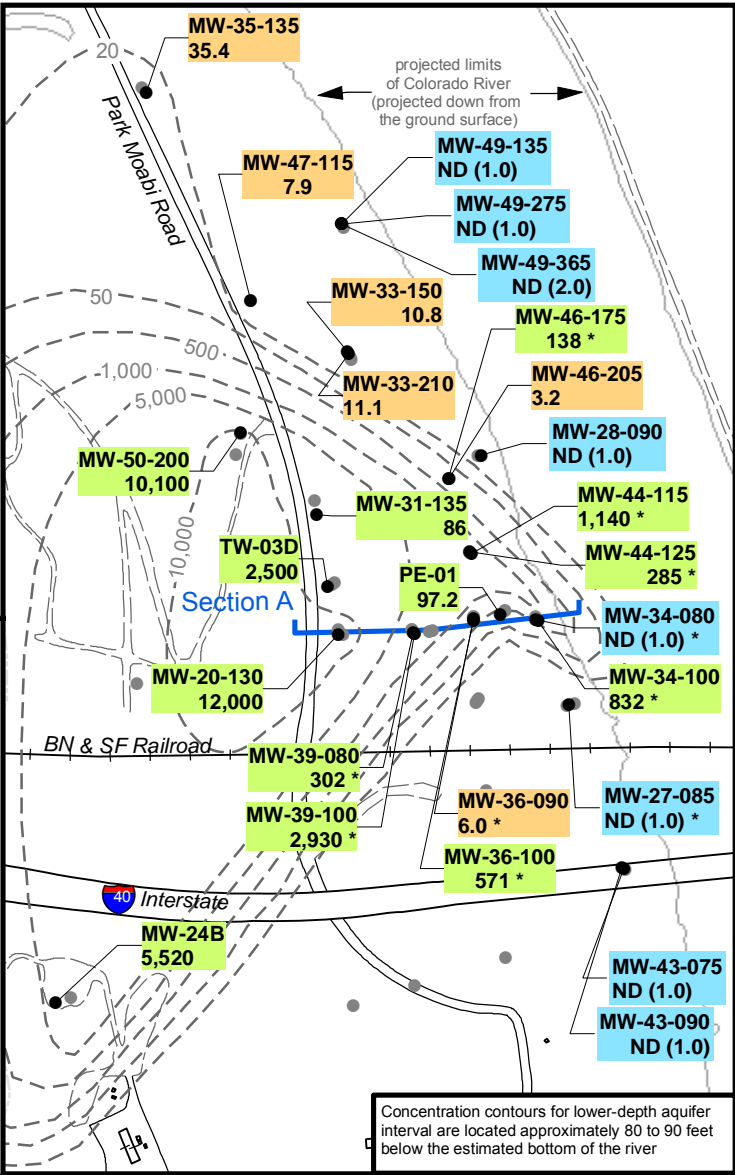
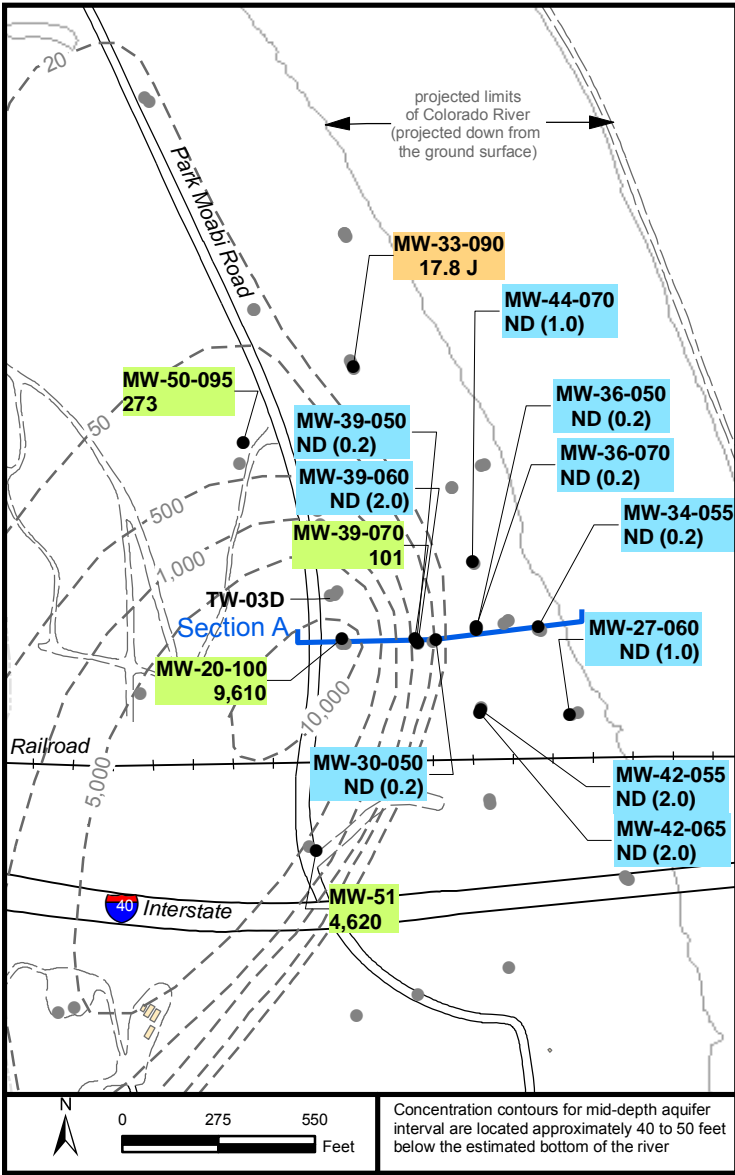
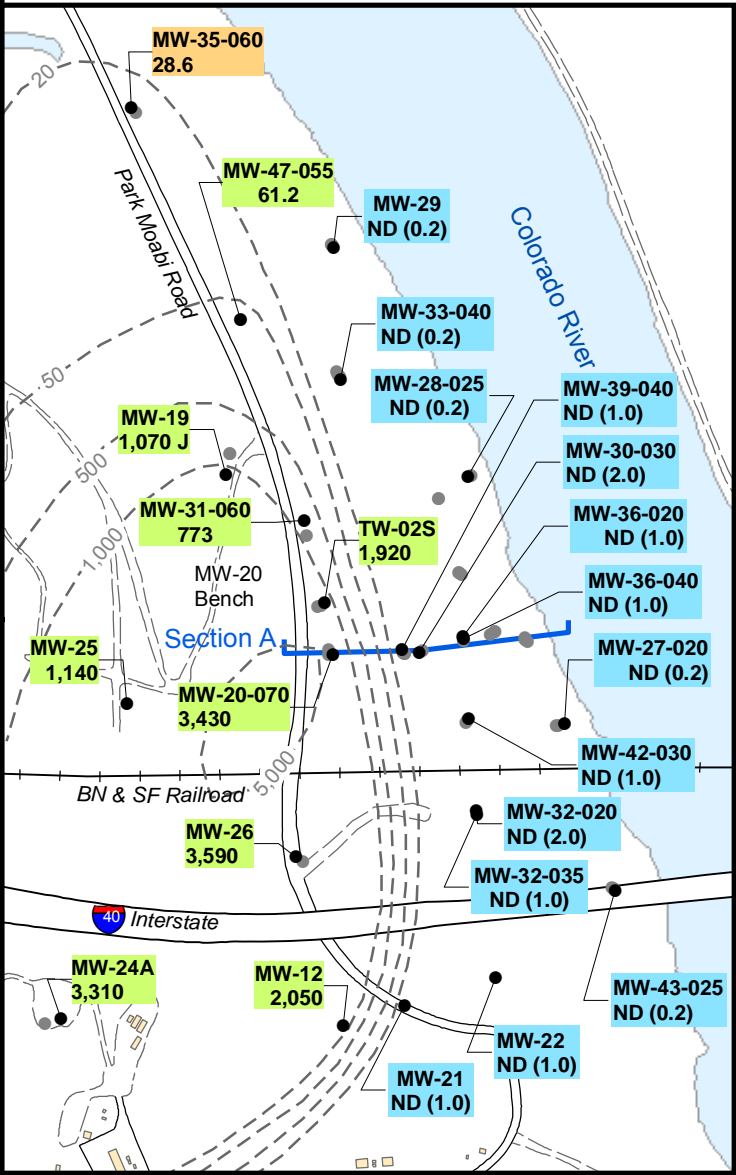
- ND (1)** Not detected at listed reporting  
limit (ppb)
- 41** Less than 50 ppb
- 3,810** Greater than 50 ppb
- 50 -- Inferred Cr(VI) concentration contour  
within aquifer depth interval
- Contours incorporate the maximum concentration  
from wells within each depth interval
- Hydrogeologic Section A (true-scale)  
showing aquifer depth intervals,  
well screens, and Cr(VI) sampling results.

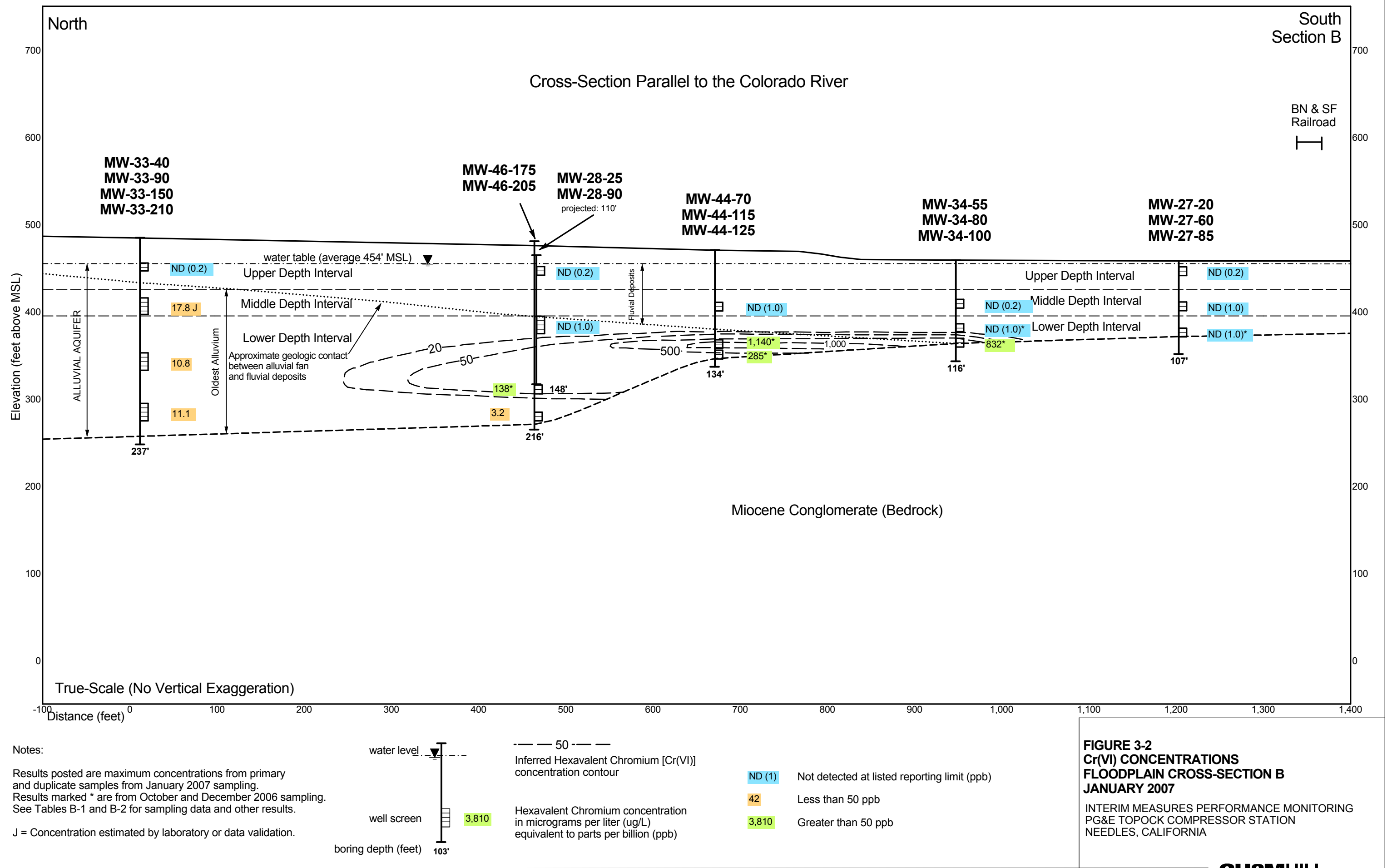
**NOTES ON CONTOUR MAPS**

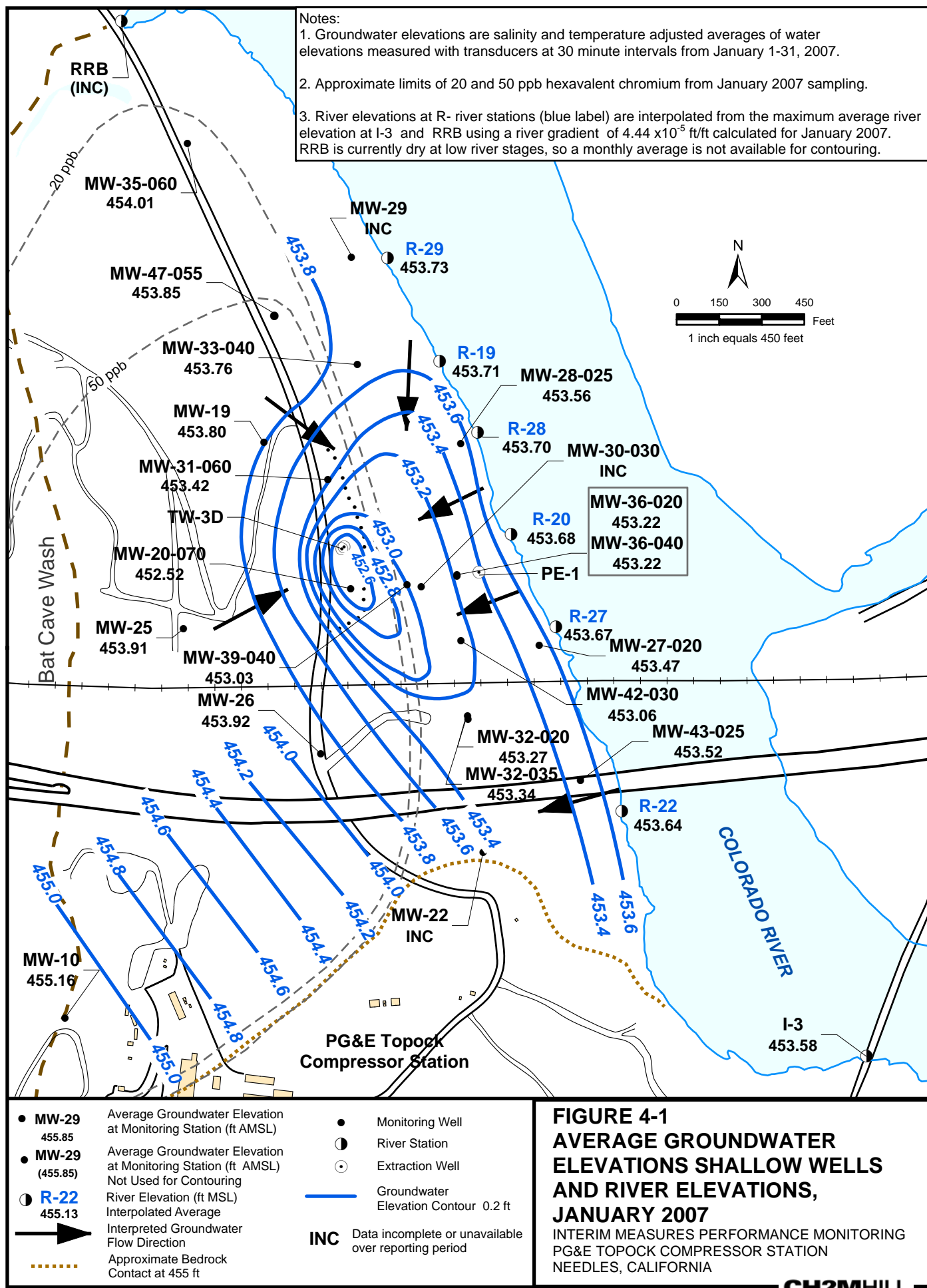
1. The Cr(VI) contour maps for 2006-2007 performance monitoring  
incorporate data from new wells and water quality data trends for  
the floodplain area. The contour maps provide additional  
interpretation of plume limits and do not reflect plume  
migration during performance monitoring
2. The locations of the Cr(VI) contours shown for depths  
80-90 feet below the Colorado River (east and southeast of  
well clusters MW-34) are estimated based on hydrogeologic  
and geochemical conditions documented in site investigations  
2004-2006. The actual locations of contours beyond well control  
points in these areas are not certain, but are inferred using  
available site investigation and monitoring data (bedrock structure,  
hydraulic gradients, observed distribution of geochemically  
reducing conditions and Cr(VI) concentration gradients).  
There are no data confirming the existence of Cr(VI) under the  
Colorado River.

**FIGURE 3-1**  
**MAXIMUM CR(VI) CONCENTRATIONS**  
**IN ALLUVIAL AQUIFER, JANUARY 2007**

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



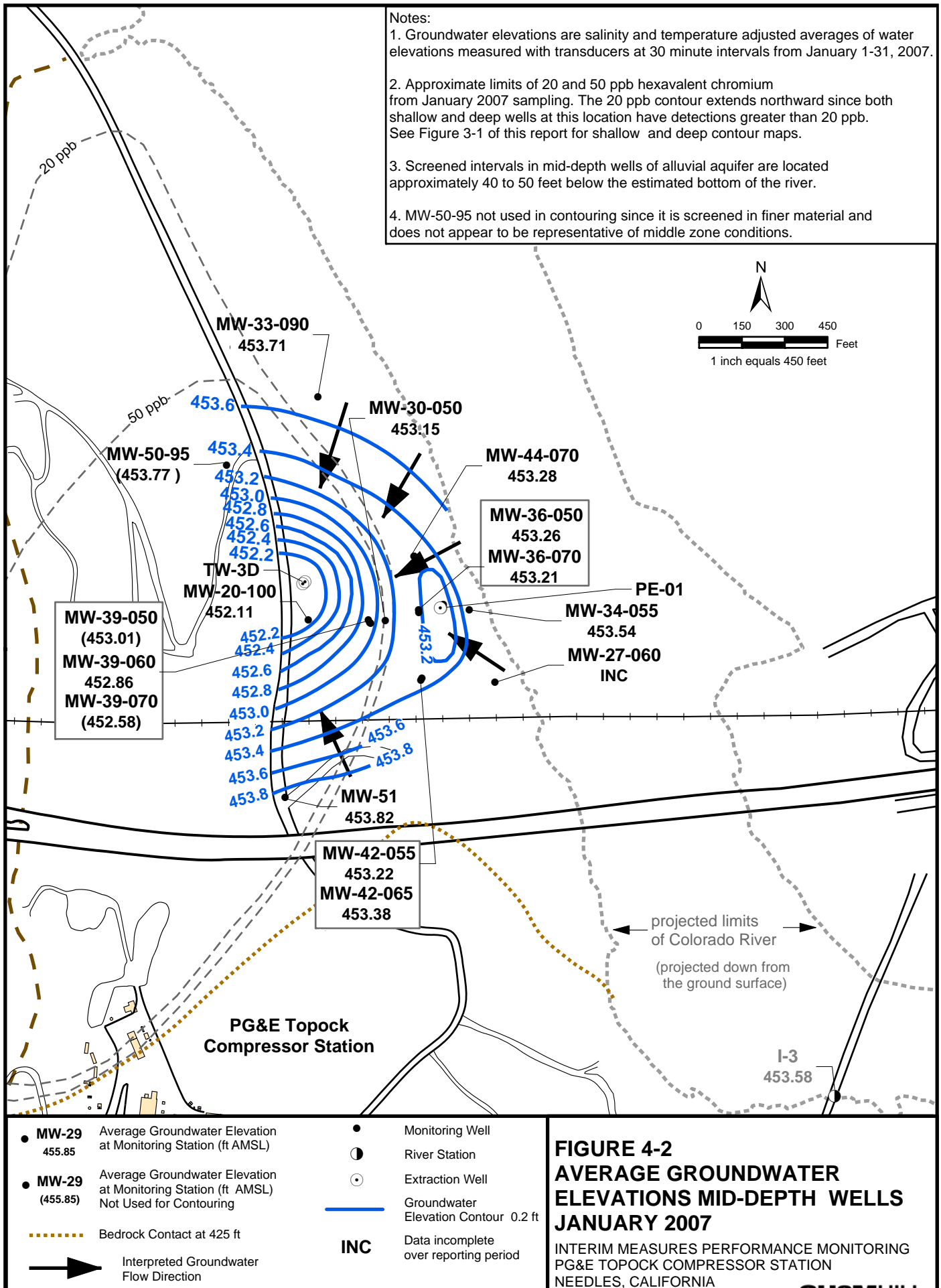






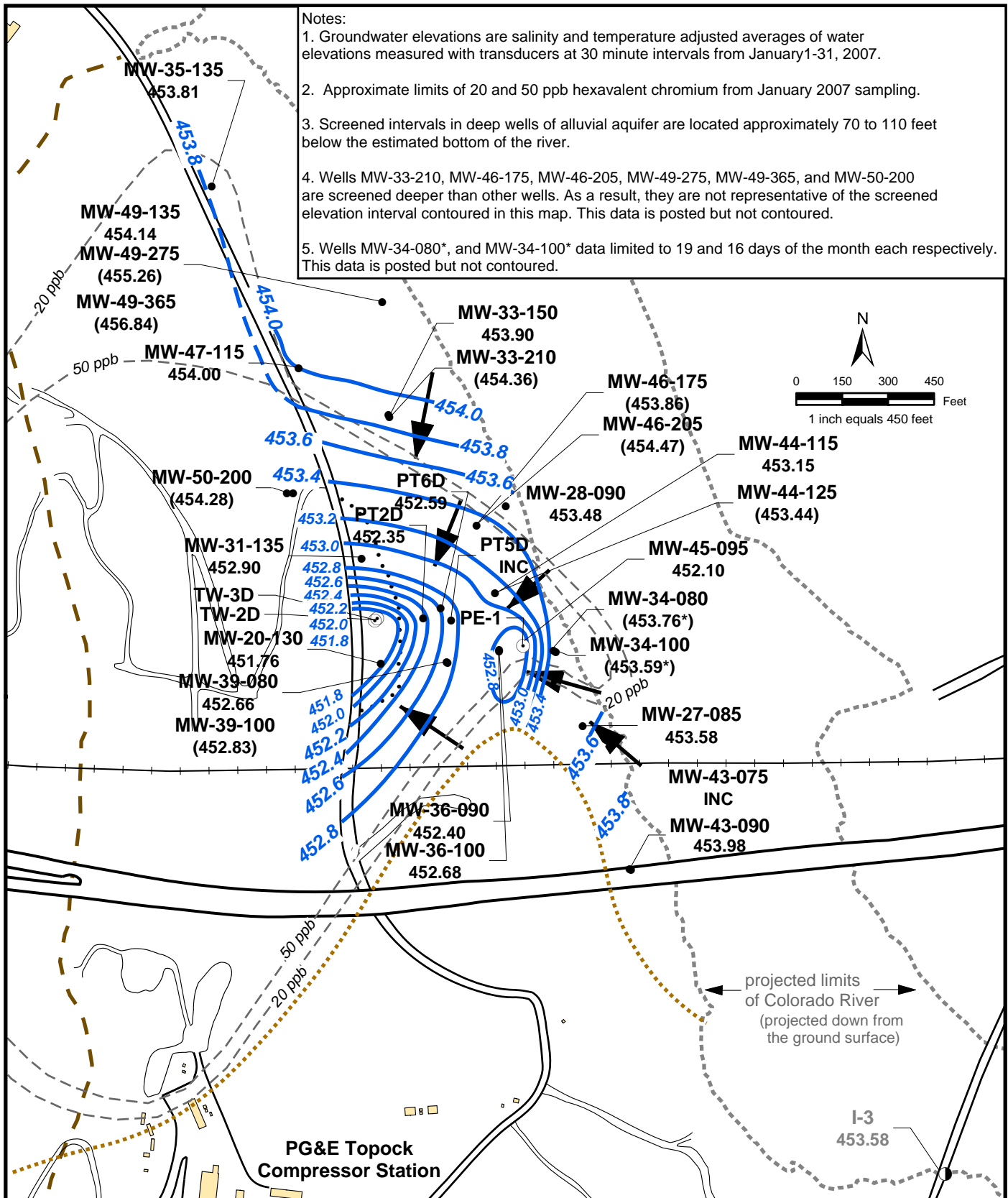
**Notes:**

1. Groundwater elevations are salinity and temperature adjusted averages of water elevations measured with transducers at 30 minute intervals from January 1-31, 2007.
2. Approximate limits of 20 and 50 ppb hexavalent chromium from January 2007 sampling. The 20 ppb contour extends northward since both shallow and deep wells at this location have detections greater than 20 ppb. See Figure 3-1 of this report for shallow and deep contour maps.
3. Screened intervals in mid-depth wells of alluvial aquifer are located approximately 40 to 50 feet below the estimated bottom of the river.
4. MW-50-95 not used in contouring since it is screened in finer material and does not appear to be representative of middle zone conditions.



**Notes:**

1. Groundwater elevations are salinity and temperature adjusted averages of water elevations measured with transducers at 30 minute intervals from January 1-31, 2007.
2. Approximate limits of 20 and 50 ppb hexavalent chromium from January 2007 sampling.
3. Screened intervals in deep wells of alluvial aquifer are located approximately 70 to 110 feet below the estimated bottom of the river.
4. Wells MW-33-210, MW-46-175, MW-46-205, MW-49-275, MW-49-365, and MW-50-200 are screened deeper than other wells. As a result, they are not representative of the screened elevation interval contoured in this map. This data is posted but not contoured.
5. Wells MW-34-080\*, and MW-34-100\* data limited to 19 and 16 days of the month each respectively. This data is posted but not contoured.



**MW-29**  
● 455.85 Average Groundwater Elevation at Monitoring Station (ft AMSL)

**MW-29**  
● (455.85) Average Groundwater Elevation at Monitoring Station (ft AMSL) Not Used for Contouring

➔ Interpreted Groundwater Flow Direction

..... Bedrock Contact at 395 ft

● Monitoring Well

○ River Station

○ Extraction Well

— Groundwater Elevation Contour 0.2 ft

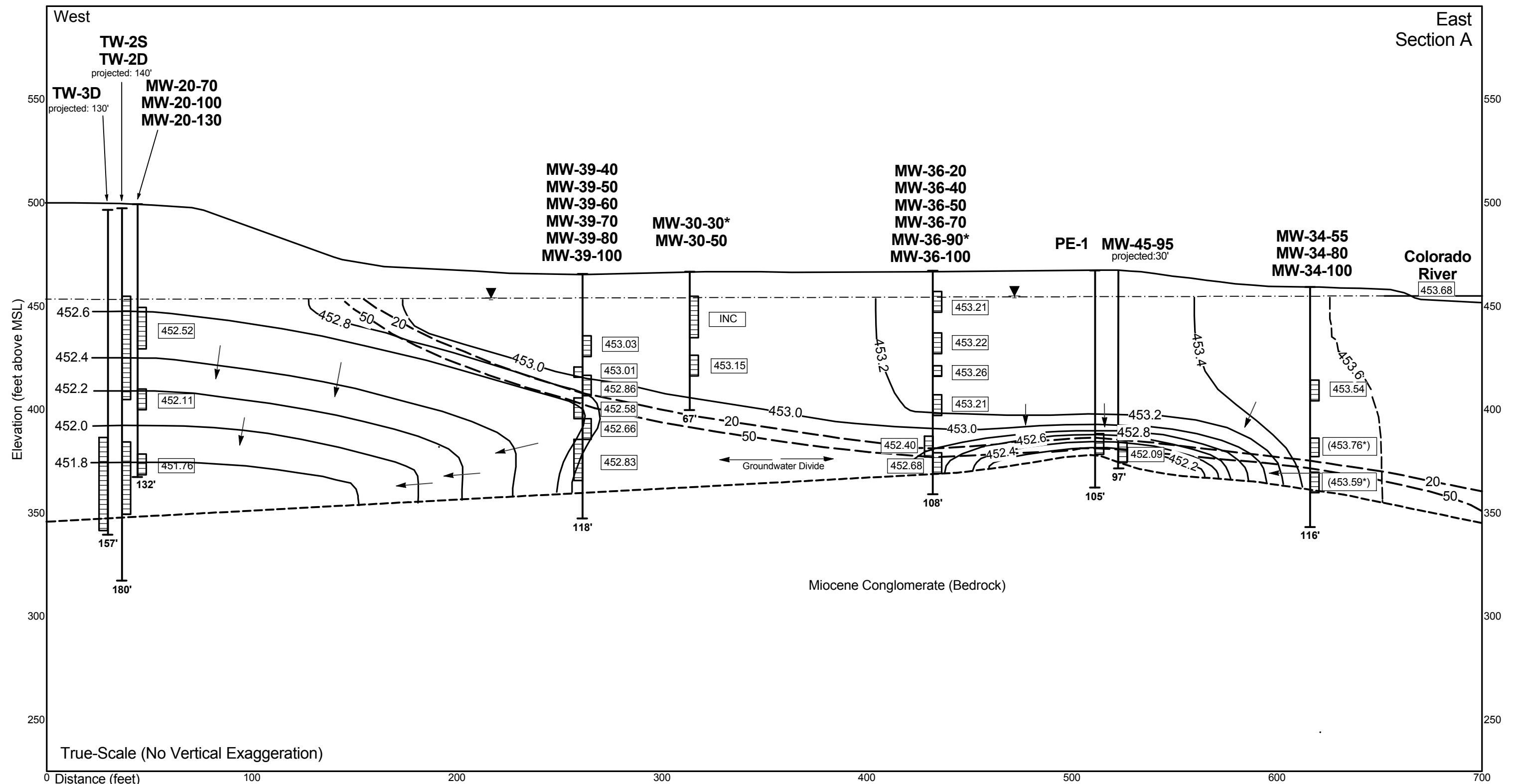
- - - Inferred Groundwater Elevation Contour 0.2 ft

INC Data incomplete for reporting period

## FIGURE 4-3 AVERAGE GROUNDWATER ELEVATIONS DEEP WELLS JANUARY 2007

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

**CH2MHILL**

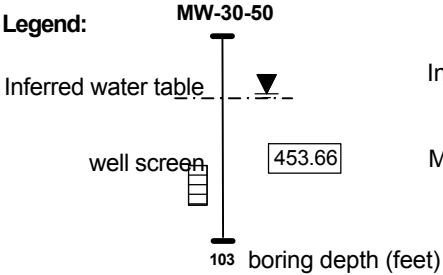


Notes: Results show average groundwater elevations for January 1 through 31, 2007 measured with transducers at 30 minute intervals. Groundwater elevations adjusted for salinity and temperature.

Well MW-36-90\* excluded from contouring. (MW-34-80\*), and (MW-34-100\*) data limited to half the reporting period. This data is posted for for reference purposes only. INC = well MW-30-30 unavailable over reporting period.

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

**Legend:**



— 20 —  
Inferred hexavalent chromium contour (ppb) January 2007

Monthly average groundwater head (ft MSL)

— 453.5 —  
Groundwater head contour

— 453.5 —  
Inferred groundwater head contour

←  
Interpreted groundwater flow direction

**FIGURE 4-4**  
**AVERAGE GROUNDWATER ELEVATIONS**  
**FOR WELLS ON FLOODPLAIN**  
**CROSS-SECTION A**  
**JANUARY 2007**

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

**CH2MHILL**

**Appendix A**  
**Extraction System Operations Log for**  
**Reporting Period**

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## Appendix A

### Extraction System Operations Log for January 2007

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

During January 2007, extraction wells TW-3D and PE-1 operated at a target pump rate of at 135 gallons per minute (gpm) excluding periods of planned and unplanned downtime. The operational run time for the IM groundwater extraction system (combined or individual pumping) was over 99 percent during the January 2007 reporting period.

The IM No. 3 facility also treated approximately 1,500 gallons of water generated from the groundwater monitoring program during January 2007. One container of solids (approximately 12 cubic yards) from the IM No. 3 facility was transported to the Chemical Waste Management at the Kettleman Hills facility during January 2007.

Periods of planned and unplanned extraction system down time (that together resulted less than 1 percent downtime during January 2007) are summarized below. The times shown are in Pacific Standard Time (PST) to be consistent with other data collected (e.g. water level data) at the site.

- **January 15, 2007 (unplanned):** The extraction well system was temporarily offline from 11:11 am until 12:25 pm due to a level indicator failure in the microfilter feed tank (T-500) that resulted in a facility shutdown. The failed level indicator transmitter was replaced with a shelf spare. Extraction system downtime was 1 hour 14 minutes.
- **January 17, 2007 (unplanned):** The extraction well system was temporarily offline from 12:24 pm to 1:55 pm to put a temporary rented plant air compressor into service, after the facility backup air compressor had an oil seal failure. The primary plant air compressor was being serviced by the manufacturer during this time and was subsequently returned to service on January 29, 2007. Extraction system downtime was 1 hour 31 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, August 2006 through January 2007

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
Shallow Wells								
MW-27-020	03-Oct-06	ND (0.2)	ND (1.0)	-176	0.5	1,240	455.0	M
MW-28-025	11-Oct-06	ND (0.2)	ND (1.0)	-111	1.5	1,860	454.4	453.7
MW-29	13-Oct-06	ND (0.2)	ND (1.0)	-56	5.3	4,770	454.9	455.0
MW-30-030	10-Oct-06	ND (2.0)	ND (1.0)	-129	1.4	56,500	454.3	453.6
MW-32-020	02-Oct-06	ND (5.0)	ND (1.0)	-122	0.9	59,800	454.3	M
	11-Dec-06	ND (2.0)	ND (1.0)	-110	1.8	61,300	453.6	455.4
MW-32-035	02-Oct-06	ND (1.0)	ND (1.0)	-162	0.7	20,000	454.4	M
	11-Dec-06	ND (1.0)	ND (1.0)	-149	1.5	23,700	454.2	455.4
MW-33-040	06-Oct-06	ND (0.2)	ND (1.0)	167	---	6,710	455.2	455.0
	14-Dec-06	ND (0.2)	1.20	31	2.8	7,080	454.0	453.2
MW-36-020	02-Oct-06	ND (1.0)	ND (1.0)	-177	1.8	24,000	454.6	M
MW-36-040	05-Oct-06	ND (1.0)	ND (1.0)	-194	1.4	16,000	454.2	455.0
MW-39-040	05-Oct-06	ND (0.2)	ND (1.0)	-198	1.4	12,500	454.0	454.0
	14-Dec-06	ND (1.0)	ND (1.0)	-174	1.7	13,200	453.4	453.1
MW-42-030	03-Oct-06	ND (1.0)	ND (1.0)	-160	0.9	19,700	454.4	M
MW-43-025	02-Oct-06	ND (0.2)	ND (1.0)	-172	0.6	1,310	454.8	M
Middle-Depth Wells								
MW-27-060	03-Oct-06	ND (1.0)	ND (1.0)	-122	0.8	14,300	455.0	M
MW-30-050	11-Oct-06	ND (0.2)	ND (1.0)	-113	0.8	8,280	454.5	454.6
	11-Oct-06 FD	ND (0.2)	ND (1.0)	FD	FD	FD	FD	FD
MW-33-090	06-Oct-06	17.3	20.9	110	0.9	12,500	455.2	454.5
	15-Dec-06	17.8 J	13.8	110	1.7	14,600	453.8	453.6
	15-Dec-06 FD	2.30 R	13.5	FD	FD	FD	FD	FD
MW-34-055	04-Oct-06	ND (0.2)	ND (1.0)	-178	2.2	3,080	455.0	453.9
MW-36-050	05-Oct-06	ND (0.2)	ND (1.0)	-165	1.4	4,200	454.9	455.1
MW-36-070	11-Jul-06	ND (1.0)	ND (1.0)	-108	0.6	7,320	455.4	454.8
	09-Aug-06	ND (0.2)	ND (1.0)	-149	0.7	6,920	455.3	455.4
	07-Sep-06	ND (0.2)	ND (1.0)	-105	1.7	5,930	455.1	455.5
	02-Oct-06	ND (0.2)	ND (1.0)	-122	1.4	5,220	454.5	M
	14-Dec-06	ND (0.2)	ND (1.0) LF	-112	1.8	3,440	453.2	453.3
MW-39-050	05-Oct-06	ND (0.2)	ND (1.0)	-77	1.4	11,200	454.2	454.2
MW-39-060	05-Oct-06	ND (1.0)	ND (1.0)	-54	1.2	11,300	454.2	454.5
	05-Oct-06 FD	ND (2.0)	ND (1.0)	FD	FD	FD	FD	FD
MW-39-070	12-Jul-06	77.0 J	66.7	74	0.9	9,570	455.1	456.4
	10-Aug-06	89.6	86.2	67	0.6	---	454.7	456.0
	07-Sep-06	155	153	21	1.7	9,760	455.0	454.7
	05-Oct-06	112	103	-1	1.2	12,200	453.6	453.9
	14-Dec-06	101	94.0	2	1.8	8,190	453.8	453.2

Refer to table footnotes for data qualifier explanation.

TABLE B-1

Groundwater Sampling Results for Floodplain Monitoring Wells, August 2006 through January 2007

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
Middle-Depth Wells								
MW-42-055	03-Oct-06	ND (1.0)	ND (1.0)	-126	0.8	19,100	454.4	M
	14-Dec-06	ND (2.0)	ND (1.0)	-132	0.5	16,500	453.6	453.3
MW-42-065	03-Oct-06	ND (1.0)	ND (1.0)	-50	0.7	20,400	454.5	M
	14-Dec-06	ND (2.0)	ND (1.0)	-42	0.6	18,300	453.8	453.4
MW-44-070	04-Oct-06	ND (1.0)	ND (1.0)	-181	2.3	8,910	454.0	453.8
	14-Dec-06	ND (1.0)	ND (1.0)	-129	1.7	6,730	453.7	453.6
Deep Wells								
MW-27-085	12-Jul-06	ND (2.0)	ND (1.0)	-71	2.2	21,400	456.2	456.8
	08-Aug-06	ND (1.0)	ND (1.0)	-33	2.7	22,900	454.8	456.2
	06-Sep-06	ND (1.0)	ND (1.0)	-87	2.4	23,200	454.7	454.4
	13-Oct-06	ND (1.0)	ND (1.0)	-78	1.1	24,100	454.0	454.2
	16-Nov-06	ND (1.0)	ND (1.0)	-87	1.2	23,400	453.1	452.8
	11-Dec-06	ND (1.0)	ND (1.0)	-82	1.3	26,700	454.9	455.8
	10-Jan-07	ND (1.0)	4.40	-61	0.3	18,640	453.6	453.7
MW-28-090	13-Jul-06	ND (1.0) J	ND (1.0)	-150	1.6	---	456.6	457.1
	11-Aug-06	ND (0.2)	ND (1.0)	-159	0.6	12,300	456.1	456.5
	08-Sep-06	ND (0.2)	ND (1.0)	-133	3.2	7,830	454.1	454.1
	13-Oct-06	ND (0.2)	ND (1.0)	-156	1.0	9,700	454.9	454.9
	14-Dec-06	ND (1.0)	ND (1.0)	-160	0.3	7,590	453.7	453.7
MW-33-150	13-Jul-06	7.40 J	6.70	-14	1.1	22,400	456.2	456.5
	11-Aug-06	9.30	8.10	-19	1.8	20,200	456.0	456.4
	08-Sep-06	7.40	4.10	28	1.8	17,900	454.8	454.3
	06-Oct-06	7.70	5.70	15	0.9	20,500	454.9	454.0
	13-Dec-06	10.8	9.80	-5	0.4	17,500	454.1	453.8
MW-33-210	13-Jul-06	10.0 J	7.50	36	2.2	27,100	456.5	456.8
	08-Aug-06	9.80	8.70	70	3.1	23,900	455.8	454.8
	08-Sep-06	9.20	4.90	59	1.7	21,000	455.2	454.4
	06-Oct-06	10.2	10.0	28	0.9	24,000	455.3	454.2
	11-Dec-06	11.1	8.00	157	1.2	27,600	454.9	455.9
MW-34-080	12-Jul-06	ND (1.0)	ND (1.0)	-75	1.6	14,800	456.1	456.3
	08-Aug-06	ND (1.0)	ND (1.0)	-33	0.6	16,200	455.5	455.4
	06-Sep-06	ND (1.0)	ND (1.0)	-84	0.9	16,000	454.8	454.7
	04-Oct-06	ND (1.0)	ND (1.0)	-111	2.1	14,400	453.7	453.9
	16-Nov-06	ND (1.0)	ND (1.0)	-86	1.1	13,200	453.0	452.6
	12-Dec-06	ND (1.0)	ND (1.0)	-23	0.3	15,000	454.5	454.6
	09-Jan-07	ND (1.0)	3.20	-36	0.3	14,300	453.5	453.6
MW-34-100	12-Jul-06	823 J	851	27	1.5	19,300	455.9	456.6
	12-Jul-06	FD	828 J	FD	FD	FD	FD	FD
	26-Jul-06	859	955	36	2.2	---	456.2	456.7
	08-Aug-06	889	982	64	0.5	20,600	455.5	455.9
	28-Aug-06	922	945	69	1.3	28,900	453.6	453.6
	06-Sep-06	844	963	117	1.9	22,500	454.8	454.9

Refer to table footnotes for data qualifier explanation.



TABLE B-1

Groundwater Sampling Results for Floodplain Monitoring Wells, August 2006 through January 2007

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-34-100	06-Sep-06 FD	797	907	FD	FD	FD	FD	FD
	20-Sep-06	872	984	181	1.5	19,600	454.3	M
	04-Oct-06	910	889	0	2.0	20,700	454.6	453.9
	18-Oct-06	815	920	52	0.8	21,700	454.0	453.9
	01-Nov-06	832	752	33	1.6	20,200	454.0	453.9
	16-Nov-06	777	801	146	1.4	20,500	453.0	453.0
	30-Nov-06	744	712	115	0.9	21,900	452.5	452.2
	12-Dec-06	851	625 J	-16	0.3	21,000	454.1	454.5
	28-Dec-06	723	603	115	---	16,760	453.3	452.7
	09-Jan-07	797	830	52	0.2	---	453.2	453.6
	24-Jan-07	832	817	129	0.3	17,700	453.4	453.3
MW-36-090	11-Jul-06	12.2	11.1	-34	0.8	14,000	454.4	455.3
	09-Aug-06	9.00	8.20	-96	0.8	9,190	454.9	455.9
	07-Sep-06	8.80	7.70	-55	1.7	8,400	454.9	455.4
	02-Oct-06	9.00	8.50	-20	1.0	8,270	453.6	M
	02-Oct-06 FD	8.90	10.8	FD	FD	FD	FD	FD
	15-Nov-06	ND (1.0)	2.40	-64	1.0	11,700	452.4	453.6
	14-Dec-06	3.80 J	5.80 J	-39	1.7	7,250	453.6	453.4
	14-Dec-06 FD	4.00	3.00 J	FD	FD	FD	FD	FD
	10-Jan-07	6.00	9.70	-83	0.2	7,743	452.4	453.7
	MW-36-100	13-Jul-06	528	497	37	1.0	19,600	455.7
09-Aug-06		551	474	67	1.6	14,600	455.1	456.3
08-Sep-06		556	561	-10	2.6	16,200	453.4	454.0
11-Oct-06		556	629	17	0.9	16,500	453.7	453.8
14-Nov-06		657	764	13	1.0	17,900	452.5	453.1
11-Dec-06		586	513	-64	1.1	21,700	453.8	455.7
10-Jan-07		571	554	-55	0.3	20,300	452.8	453.7
MW-39-080	12-Jul-06	830 J	750	69	1.1	14,600	455.2	456.8
	10-Aug-06	481	447	78	0.6	15,800	454.5	455.4
	07-Sep-06	1160	1160	47	1.6	17,500	455.2	454.5
	05-Oct-06	580	594	76	1.2	19,500	454.2	454.3
	15-Nov-06	339	422	52	0.9	17,600	452.6	453.5
	14-Dec-06	326	272	44	1.7	17,300	453.8	453.2
	10-Jan-07	302	292	---	0.2	13,900	452.7	453.7
	MW-39-100	13-Jul-06	3790	3470	80	1.5	26,200	455.5
10-Aug-06		3230	3440	141	1.6	23,000	454.9	456.0
10-Aug-06 FD		3170	3410	FD	FD	FD	FD	FD
08-Sep-06		3290	3780	46	2.8	20,700	453.6	453.9
11-Oct-06		3370	3500	87	1.2	23,100	454.4	454.4
15-Nov-06		2850	3190	96	2.5	23,000	452.9	453.2
15-Nov-06 FD		2960	3060	FD	FD	FD	FD	FD
12-Dec-06		3820	3350	95	0.4	24,200	453.4	454.5
10-Jan-07		2930	2560	75	0.5	19,570	452.9	453.7

Refer to table footnotes for data qualifier explanation.

TABLE B-1

Groundwater Sampling Results for Floodplain Monitoring Wells, August 2006 through January 2007

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-43-075	02-Oct-06	ND (1.0)	ND (1.0)	-128	1.2	17,900	454.2	M
	12-Dec-06	ND (1.0)	ND (1.0)	-109	1.2	17,400	454.6	454.7
MW-43-090	02-Oct-06	ND (1.0)	ND (1.0)	-108	0.4	23,600	455.2	M
	12-Dec-06	ND (1.0)	ND (1.0)	-85	0.5	25,200	454.8	454.7
MW-44-115	12-Jul-06	1700 J	1430	14	1.2	17,300	455.2	455.9
	26-Jul-06	1290	1530	-31	0.6	---	455.4	455.9
	09-Aug-06	1230	1460 LF	63	2.9	17,700	455.0	455.3
	23-Aug-06	1370	1440	93	0.6	16,800	454.6	455.0
	07-Sep-06	1380	1340	139	1.7	15,600	454.7	455.5
	21-Sep-06	911	1180	57	2.7	14,600	454.4	M
	05-Oct-06	1300	1310	3	2.9	18,400	454.7	454.4
	18-Oct-06	1250	1380	23	0.8	18,300	454.1	454.5
	15-Nov-06	1210	1480	19	1.5	14,000	453.1	453.5
	12-Dec-06	1310	1090	116	0.6	18,300	453.7	454.4
	09-Jan-07	1140	1260	-34	0.2	20,400	453.1	453.6
	MW-44-125	11-Jul-06	373	395	-16	0.7	12,100	455.0
11-Jul-06		FD	365	335	FD	FD	FD	FD
26-Jul-06		155	177	-140	1.9	---	455.7	455.9
26-Jul-06		FD	157	180	FD	FD	FD	FD
09-Aug-06		218	227 LF	-93	0.6	16,800	455.4	455.7
28-Aug-06		468	486	-188	1.1	17,700	454.4	454.2
28-Aug-06		FD	462	540	FD	FD	FD	FD
07-Sep-06		314	297	-39	4.1	14,600	454.6	455.2
07-Sep-06		FD	311	275	FD	FD	FD	FD
20-Sep-06		224	262	-130	0.4	16,700	453.8	M
20-Sep-06		FD	226	261	FD	FD	FD	FD
05-Oct-06		284	280	-97	2.6	18,000	455.1	454.5
18-Oct-06		304	327	-112	0.8	18,900	454.7	454.6
18-Oct-06		FD	308	272	FD	FD	FD	FD
15-Nov-06		320	363	-119	1.3	14,200	453.5	453.7
13-Dec-06		300	321	-67	0.8	14,200	454.0	454.3
09-Jan-07		285	285	-92	0.2	22,700	453.4	453.6
09-Jan-07		FD	284	268	FD	FD	FD	FD
MW-45-095a	13-Jul-06	197	202	45	1.4	22,200	454.4	456.1
MW-46-175	12-Jul-06	135 J	85.8	38	1.5	19,500	456.0	455.6
	27-Jul-06	174	206	16	0.7	---	456.2	456.6
	09-Aug-06	210	186	65	0.7	21,900	455.3	454.8
	09-Aug-06	FD	223	214	FD	FD	FD	FD
	25-Aug-06	137	136	-24	1.1	19,800	455.2	454.9
	07-Sep-06	183	170	90	2.2	26,400	454.8	454.7
	21-Sep-06	190	244	43	2.3	18,300	455.4	M
	05-Oct-06	194	192	0	2.8	22,200	454.9	453.9
	05-Oct-06	FD	195	187	FD	FD	FD	FD

Refer to table footnotes for data qualifier explanation.

TABLE B-1

Groundwater Sampling Results for Floodplain Monitoring Wells, August 2006 through January 2007  
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-46-175	18-Oct-06	204	253	15	0.9	21,900	454.8	454.0
	15-Nov-06	163	147	-118	1.1	17,100	453.9	453.1
	13-Dec-06	187	174	-33	0.3	17,700	454.2	453.9
	10-Jan-07	138	133	-160	0.1	17,450	453.9	453.7
MW-46-205	13-Jul-06	ND (1.0)	3.50	-152	1.0	24,900	456.4	457.4
	10-Aug-06	ND (1.0)	ND (1.0)	-88	1.3	22,900	455.9	455.4
	07-Sep-06	2.00	2.30	-37	1.6	26,000	455.2	454.5
	05-Oct-06	2.10	2.30	-96	2.4	27,500	455.2	453.9
	13-Dec-06	3.20	3.00	10	1.0	21,000	454.5	454.0
MW-49-135	12-Oct-06	ND (1.0)	ND (1.0)	-200	1.9	21,200	455.3	453.9
	15-Dec-06	ND (1.0)	ND (1.0)	-157	0.3	27,700	454.5	453.3
MW-49-275	12-Oct-06	ND (1.0)	ND (1.0)	-252	1.8	31,100	455.9	453.5
	15-Dec-06	ND (1.0)	ND (1.0)	-213	1.7	30,000	454.9	453.4
MW-49-365	12-Oct-06	ND (2.0)	ND (1.0)	-275	1.4	47,700	457.3	453.0
	15-Dec-06	ND (2.0)	1.10	-172	1.7	44,400	456.2	453.2

**NOTES:**

ND = not detected at listed reporting limit (RL)

FD = field duplicate

LF = lab filtered

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

R = result exceeded analytical criteria for precision and accuracy; should not be used for project decision-making

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.

TABLE B-2

Groundwater Sampling Results for Other Monitoring Wells in PMP Area, May 2006 through January 2007  
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	01-May-06	1250	1280	---	---	3840
	04-Oct-06	1740	1790	128	5.22	---
	13-Dec-06	2050	1880	155	6.20	4660
MW-19	02-May-06	1130	1120	38.0	3.30	2450
	02-Oct-06	970	1300	44.0	---	2450
	15-Dec-06	1070 J	1090	76.0	6.64	2360
MW-20-070	05-May-06	4100	4440	97.0	7.21	3050
	03-Oct-06	3290	3390	117	7.47	3460
	03-Oct-06 FD	3410	3330	FD	FD	FD
	13-Dec-06	3430	3120	203	7.93	2890
MW-21	02-May-06	ND (1.0)	ND (1.0)	-77	---	11500
	03-Oct-06	ND (1.0)	ND (1.0)	-67	6.90	15900
	13-Dec-06	ND (1.0)	ND (1.0)	-68	1.22	13000
MW-22	03-May-06	ND (1.0) J	ND (1.0)	-88	4.14	34200
	13-Oct-06	ND (1.0)	ND (1.0)	-105	0.97	42200
MW-24A	03-Oct-06	4300	4260	101	2.87	3910
	14-Dec-06	3310	4250	76.0	0.33	---
MW-25	03-May-06	1390	1310	98.0	7.72	2110
	03-May-06 FD	1280	1310	FD	FD	FD
	03-Oct-06	1140	1150	81.0	6.88	1720
MW-26	01-May-06	3210	3110	---	---	3290
	03-Oct-06	3590	3850	104	---	4140
MW-31-060	01-May-06	952	959	---	---	2740
	05-Oct-06	773	849	82.0	7.77	3440
MW-35-060	01-May-06	25.7	26.4	-37	---	6770
	12-Oct-06	28.6	29.1	112	1.26	12200
MW-47-055	16-May-06	24.0	27.3	22.0	2.89	4430
	10-Oct-06	56.9	56.8	6.00	2.83	5300
	14-Dec-06	61.2	82.0	28.0	2.19	3970
TW-02S	03-May-06	2400	2600	80.0	6.75	3150
	04-Oct-06	1920	2130	224	6.70	3470
Middle-Depth Wells						
MW-20-100	05-May-06	10400	12100	98.0	5.20	3760
	03-Oct-06	9520	10300	106	3.46	4340
	13-Dec-06	9610	9220 J	188	2.19	5200
	13-Dec-06 FD	9400	11500 J	FD	FD	FD
MW-50-095	09-May-06	199	194	30.0	3.00	5480
	24-May-06	218	221	50.0	3.42	---
	10-Oct-06	278	277	24.0	2.85	7120
	12-Dec-06	273	262	112	2.40	4590
MW-51	12-May-06	4370	4630	92.0	2.51	12100

TABLE B-2

Groundwater Sampling Results for Other Monitoring Wells in PMP Area, May 2006 through January 2007  
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
MW-51	30-May-06	4130	4530	17.0	1.53	10600
	06-Oct-06	4560	4590	119	3.79	13800
	12-Dec-06	4620	5360	129	3.07	10800
<b>Deep Wells</b>						
MW-20-130	05-May-06	12000	13700	97.0	2.21	12400
	18-Oct-06	11600	16400	78.0	2.68	19500
	13-Dec-06	12000	10500	181	0.80	---
	13-Dec-06 FD	11800	10700	FD	FD	FD
MW-24B	03-Oct-06	6120	5830	85.0	2.72	18700
	14-Dec-06	5520	5060	4.00	0.51	---
MW-31-135	09-May-06	154	146 LF	82.0	2.75	15900
	05-Oct-06	85.7	81.7	65.0	2.91	13600
MW-35-135	02-May-06	21.0	20.7	0.00	2.70	13000
	12-Oct-06	35.4	34.6	113	1.20	14400
	12-Oct-06 FD	34.0	30.8	FD	FD	FD
MW-47-115	16-May-06	1.40	5.10	-67	1.93	18400
	10-Oct-06	ND (3.5)	6.90	-80	1.13	16800
	14-Dec-06	7.90	6.10	-25	0.36	14800
MW-50-200	09-May-06	7750	7360	-11	1.91	20200
	24-May-06	5810	5910	60.0	4.11	37000
	10-Oct-06	9660	11800	93.0	2.99	28100
	12-Dec-06	10100	9250	123	3.17	20600
TW-02D	03-May-06	1120	1120	82.0	6.10	8490
	04-Oct-06	872	910	162	4.91	11900
TW-04	18-May-06	1.00	6.40	-97	0.56	15600
	05-Jun-06	ND (1.0)	4.10	-131	0.00	18300
	09-Oct-06	28.5	26.6	12.0	1.11	24700
TW-05	10-May-06	1.10 J	1.30	-161	0.60	15100
	01-Jun-06	ND (1.0) J	ND (1.0)	17.0	1.51	10600
	09-Oct-06	3.60	3.20	60.0	1.12	15800

**TABLE B-2**

Groundwater Sampling Results for Other Monitoring Wells in PMP Area, May 2006 through January 2007  
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

LF = lab filtered

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

µg/L = micrograms per liter

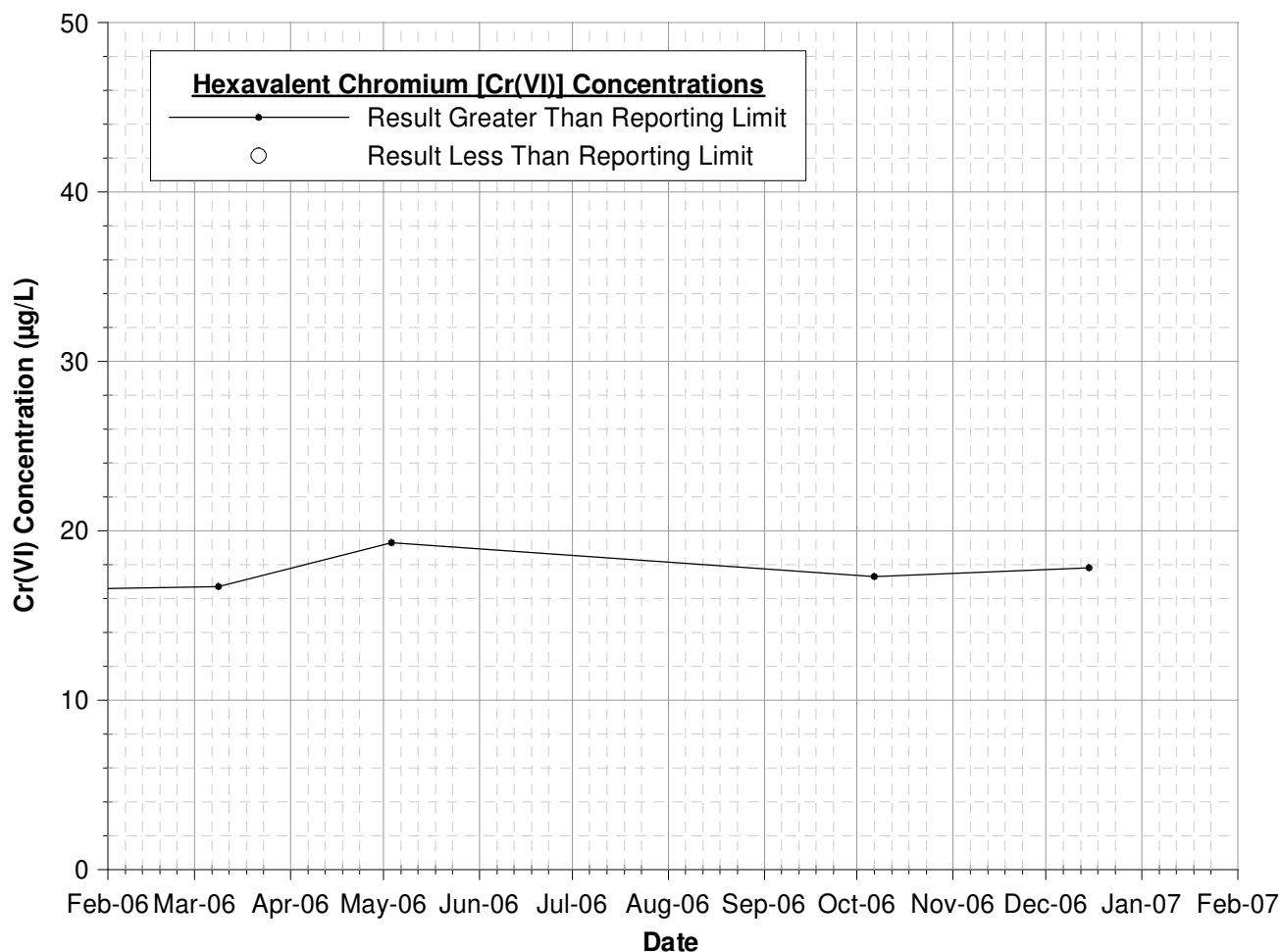
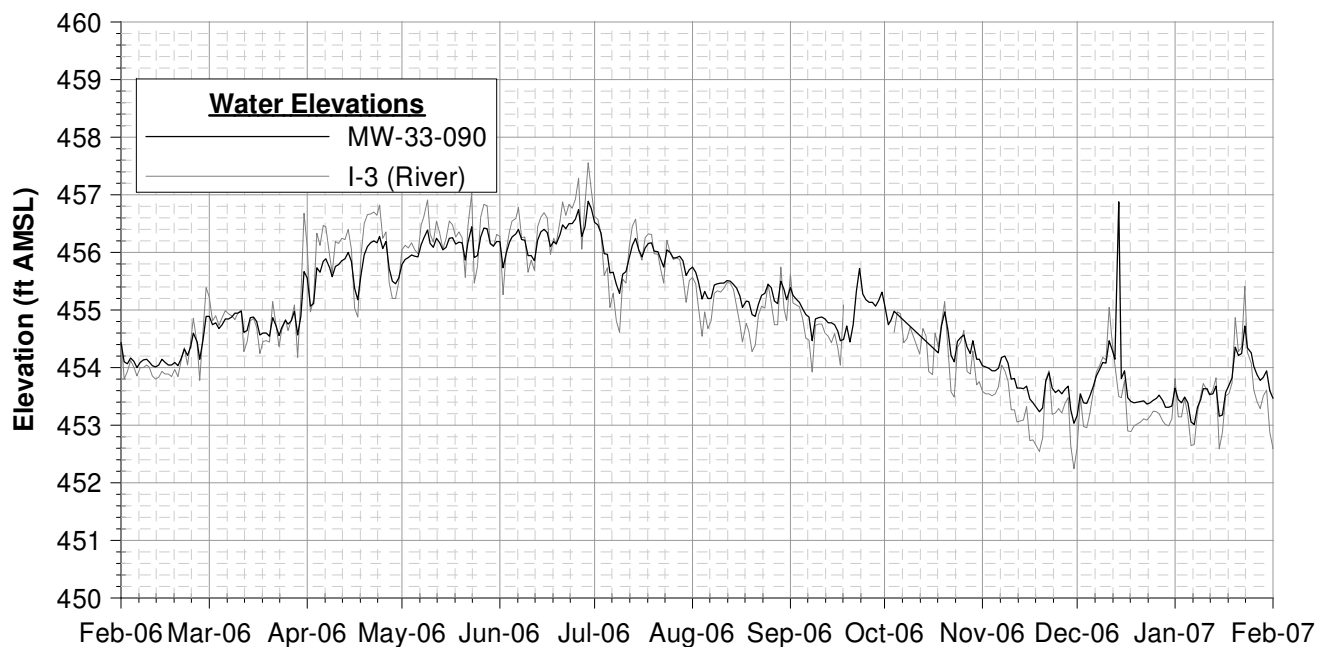
mg/L = milligrams per liter

mV = oxidation-reduction potential (ORP)

µS/cm = microSiemens per centimeter

PMP = Interim Measure Performance Monitoring Program

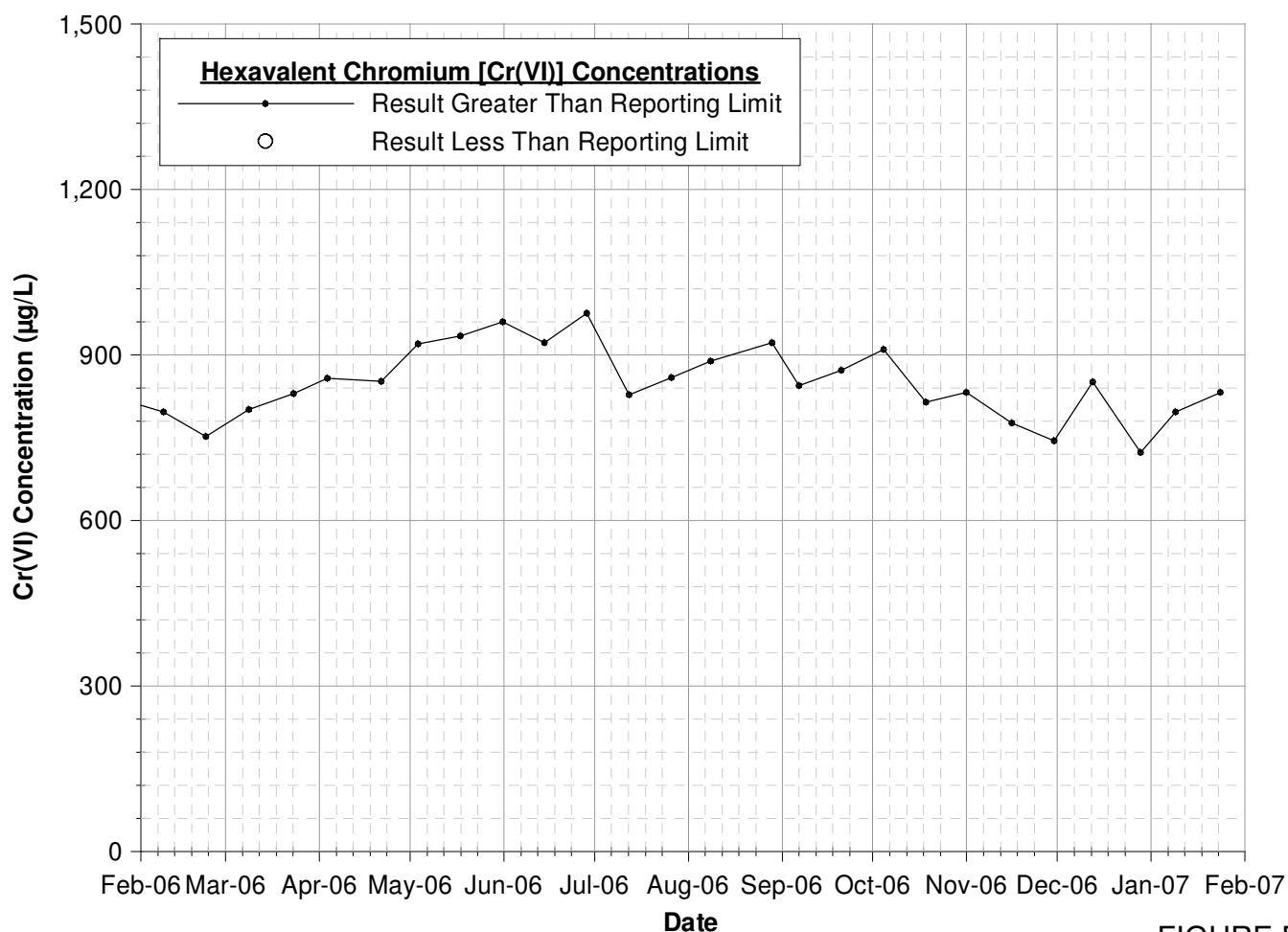
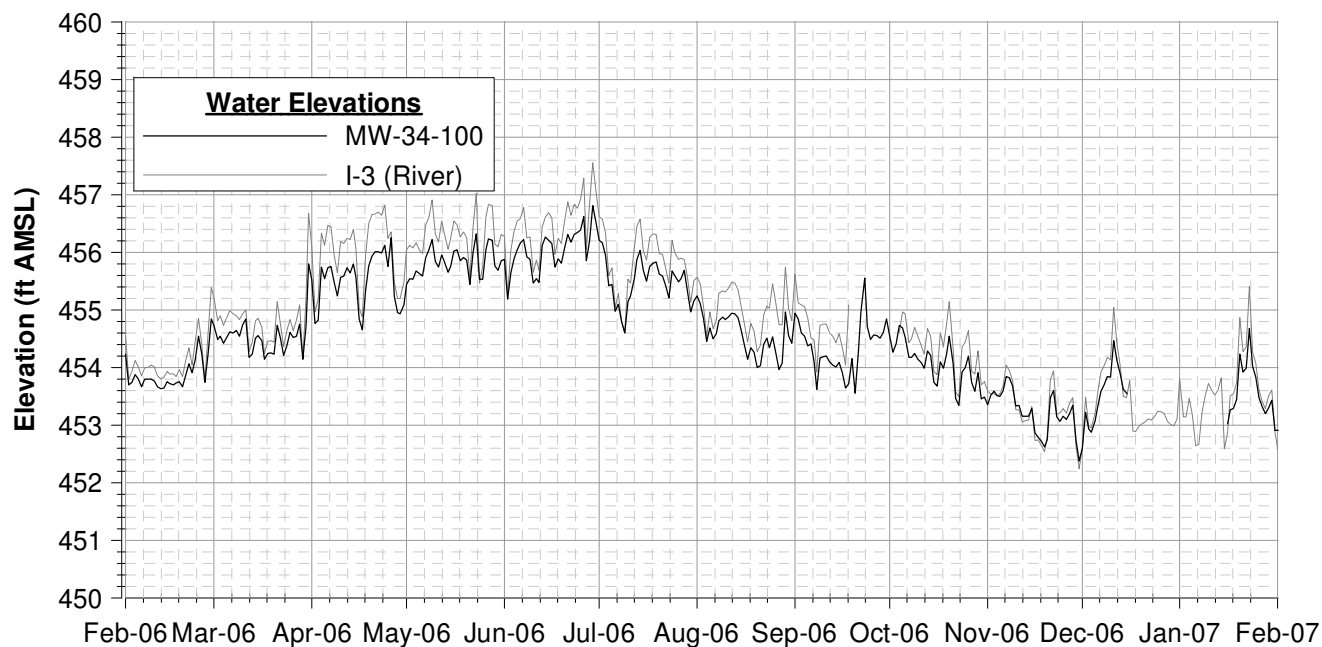
Samples analyzed for total chromium by EPA Method 6010B or 6020 were filtered and preserved in the field after sample collection, as per DTSC's June 30, 2005 letter.



**FIGURE B-1**  
**MW-33-90 CR(VI) CONCENTRATION & HYDROGRAPH - THROUGH 12/15/06**  
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 maximum concentrations from primary and duplicate samples; see Table B-1 for complete results.
4. I-3 data is unavailable from 9/18/2006 through 10/4/2006.

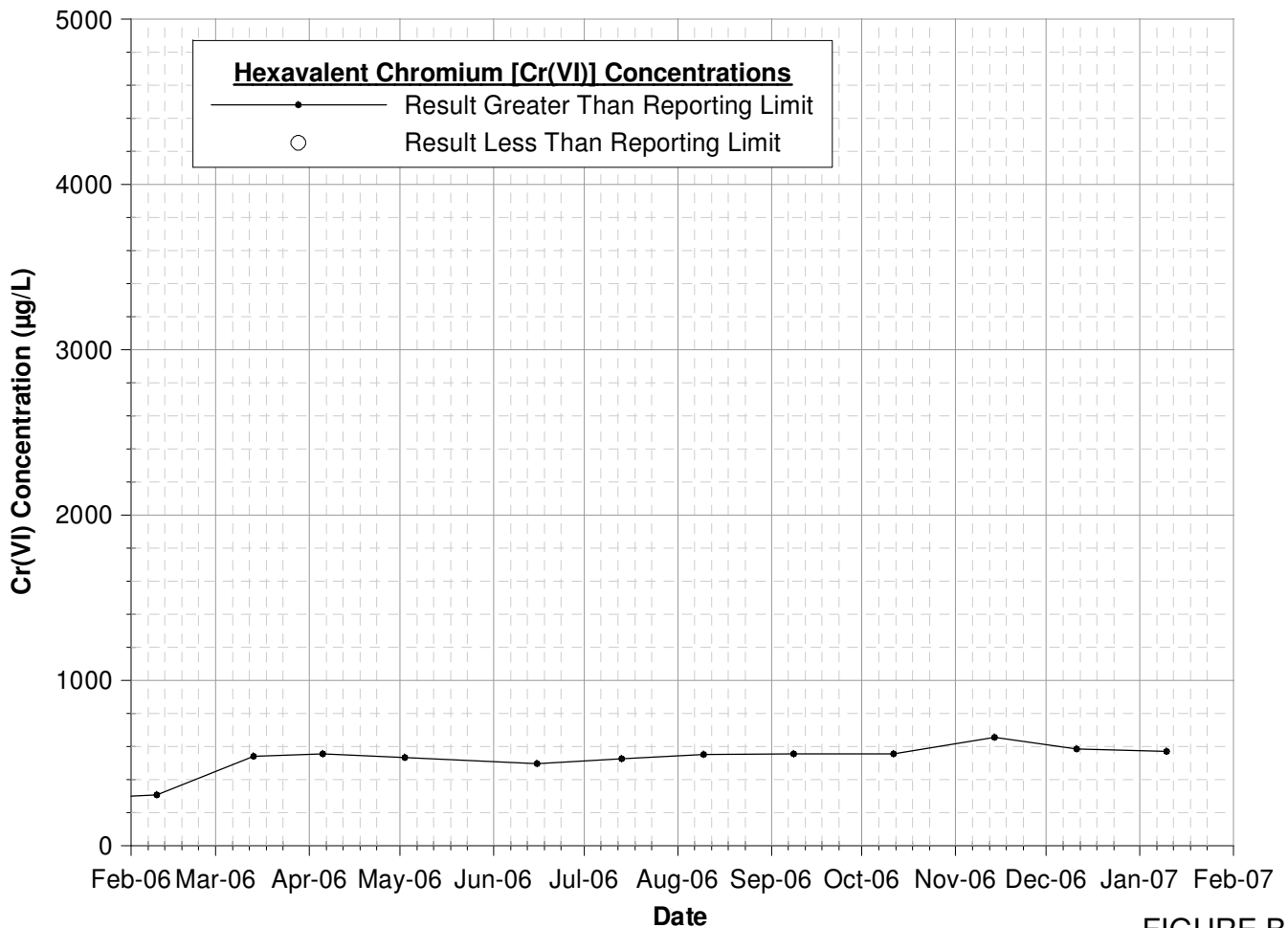
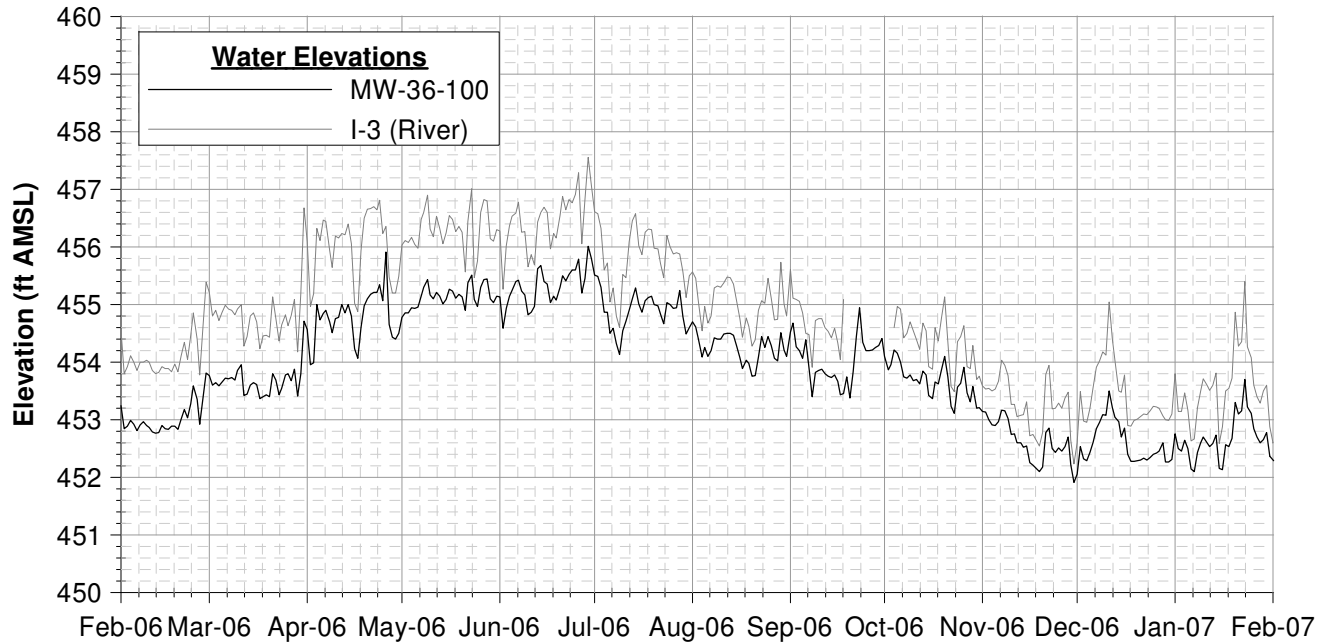


**FIGURE B-2**  
**MW-34-100 CR(VI) CONCENTRATION &**  
**HYDROGRAPH - THROUGH 1/24/07**  
 INTERIM MEASURES PERFORMANCE MONITORING  
 PG&E TOPOCK COMPRESSOR STATION  
 NEEDLES, CALIFORNIA

**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 maximum concentrations from primary and duplicate samples; see Table B-1 for complete results.
5. I-3 data is unavailable from 9/18/2006 through 10/4/2006.
6. MW-34-100 data is unavailable from January 1 through January 15, 2007.





**FIGURE B-3**  
**MW-36-100 CR(VI) CONCENTRATION & HYDROGRAPH - THROUGH 1/10/2007**

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 maximum concentrations from primary and duplicate samples; see Table B-1 for complete results.
4. I-3 data is unavailable from 9/18/2006 through 10/4/2006.

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

**TABLE C-1**

Monthly Average, Minimum, and Maximum Groundwater Elevations, January 2007  
*Interim Measures Performance Monitoring*  
*PG&E Topock Compressor Station*

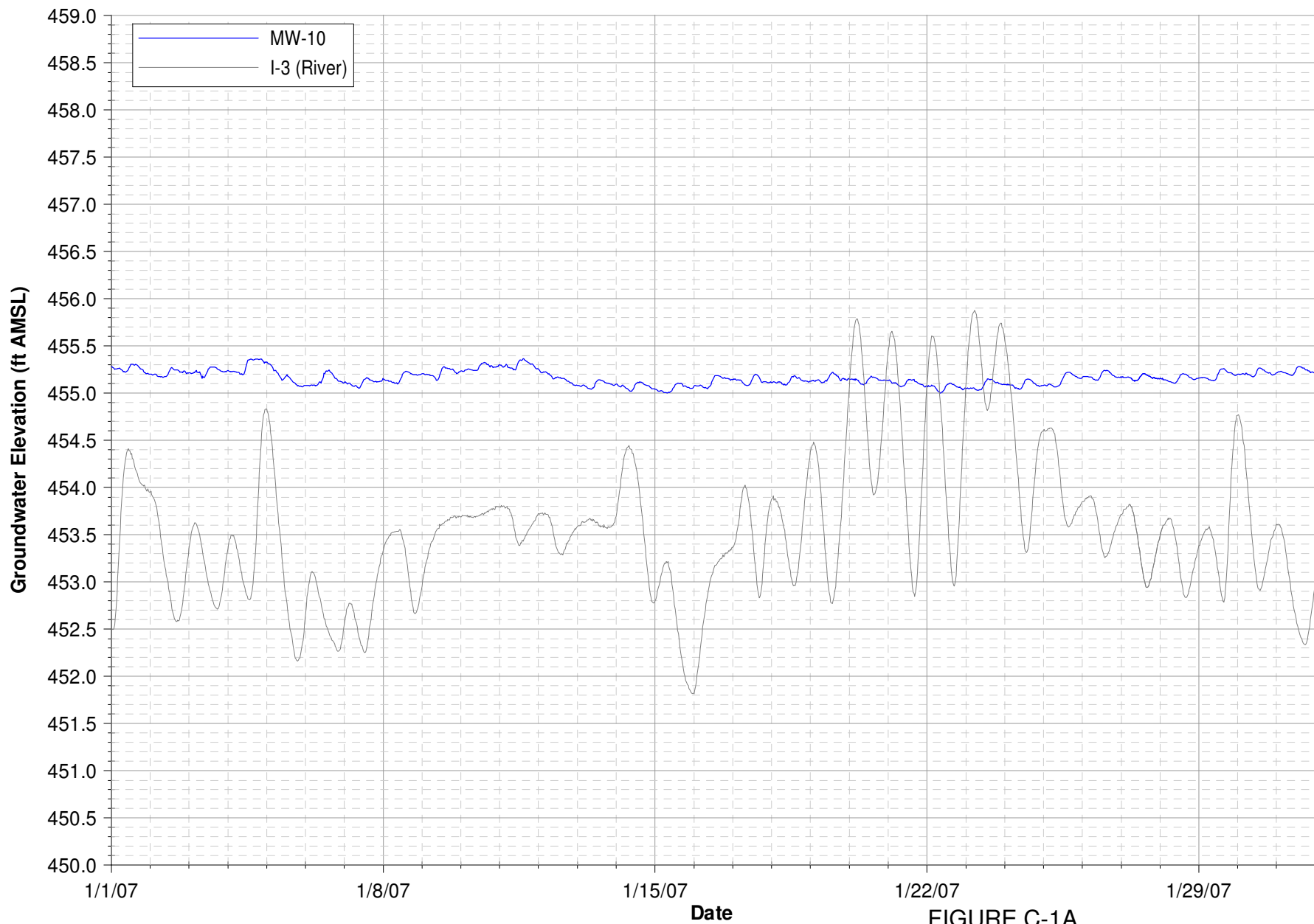
<b>Well</b>	<b>Average (ft AMSL)</b>	<b>Minimum (ft AMSL)</b>	<b>Maximum (ft AMSL)</b>	<b># of Days with recorded data</b>	<b>Aquifer Depth</b>
I-3	453.58	452.91	454.27	31	River Station
MW-10	455.16	455.10	455.23	31	Shallow
MW-19	453.80	453.71	453.89	31	Shallow
MW-20-070	452.52	452.43	452.62	31	Shallow
MW-20-100	452.11	451.99	452.32	31	Mid-Depth
MW-20-130	451.76	451.60	452.05	31	Deep
MW-22	INC	INC	INC	0	Shallow
MW-25	453.91	453.86	453.96	29	Shallow
MW-26	453.92	453.86	453.98	31	Shallow
MW-27-020	453.47	453.27	453.65	31	Shallow
MW-27-060	453.33	453.09	453.59	16	Mid-Depth
MW-27-085	453.58	452.67	453.96	31	Deep
MW-28-025	453.56	453.23	453.88	31	Shallow
MW-28-090	453.48	453.03	453.94	31	Deep
MW-29	INC	INC	INC	0	Shallow
MW-30-030	INC	INC	INC	0	Shallow
MW-30-050	453.15	452.85	453.48	29	Mid-Depth
MW-31-060	453.42	453.31	453.53	31	Shallow
MW-31-135	452.90	452.71	453.13	31	Deep
MW-32-020	453.27	453.18	453.35	31	Shallow
MW-32-035	453.34	453.15	453.53	29	Shallow
MW-33-040	453.76	453.54	453.99	31	Shallow
MW-33-090	453.71	453.46	453.97	31	Mid-Depth
MW-33-150	453.90	453.66	454.16	31	Deep
MW-33-210	454.36	454.15	454.58	31	Deep
MW-34-055	453.54	453.10	453.97	29	Mid-Depth
MW-34-080	453.76	453.29	454.24	19	Deep
MW-34-100	453.59	453.16	454.08	16	Deep
MW-35-060	454.01	453.82	454.20	31	Shallow
MW-35-135	453.81	453.68	453.95	31	Deep
MW-36-020	453.22	452.91	453.52	31	Shallow
MW-36-040	453.22	452.88	453.58	31	Shallow
MW-36-050	453.26	452.90	453.63	31	Mid-Depth
MW-36-070	453.21	452.84	453.58	31	Mid-Depth
MW-36-090	452.40	452.07	452.76	31	Deep
MW-36-100	452.68	452.27	453.05	31	Deep
MW-39-040	453.03	452.72	453.34	31	Shallow
MW-39-050	453.01	452.72	453.33	31	Mid-Depth
MW-39-060	452.86	452.59	453.17	31	Mid-Depth
MW-39-070	452.58	452.35	452.87	31	Mid-Depth
MW-39-080	452.66	452.43	452.94	31	Deep
MW-39-100	452.83	452.60	453.12	31	Deep
MW-42-030	453.06	452.82	453.30	31	Shallow

**TABLE C-1**

Monthly Average, Minimum, and Maximum Groundwater Elevations, January 2007  
*Interim Measures Performance Monitoring*  
*PG&E Topock Compressor Station*

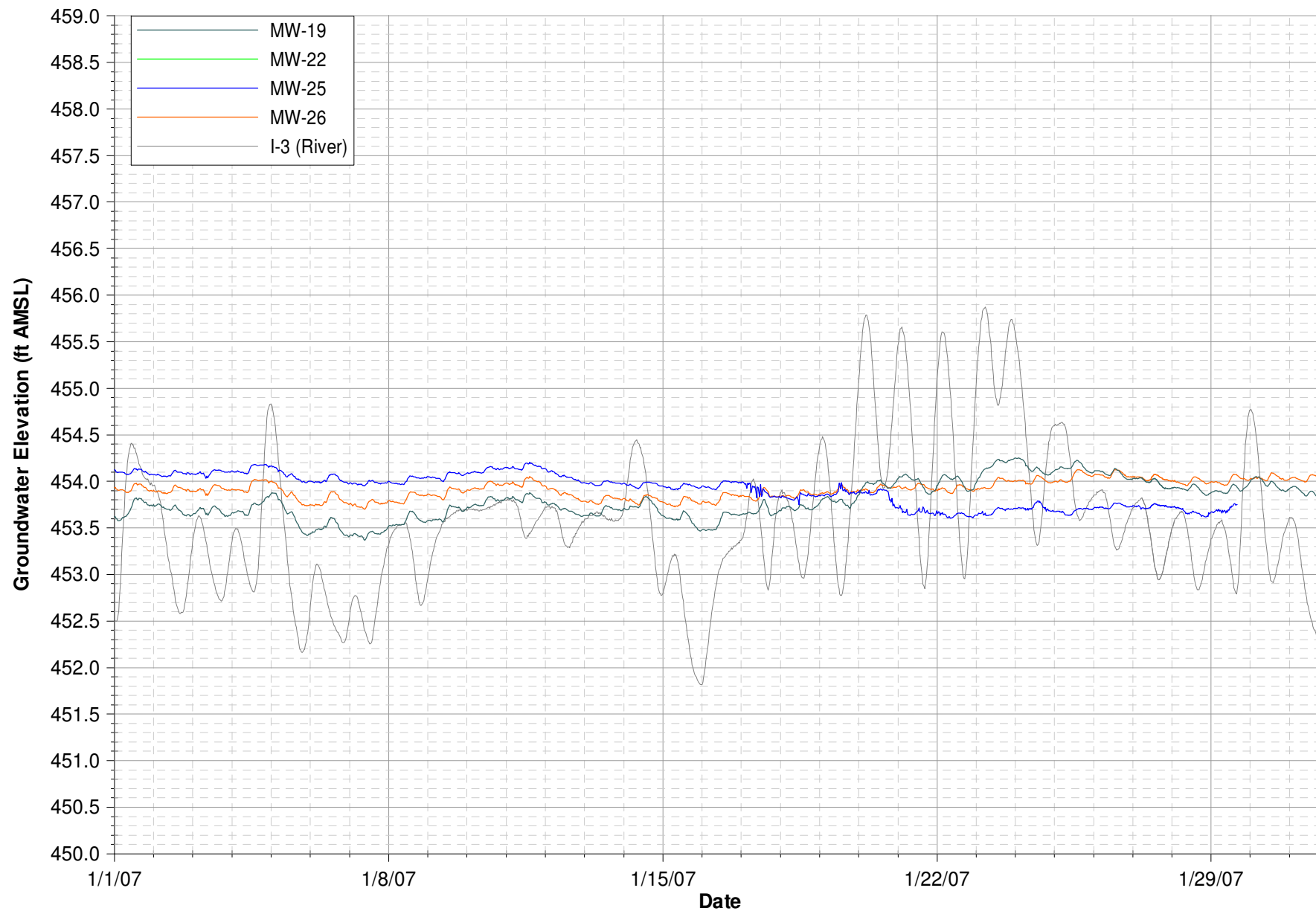
<b>Well</b>	<b>Average (ft AMSL)</b>	<b>Minimum (ft AMSL)</b>	<b>Maximum (ft AMSL)</b>	<b># of Days with recorded data</b>	<b>Aquifer Depth</b>
MW-42-055	453.22	452.97	453.47	31	Mid-Depth
MW-42-065	453.38	453.11	453.66	31	Mid-Depth
MW-43-025	453.52	453.17	453.87	31	Shallow
MW-43-075	454.03	453.63	454.46	16	Deep
MW-43-090	453.98	453.60	454.36	31	Deep
MW-44-070	453.28	452.86	453.70	31	Mid-Depth
MW-44-115	453.15	452.82	453.52	31	Deep
MW-44-125	453.44	453.10	453.80	31	Deep
MW-45-095	452.10	451.69	452.73	31	Deep
MW-46-175	453.86	453.57	454.16	31	Deep
MW-46-205	454.47	454.23	454.72	31	Deep
MW-47-055	453.85	453.72	453.97	31	Shallow
MW-47-115	454.00	453.86	454.15	31	Deep
MW-49-135	454.14	453.86	454.43	31	Deep
MW-49-275	455.26	455.09	455.43	31	Deep
MW-49-365	456.84	456.69	456.99	31	Deep
MW-50-095	453.77	453.68	453.88	31	Mid-Depth
MW-50-200	454.28	454.16	454.41	31	Deep
MW-51	453.82	453.72	453.89	31	Mid-Depth
PT2D	452.35	452.11	452.64	31	Deep
PT5D	452.50	452.25	452.81	28	Deep
PT6D	452.59	452.25	452.91	31	Deep
RRB	453.84	453.35	454.47	31	River Station
TW-02D	INC	INC	INC	0	Deep

INC= Data incomplete over reporting period



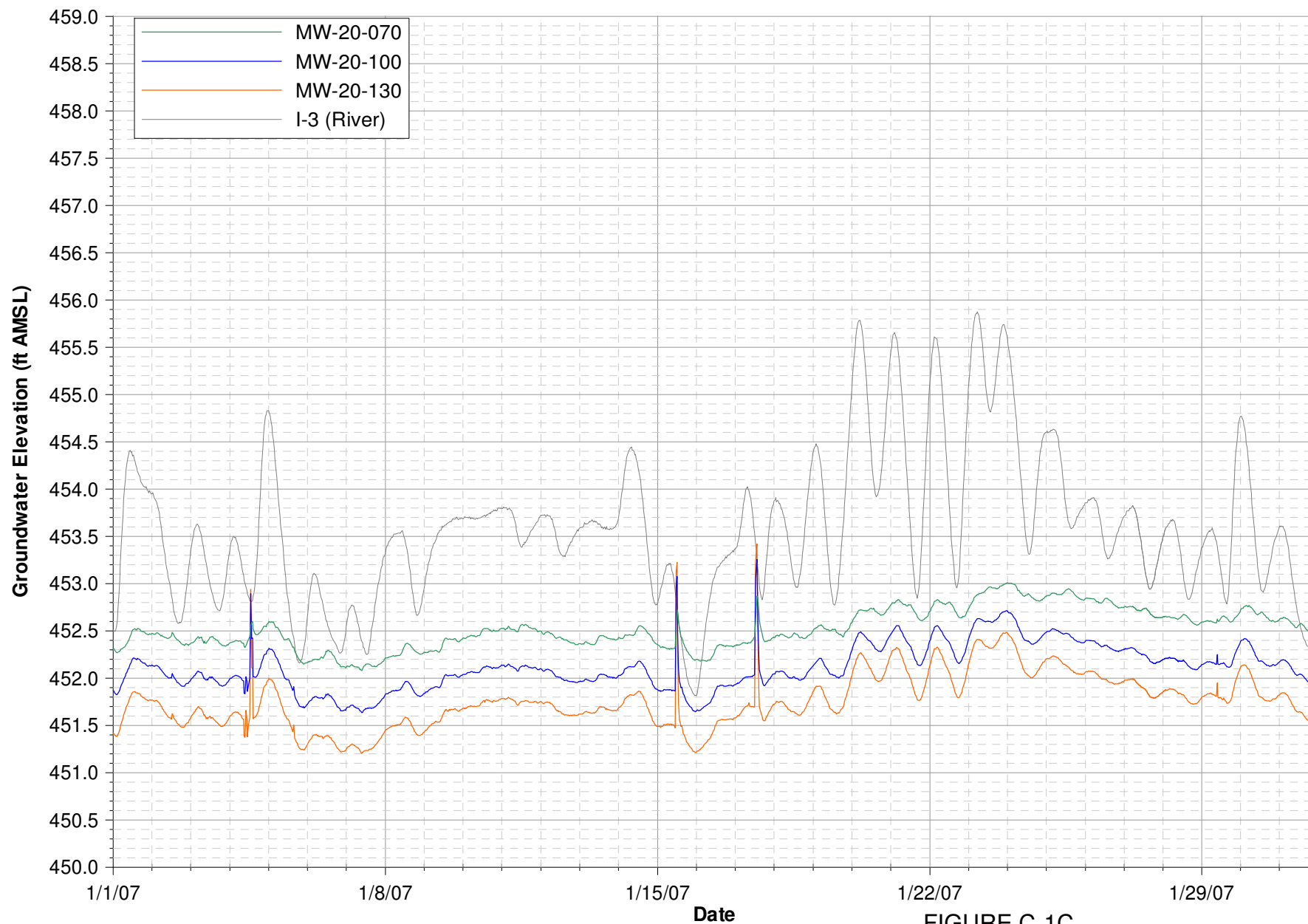
Note: Data subject to review.

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



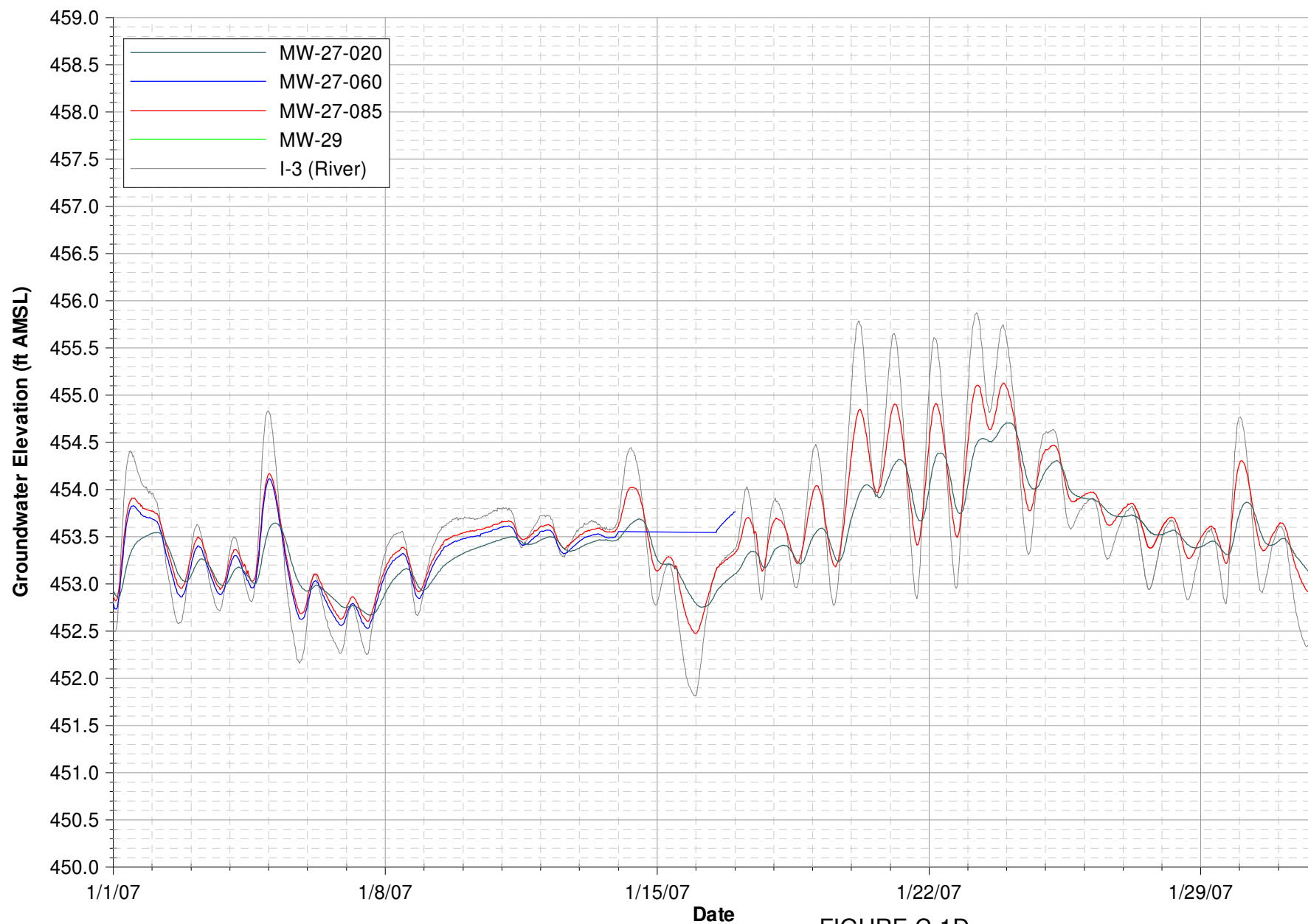
Notes:  
 Data subject to review.  
 MW-22 data unavailable after September 19, 2006.  
 MW-25 Data unavailable January 30 and January 31, 2007.

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



Notes:  
Data subject to review.

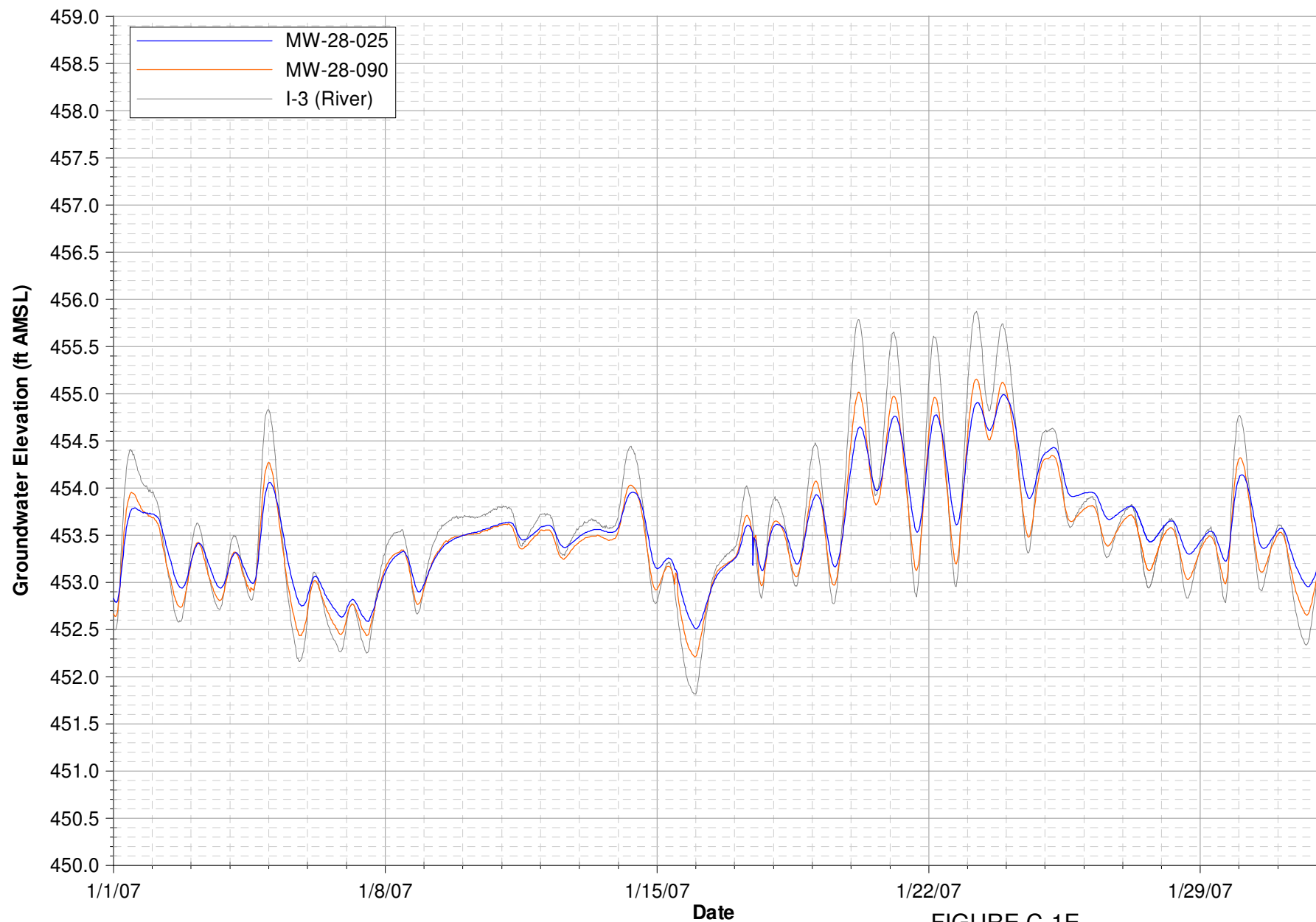
**FIGURE C-1C**  
**MW-20 CLUSTER HYDROGRAPHS**  
INTERIM MEASURES PERFORMANCE MONITORING  
PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA



Notes:  
 Data subject to review.  
 MW-29 Data unavailable after October 1, 2006.  
 MW-27-60 Data unavailable after January 18, 2007.

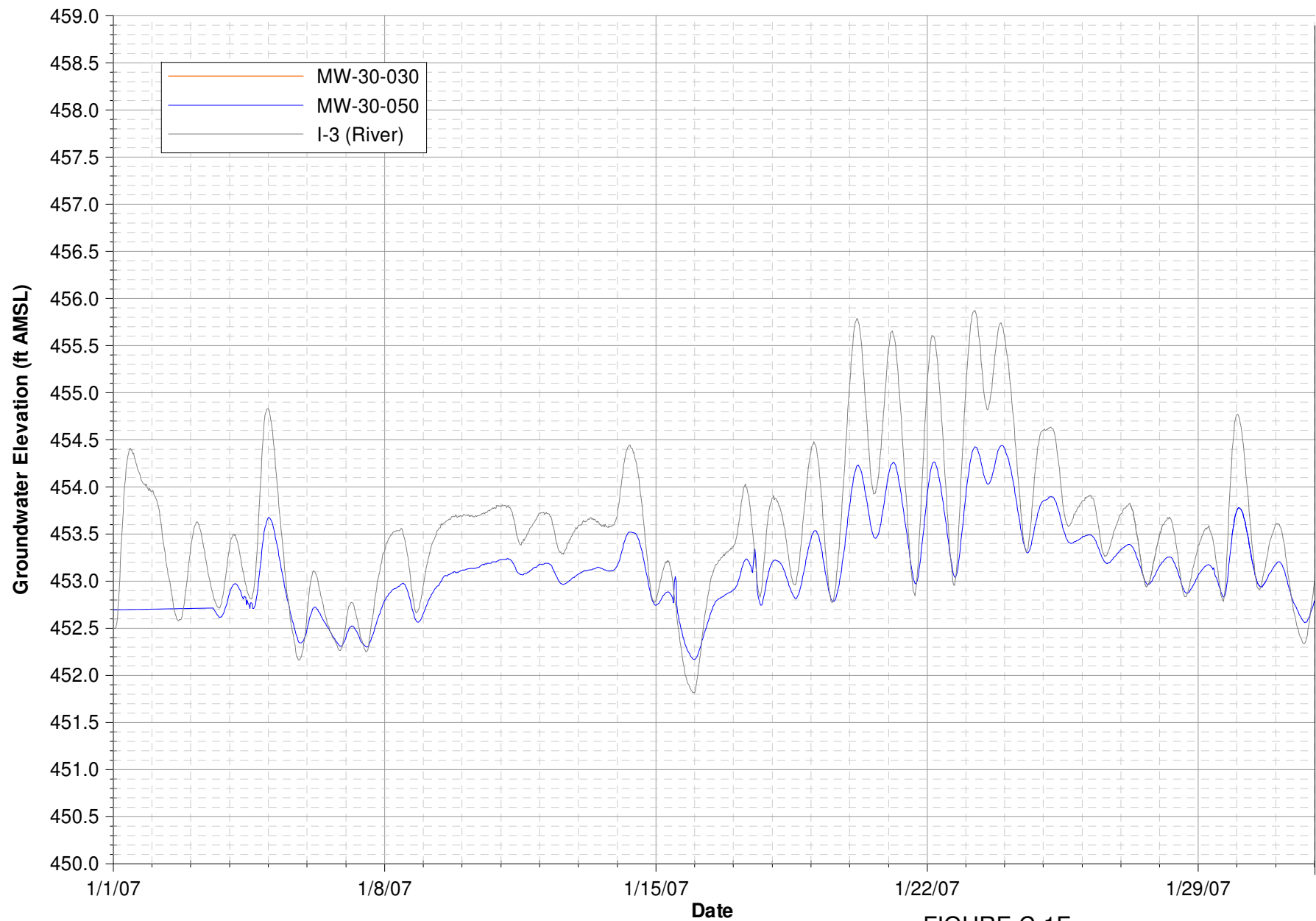
**FIGURE C-1D**  
**MW-27 CLUSTER AND MW-29 HYDROGRAPHS**  
 INTERIM MEASURES PERFORMANCE MONITORING  
 PG&E TOPOCK COMPRESSOR STATION  
 NEEDLES, CALIFORNIA





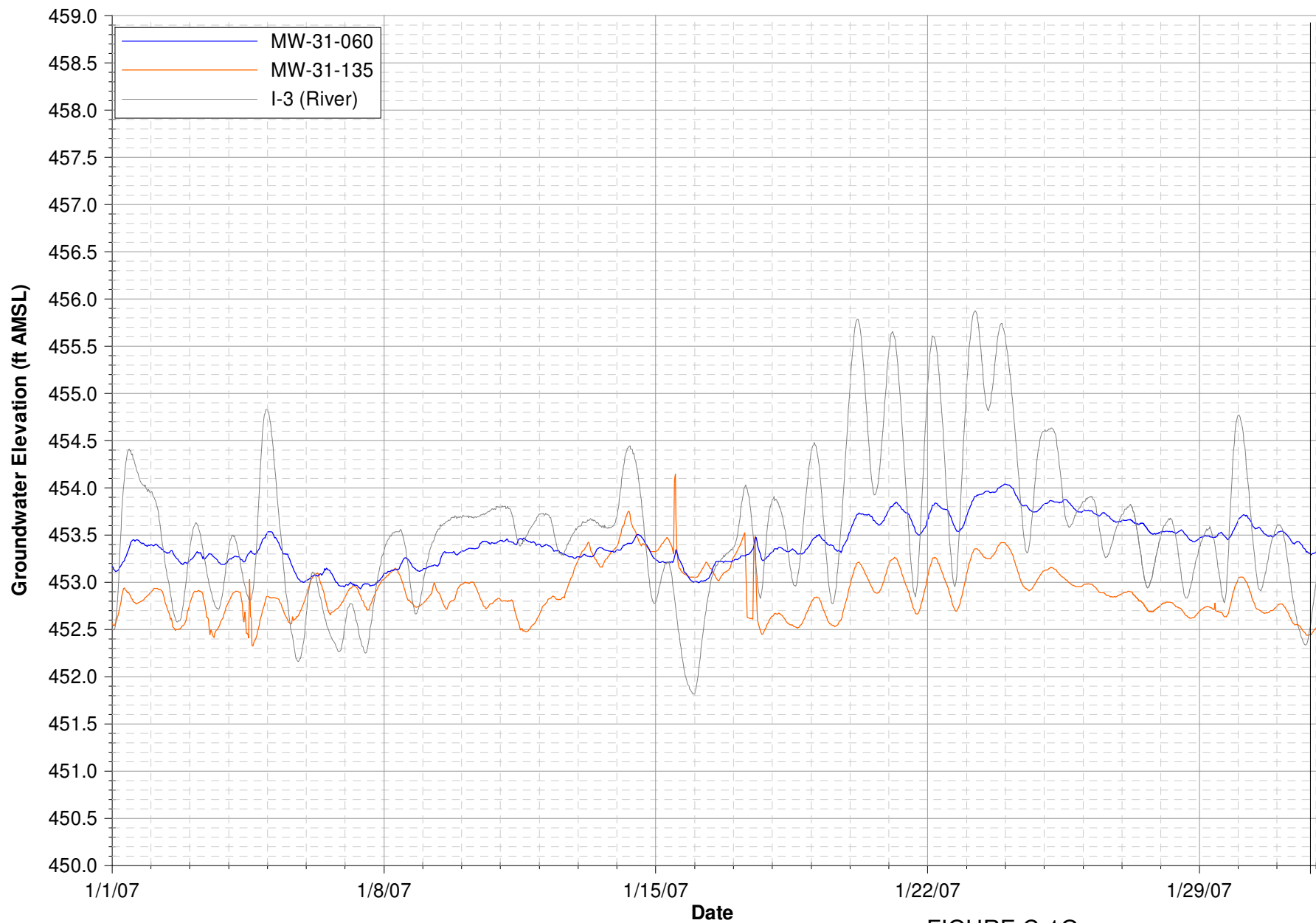
Notes:  
Data subject to review.

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



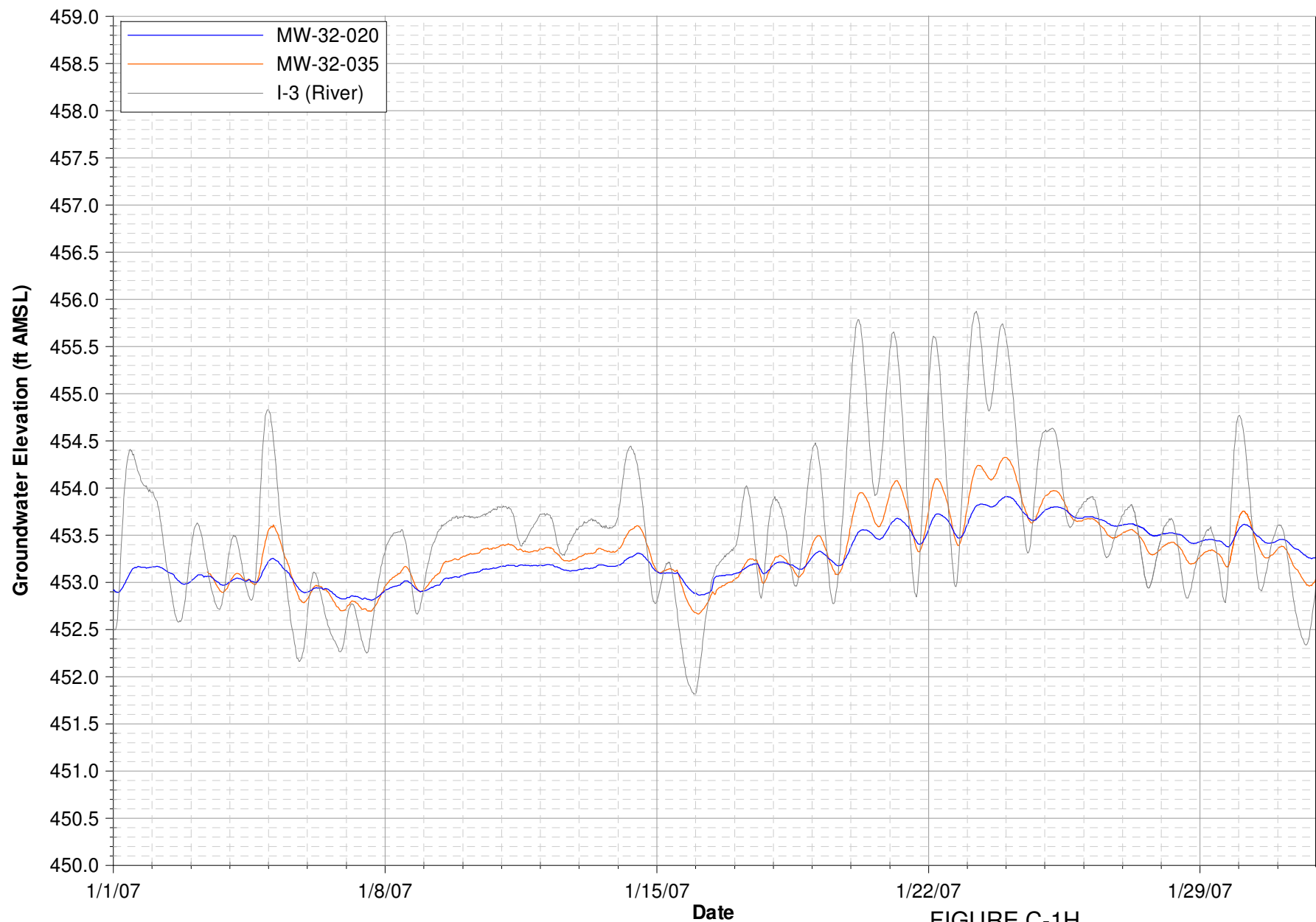
Notes:  
 Data subject to review.  
 MW-30-30 Data unavailable after 10/31/06.  
 MW-30-35 Data unavailable January 1 and January 2, 2007.

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



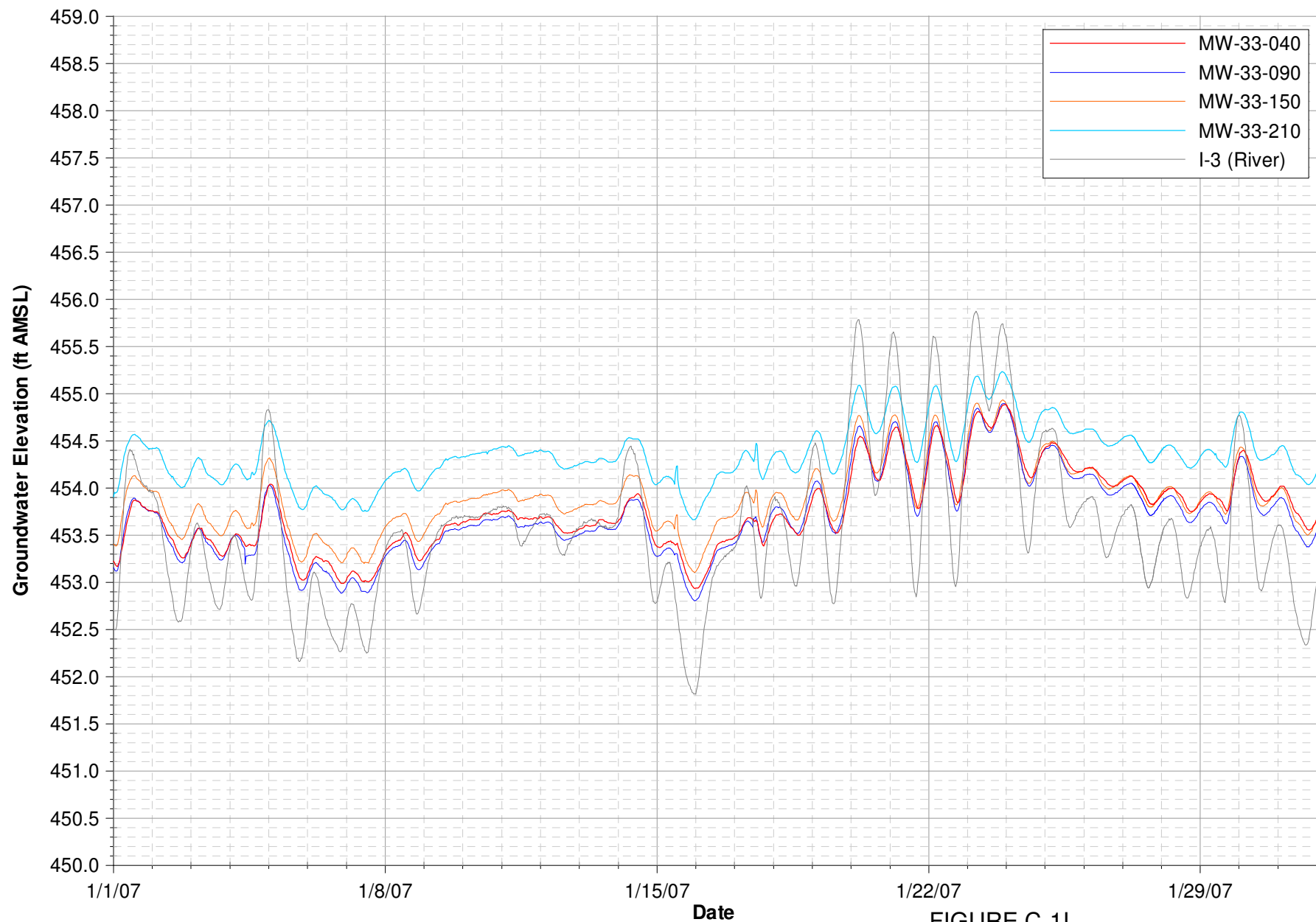
Notes:  
Data subject to review.

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



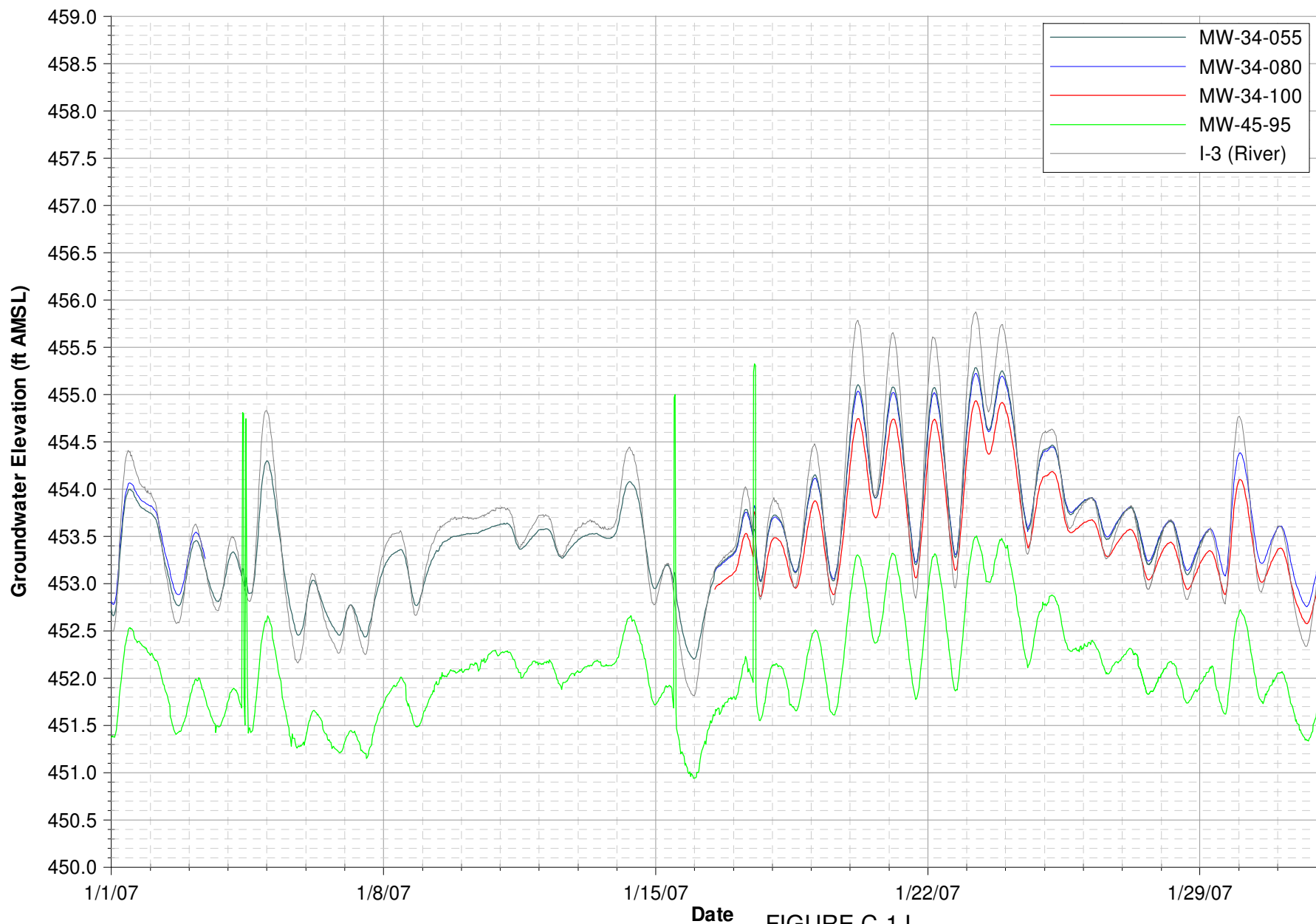
Notes:  
Data subject to review.  
MW-32-035 data unavailable 12/6/2006 through 1/3/2007.

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



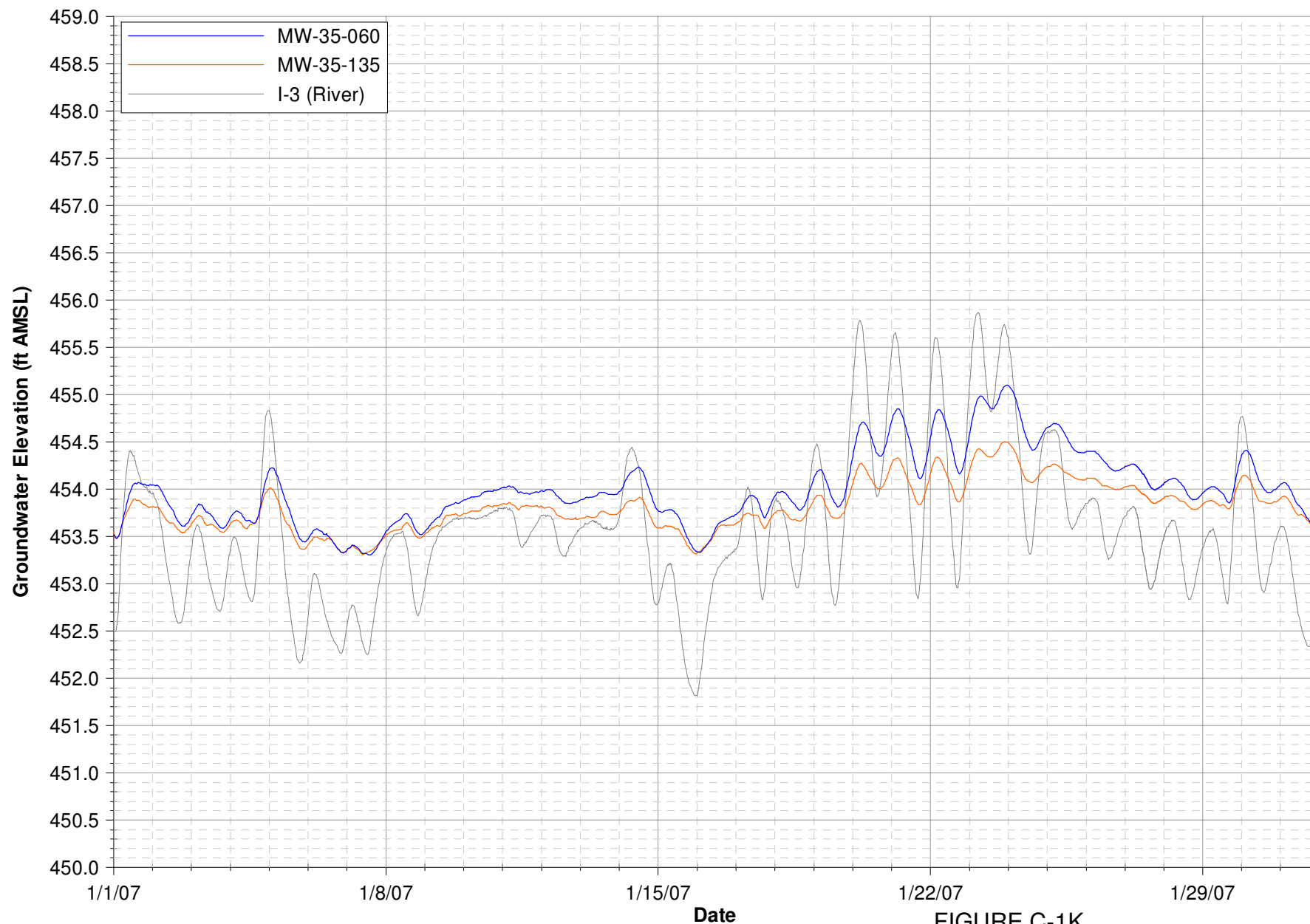
Notes:  
Data subject to review.

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



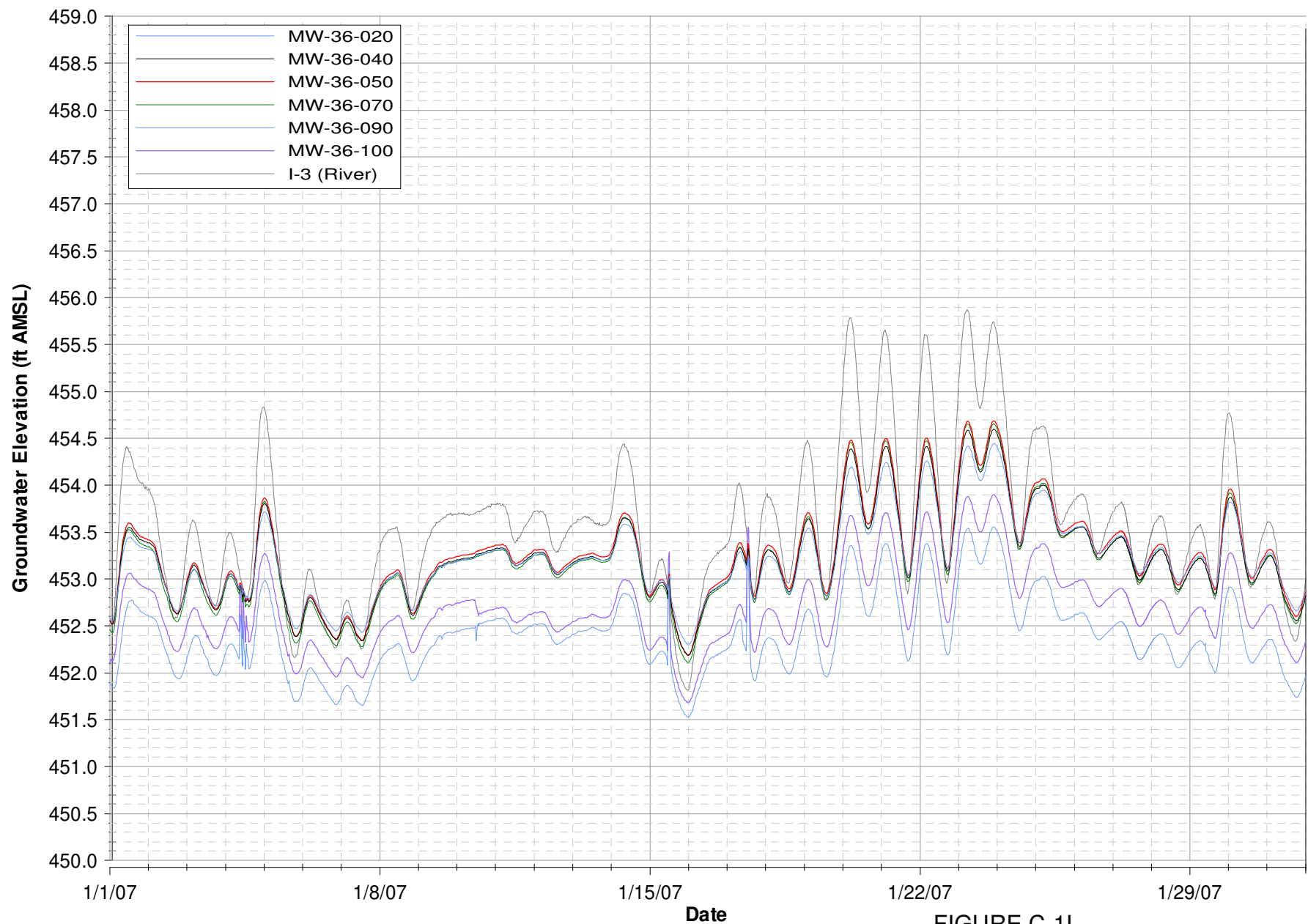
Notes:  
 Data subject to review.  
 MW-34-100 Data unavailable from January 1 through January 15, 2007.  
 MW-34-080 Data unavailable from January 4 through January 15, 2007.  
 MW-34-055 Data unavailable from January 30 through January 31, 2007.

**FIGURE C-1J**  
**MW-34 CLUSTER AND MW-45-95 HYDROGRAPHS**  
 INTERIM MEASURES PERFORMANCE MONITORING  
 PG&E TOPOCK COMPRESSOR STATION  
 NEEDLES, CALIFORNIA



Notes:  
Data subject to review.

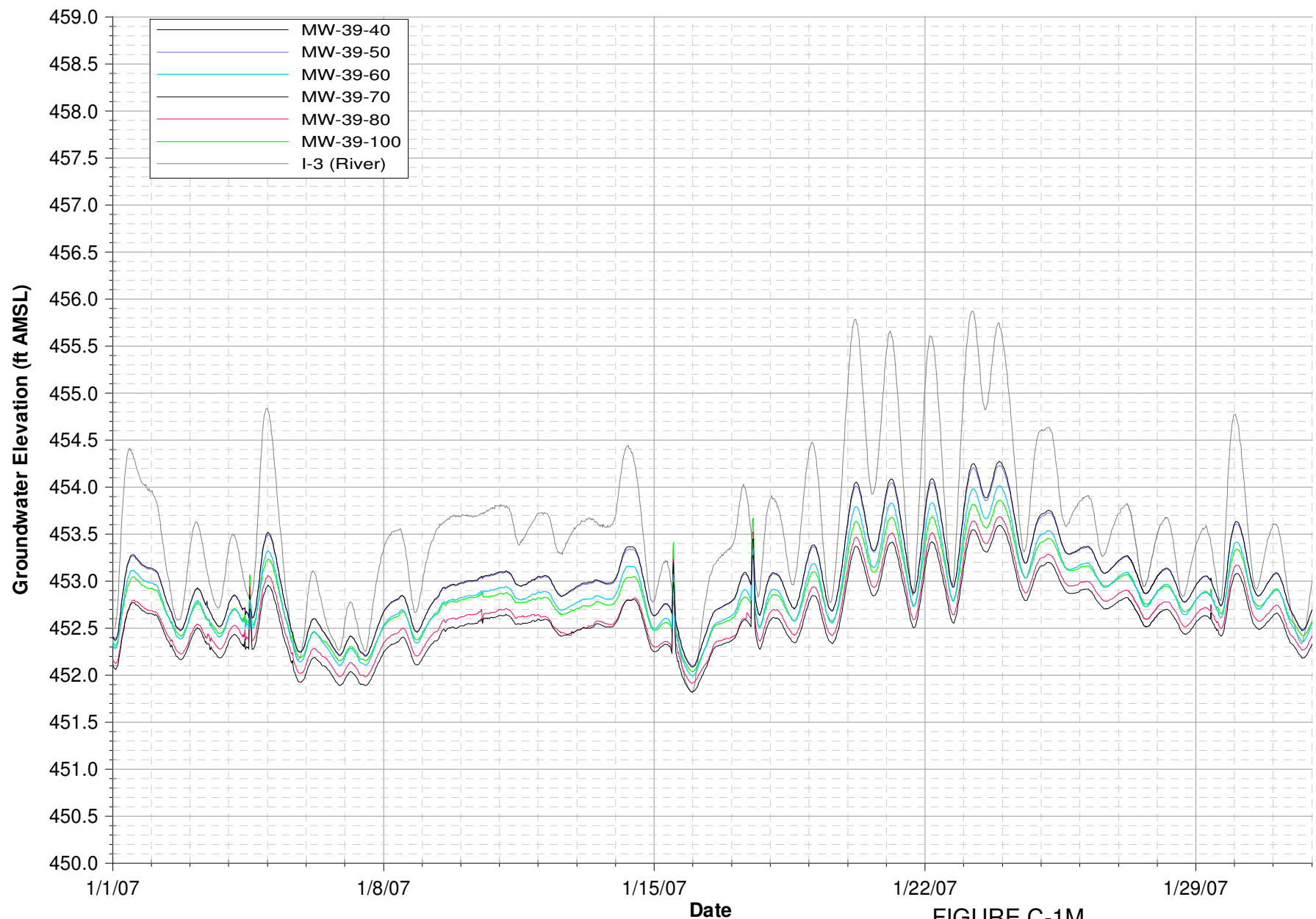
**FIGURE C-1K**  
**MW-35 WELL HYDROGRAPHS**  
INTERIM MEASURES PERFORMANCE MONITORING  
PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA



Notes:  
Data subject to review.

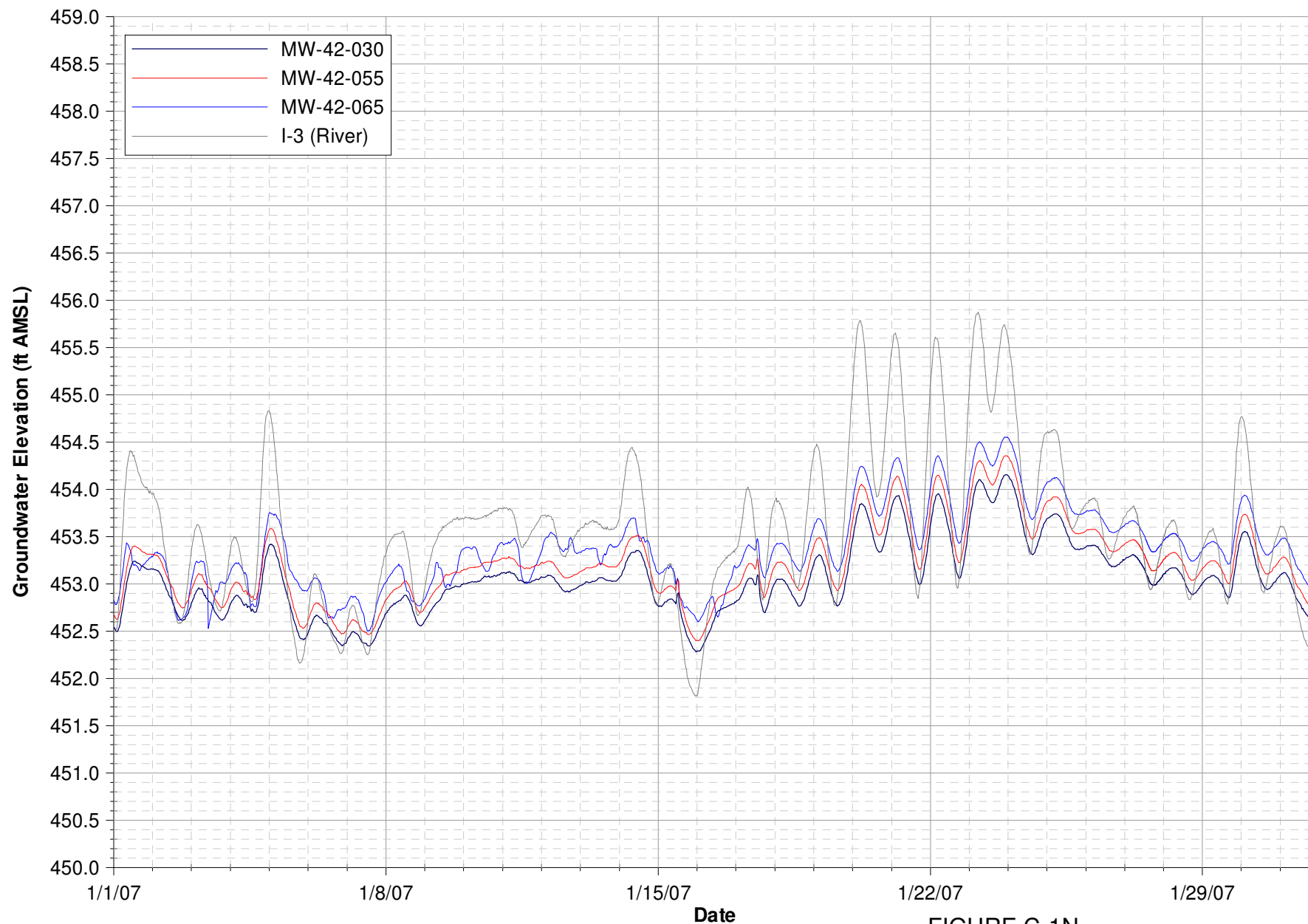
**FIGURE C-1L**  
**MW-36 CLUSTER**  
 INTERIM MEASURES PERFORMANCE MONITORING  
 PG&E TOPOCK COMPRESSOR STATION  
 NEEDLES, CALIFORNIA





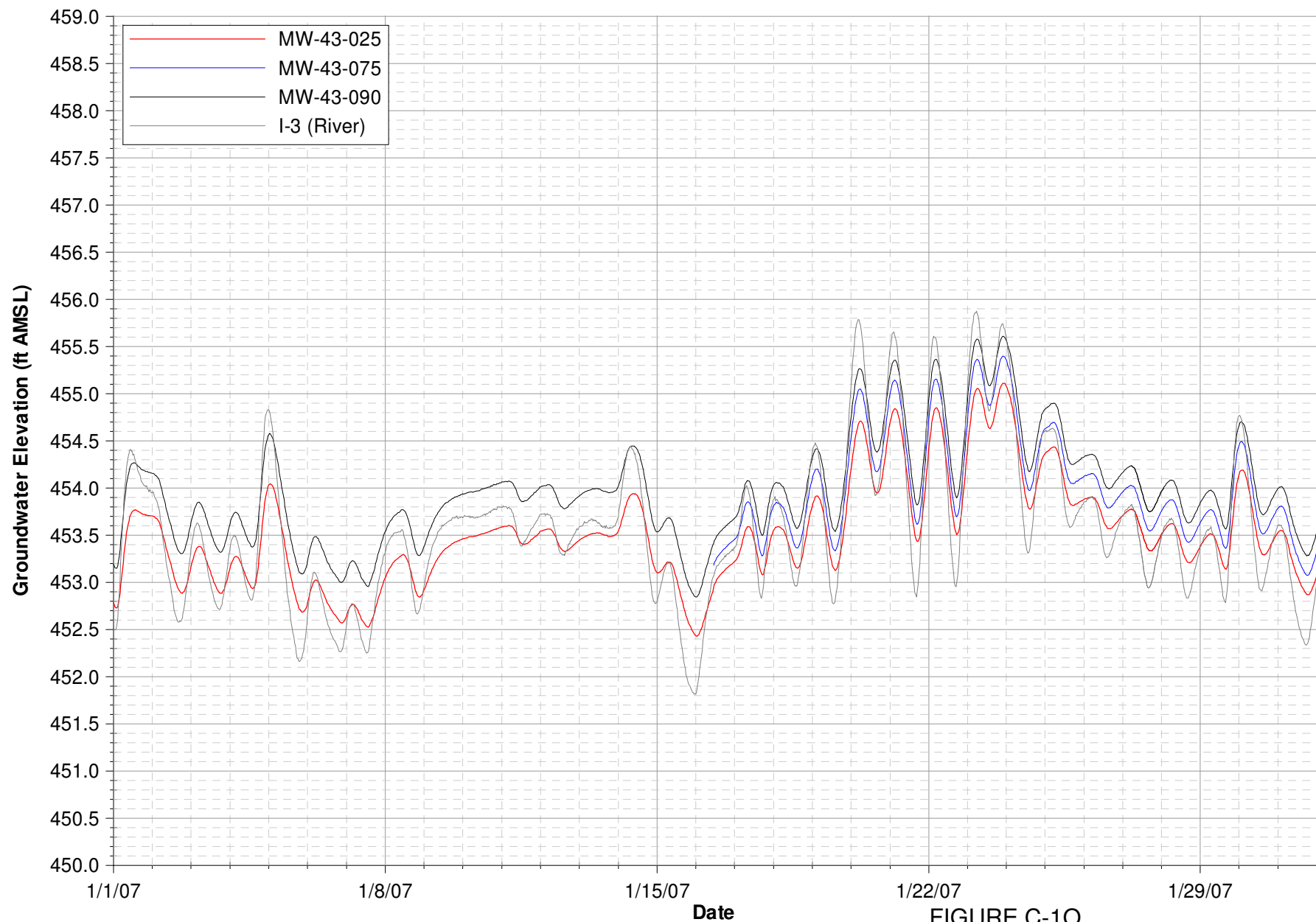
Notes:  
Data subject to review.

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



Notes:  
Data subject to review.

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



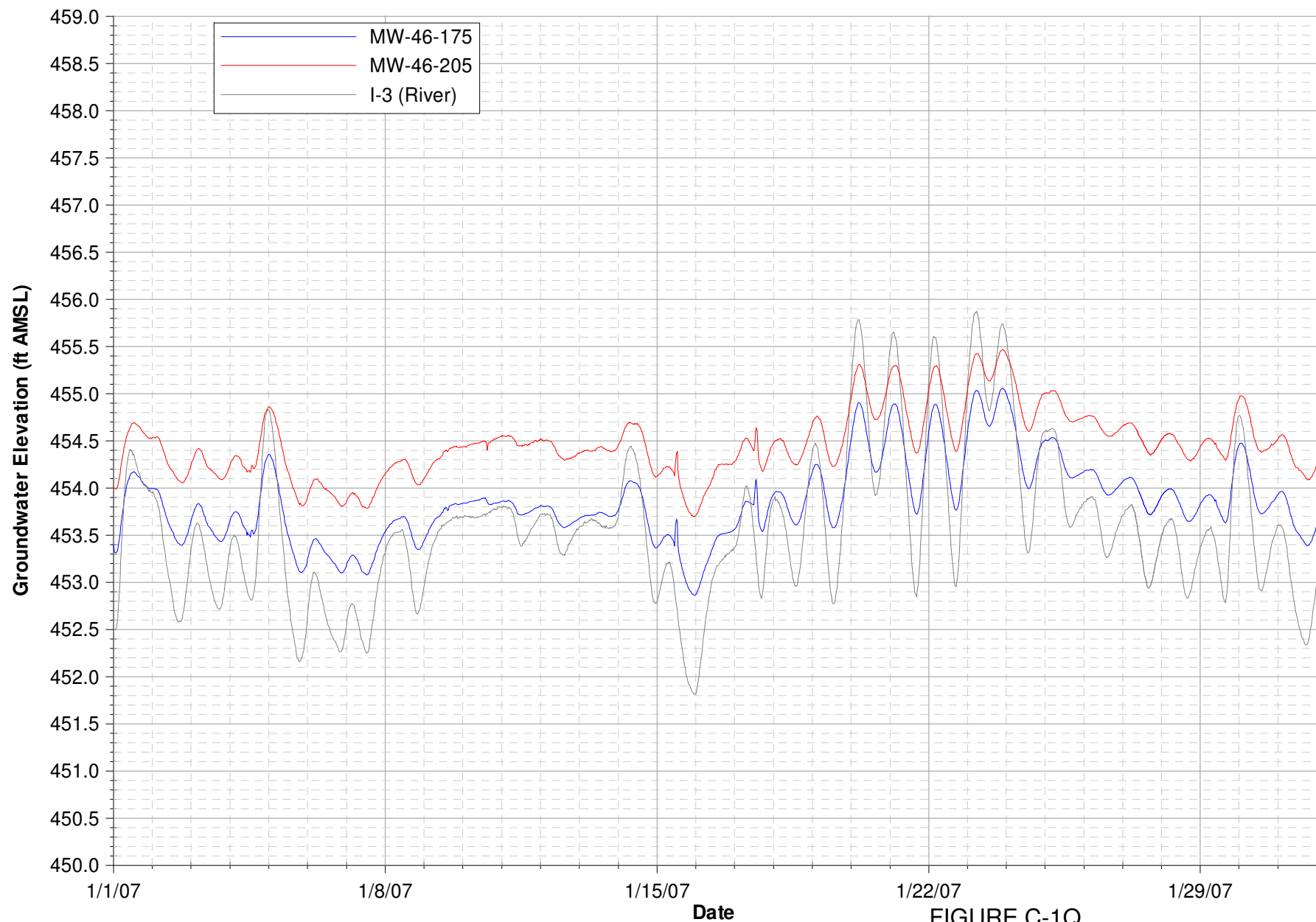
Notes:  
 Data subject to review.  
 MW-43-070 Data unavailable from January 1 through January 15, 2007.

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



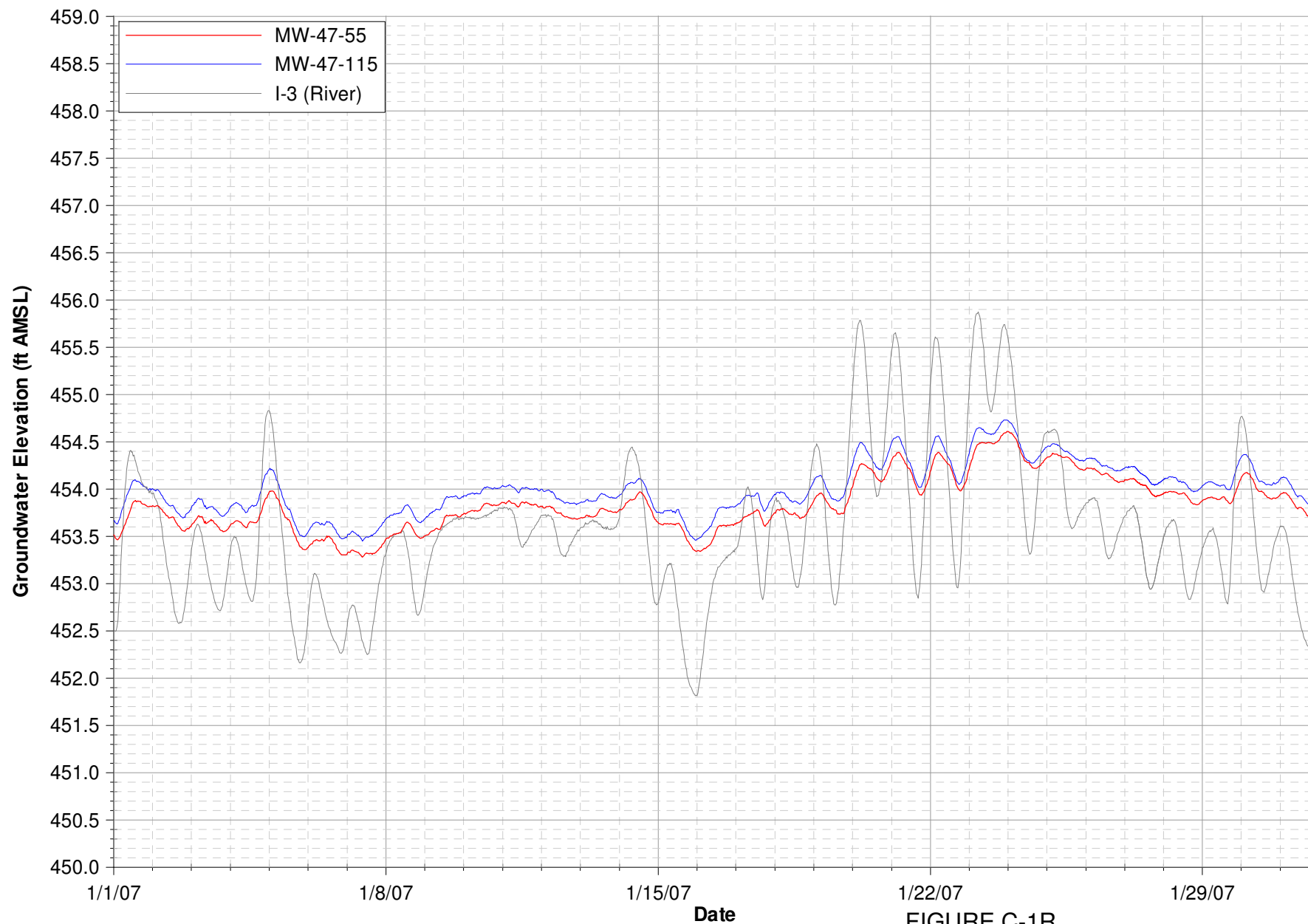
Notes:  
Data subject to review.

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



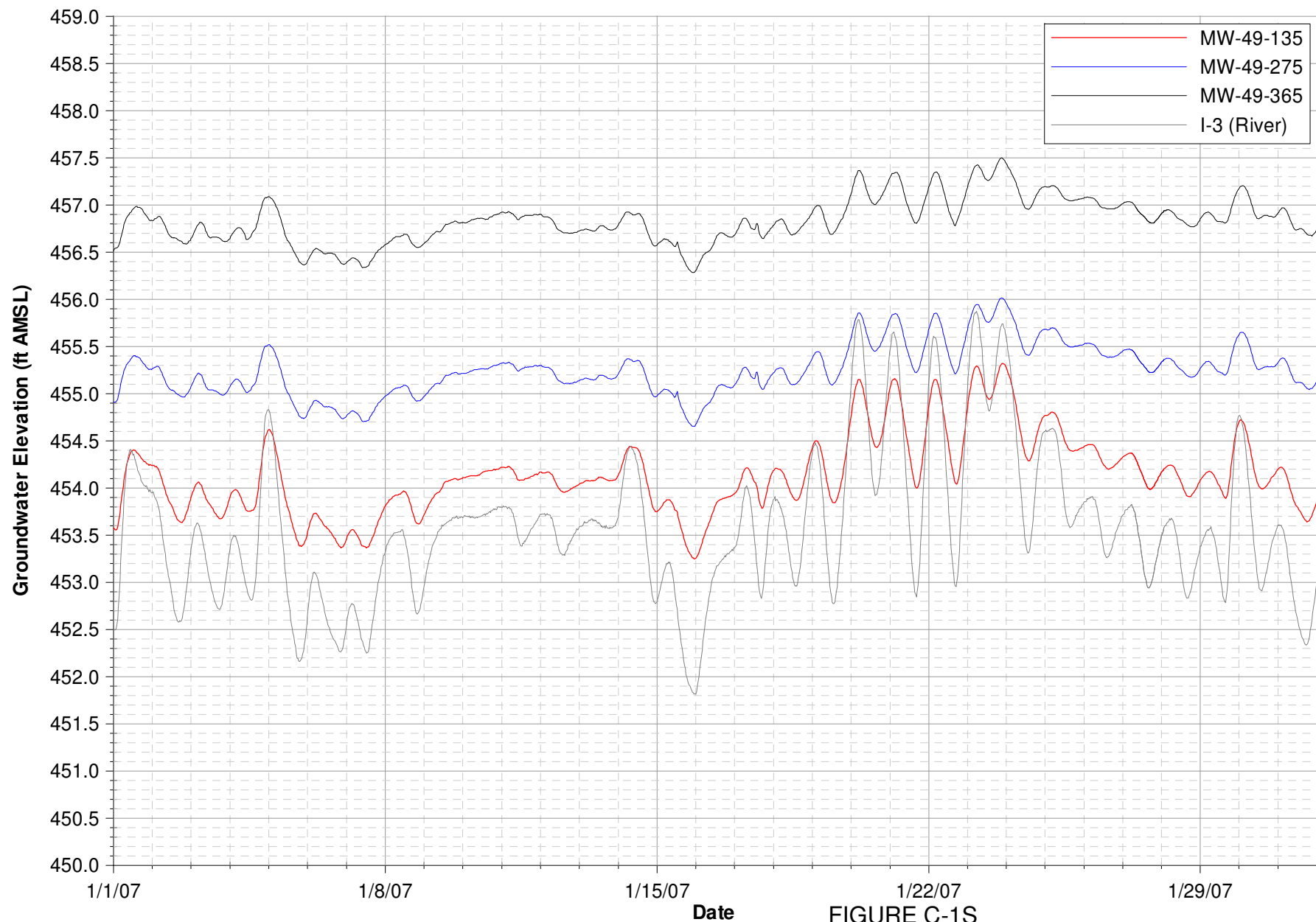
Notes:  
Data subject to review.

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



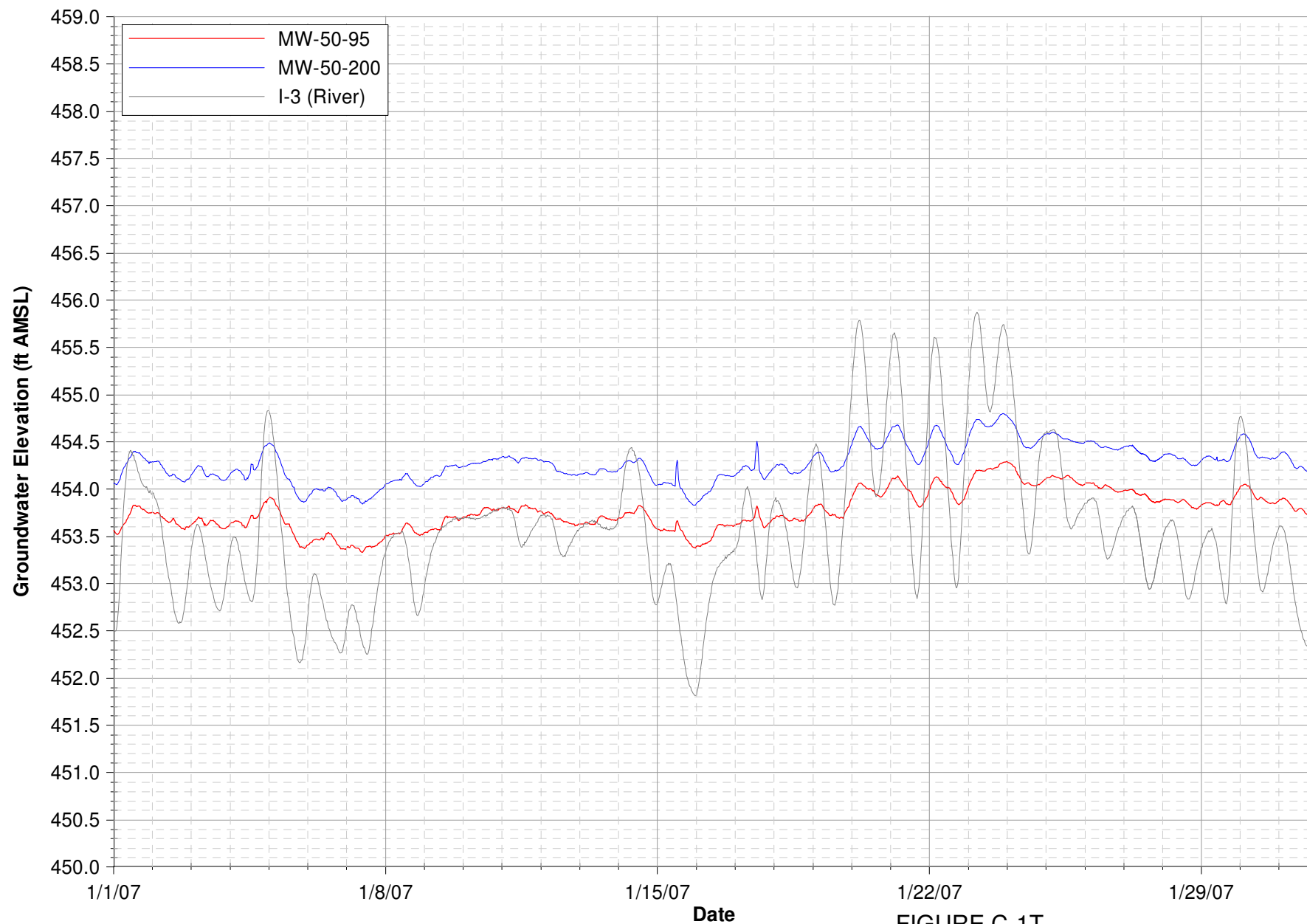
Notes:  
Data subject to review.

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



Notes:  
Data subject to review.

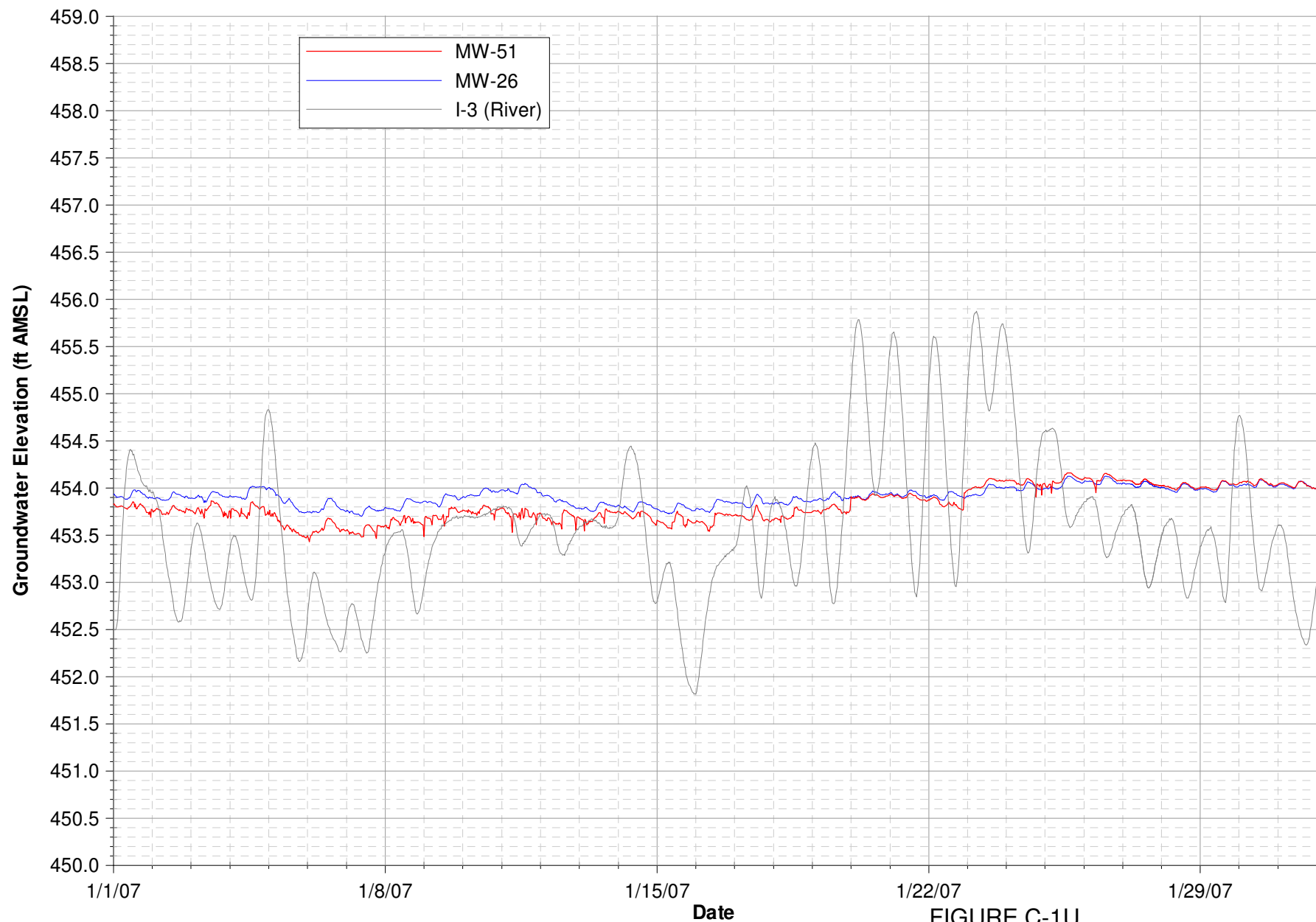
**FIGURE C-1S**  
**MW-49 CLUSTER HYDROGRAPHS**  
INTERIM MEASURES PERFORMANCE MONITORING  
PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA



Notes:  
Data subject to review.

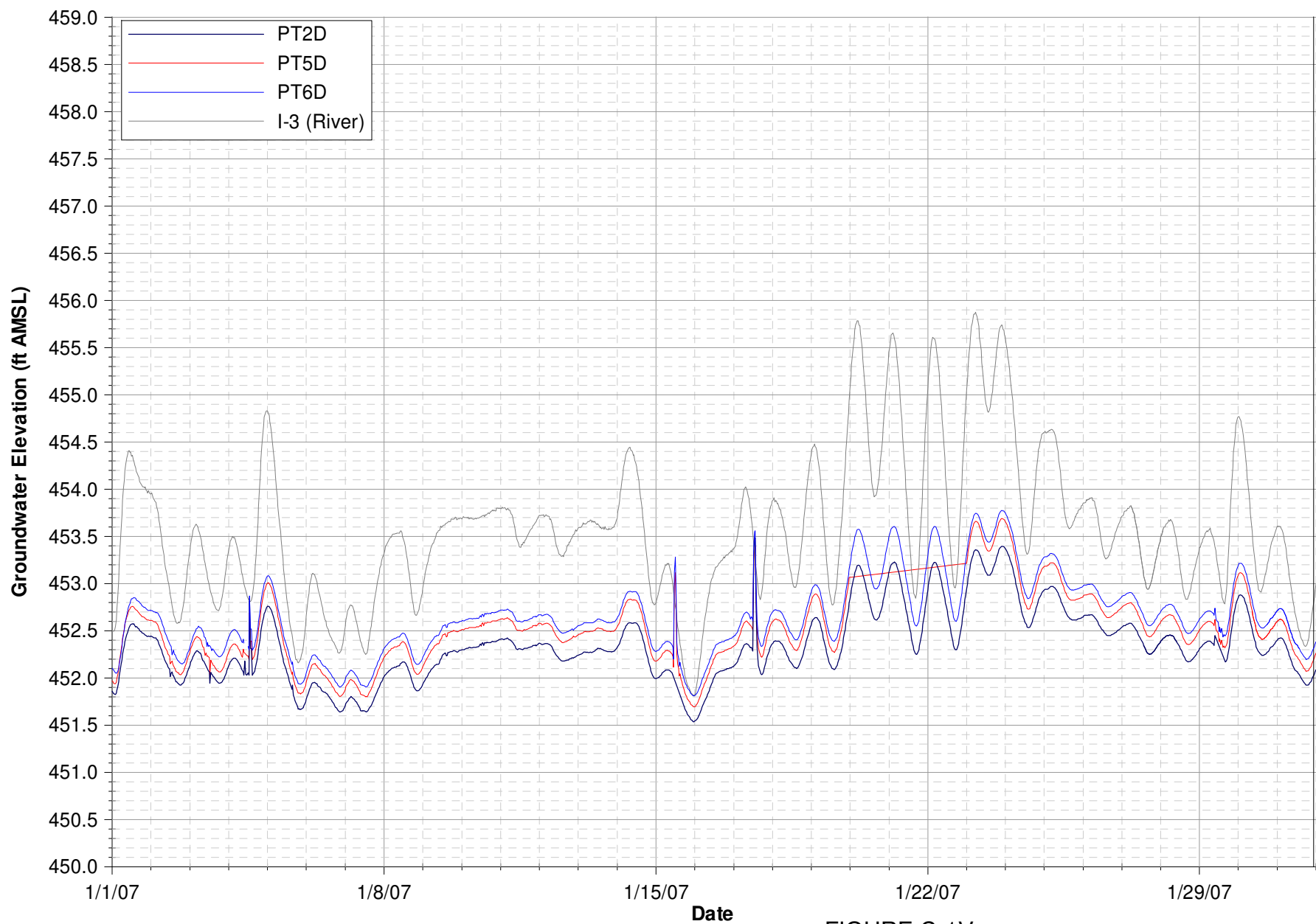
**FIGURE C-1T**  
**MW-50 CLUSTER HYDROGRAPHS**  
INTERIM MEASURES PERFORMANCE MONITORING  
PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA





Notes:  
Data subject to review.

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



Note: Data subject to review.  
PT5D data unavailable from January 20 through January 22, 2007.

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