

**Performance Monitoring Report No. 15,  
PG&E Topock Compressor Station,  
Interim Measures No. 2,  
February 1 through 28, 2005**

Prepared for  
**Pacific Gas and Electric Company**

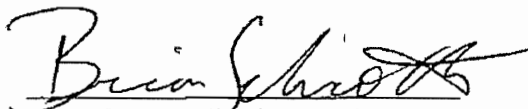
March 15, 2005

**CH2MHILL**

**Performance Monitoring Report No. 15**  
**PG&E Topock Compressor Station, Interim Measures No. 2**  
**February 1 through 28, 2005**

Prepared for  
Pacific Gas and Electric Company

This monitoring report was prepared under supervision of a  
California Registered Geologist,

A handwritten signature in black ink, reading "Brian Schroth". The signature is written in a cursive style with a horizontal line underneath the name.

Brian Schroth, Professional Geologist No. 7423  
Senior Hydrogeologist

# **Performance Monitoring Report No. 15, PG&E Topock Compressor Station, Interim Measures No. 2 February 1 through 28, 2005**

---

Pacific Gas and Electric Company (PG&E) is implementing Interim Measure (IM) No. 2 at the Topock Compressor Station near Needles, California, as described in the *Final Interim Measures Work Plan No. 2* prepared by CH2M HILL on March 2, 2004 and *Addenda to Interim Measures Work Plan No. 2*, prepared by CH2M HILL on March 1, 2004. This performance monitoring report describes operational and monitoring information for IM No. 2 for the period between February 1 and February 28, 2005.

This performance monitoring report has been prepared in compliance with the *Final Interim Measures Work Plan No. 2*, which requires reporting of system operations and performance monitoring data. Future reports will be submitted monthly on the 15<sup>th</sup> of each month, and each report will cover activities of the entire preceding month. The next report will be submitted on April 15<sup>th</sup>.

During late January and February a total of 11 new monitoring wells were installed at 5 locations on the floodplain. After hexavalent chromium was detected in samples from the new deep well at the MW-34 cluster, DTSC directed PG&E to install two soil borings and install a new extraction well (PE-1) at a location approximately 70 feet east of the MW-36 well cluster. These borings and the new extraction well were installed in late February and early March. Results from the field investigation and initial sampling from the new wells will be compiled in a field summary report to be delivered in early April.

As a result of the new hexavalent chromium detections, DTSC directed PG&E on February 16 to increase IM-2 pumping to the maximum possible rate. This required well MW-20-130 to be used as a pumping well. The pumping increase occurred on February 21. After well MW-20-130 began pumping, the water levels in this well could no longer be used to calculate accurate gradients in the aquifer. Water levels inside the casing of a pumping well are typically much lower than in the aquifer nearby.

In a letter dated February 14, 2005, DTSC directed PG&E to begin assessing the performance of the IM-2 pumping by maintaining a minimum monthly average 0.001 gradient between 3 key well pairs. MW-20-130 is included in two of these three key well pairs. So long as MW-20-130 is pumping, it is not appropriate to use the water levels in this well for calculating gradients. The third gradient well pair includes newly installed well MW-33-150 and MW-31-135. The new MW-33-150 well was one of the last wells installed and there were no water level data available from this well to allow calculation of a monthly average gradient in February. Because it was not possible to calculate accurate gradients at the key well pairs this month, this report presents the gradient maps in the format that has been presented in previous monthly progress reports. After pumping from MW-20-130 is stopped and

sufficient water level data can be collected to calculate average monthly gradients for the other key well pairs, the gradients will be calculated and presented in the subsequent progress report.

## **System Operations**

### **Batch Plant Description**

On May 21, 2004, the United States Bureau of Land Management approved the PG&E work plan to modify the existing operations to batch treat the water onsite. The modifications were started on June 9, 2004 and completed on July 15, 2004. Start-up and testing of the batch plant began on July 19, 2004.

Treatment is completed in three steps: (1) chromium reduction by reaction with ferrous chloride to reduce the hexavalent chromium to the less soluble trivalent form, (2) iron oxidation to precipitate out excess iron and reduced chromium, and (3) clarification to remove the precipitated solids from the water. Treated water from the clarifier is transferred to holding tanks for off-site disposal. Precipitated solids are periodically pumped from the clarifier into a container (phase separator) for off-site disposal.

### **System Operations**

Table 1 summarizes the pumping data for the reporting period. An average pumping rate of approximately 69 gallons per minute from TW-2D was maintained from February 1 through February 21, 2005. On February 16, 2005, the California Department of Toxic Substances Control (DTSC) directed PG&E to increase the pumping rate to the maximum available capacity of the IM No. 2 batch treatment system. The pump rate was increased on February 21, 2005 after coordinating additional transportation and arranging for additional disposal capacity for the treated water at United States Filter Corporation in Los Angeles, California. From February 21 to February 28, 2005, a pump rate of approximately 88.5 gpm was achieved by pumping from TW-2D at 79.1 gpm and re-starting pumping operations from monitoring well MW-20-120 at 9.4 gpm. Small daily fluctuations (i.e., 1 to 2 gpm) in recorded pump rates and volumes have been observed due to daily fluctuations in water levels, potential intermittent changes in power supply from the generator(s), and inherent limitations in flow meter accuracy (typically 1 to 2%). No other changes in pump rates were recorded during this monitoring period.

A total of 2,983,475 gallons of groundwater were extracted and batch treated during this reporting period. The monthly average pumping rate, including system downtime, was 74 gpm. The batch treated water was manifested as a RCRA non-hazardous waste and transported to United States Filter Corporation in Los Angeles, California for additional treatment and disposal. Solids accumulated in the clarifier were disposed as a RCRA hazardous waste at the Waste Management, Kettleman Hills Facility.

**TABLE 1**

Pump Data from TW-2S, TW-2D, and MW-20-130 (February 1 through February 28, 2005)  
Performance Monitoring Report No. 15, Topock Compressor Station, Interim Measure No. 2

| Extraction Well   | Reporting Period <sup>3</sup>              |                     | Project To Date                |
|---|--|---------------------|--------------------------------|
|   | Average Pumping Rate <sup>4</sup><br>(gpm) | Volume Pumped (gal) | Cumulative Volume Pumped (gal) |
| TW-2S <sup>1</sup>  | 0  | 0                   | 486,358                        |
| TW-2D   | 71.6                                       | 2,884,900           | 19,315,280                     |
| MW-20-130 <sup>2</sup>  | 9.4  | 98,575              | 847,077                        |
| <b>Total</b>  | ---  | 2,983,475           | 20,648,715                     |
| Volume Previously Pumped from MW-20-70 and MW-20-100 <sup>5</sup> |  |                     | 475,823                        |
| Total Volume Pumped (gal)   |  |                     | 21,124,538                     |
| Total Volume Pumped (ac-ft)                                       |  |                     | 64.8                           |

gpm: gallons per minute.

gal: gallons.

ac-ft: acre-feet.

<sup>1</sup>Pumping from TW-2S was temporarily terminated on June 11, 2004.

<sup>2</sup>Well MW-20-130 restarted on February 21, 2005. Cumulative volume pumped includes the volume pumped from MW-20-130 between March 8, 2004 and May 13, 2004.

<sup>3</sup>Pumping results during the reporting period are based on readings collected between January 31, 2005 at 8:20 pm and February 28, 2005 at 7:50 pm (28.0 days)

<sup>4</sup>The "Average Pumping Rate" is the overall average during the reporting period, including system downtime based on flow meter totalizer readings.

<sup>5</sup>Volume pumped between March 8, 2004 and May 13, 2004.

Daily inspections include tank inspections, flow measurements, site security, and desert tortoise sitings. Daily logs with documentation of inspections are maintained on site. Significant precipitation events occurred on February 11, 12, 17, 18, 22, and 23, as well as trace precipitation on February 15, 16, 21, and 26 2005. Total February rainfall for the area measured at the Needles, California airport was approximately 1.9 inches.

## Extracted Water Analytical Results

Two grab samples were collected from TW-2D and one grab sample was collected from MW-20-130 in conjunction with system operations during this reporting period. Table 2 summarizes analytical results from TW-2S, TW-2D, and MW-20-130 since May 19, 2004.

## Hydraulic Monitoring

### Hydraulic Data

Water levels were recorded at intervals of 30 minutes with pressure transducers in multiple wells and two river monitoring stations (I-3 and RRB). The data are typically continuous with only short interruptions for sampling or maintenance. The wells monitored were:

- **Floodplain Wells:** MW-27, MW-28 cluster (2), MW-29, MW-30 cluster (2), MW-32 cluster (2), MW-33 cluster (2), MW-34 cluster (2), MW-36 cluster (6), and MW-39 cluster (6).
- **Intermediate Wells:** MW-19, MW-20 cluster (3), MW-26, MW-31 cluster (2), MW-35 cluster (2), TW-2S, TW-2D.
- **Basin Wells:** MW-10, MW-25.

Hydrographs for all wells with transducers are provided as Attachment 1; the Colorado River elevation at I-3 is shown on all hydrographs. Reported groundwater elevations (or hydraulic heads) are adjusted for temperature and for salinity differences between wells (i.e., adjusted to a common freshwater equivalent).

The average and the minimum and maximum daily average groundwater/river elevations have been calculated from the transducer data for the February reporting period (February 1 to 28, 2005). These values are shown on Figures 1, 2, and 3.

### Evaluation of Groundwater Gradients From the Reporting Period

Hydraulic data are summarized and groundwater elevations contoured by zone of unconsolidated aquifer (UA) on the following figures:

Figure 1 – Upper Unconsolidated Aquifer Zone (Upper UA)

Figure 2 – Middle Unconsolidated Aquifer Zone (Middle UA)

Figure 3 – Lower Unconsolidated Aquifer Zone (Lower UA)

The groundwater elevations for the middle and lower zones of the UA indicate landward hydraulic gradients along the floodplain. A landward hydraulic gradient was also observed in the upper zone of the UA, although less pronounced than in the middle and lower zones. To the west of the pumping area, the regional hydraulic gradient in the Upper UA is easterly and consistent with regional gradients outside of the river area.

Figure 4 shows the location of a hydrogeologic section B1 that runs east-west through monitoring points between the MW-20 bench and the Colorado River. Figure 5 shows the average groundwater elevations along section B1. Data indicate a strong gradient toward the pumping well between MW-30-50 and the 20-bench. In addition, downward gradients in the MW-36 and MW-34 clusters suggest the increased influence of TW-2D pumping compared to past evaluation periods. The water level inside the pumping well has not been posted or contoured on these figures because drawdown in actively pumping wells can be exaggerated due to well inefficiency.

Attachment 2 includes longer-term groundwater elevation contour maps for each zone of the UA using averaged groundwater elevation data from June 15 through February 28, 2005. Groundwater gradients in the lower and middle zones of the UA are landward based on these averaged data. Groundwater gradients in the upper zone of the UA are flatter, but are landward in the floodplain in the vicinity of TW-2D.

The correlation between Colorado River levels and United States Bureau of Reclamation (USBR) records for Davis Dam discharge has been used to estimate future river levels from of USBR discharge projections. The predicted river levels are input to the groundwater

model to help estimate future pumping requirements. Measured Davis Dam discharges do not always agree with USBR projections.

Table 3 summarizes the estimated and actual dam discharges and river elevations since April 2004. The actual Davis Dam February 2005 discharge (monthly average) was significantly less (4,820 cubic feet per second [cfs]) than the USBR projected discharge for the February reporting period (8,000 cfs). Correspondingly, the actual Colorado River elevation at I-3 (monthly average) was significantly lower (0.5 feet) than the predicted elevation for the February reporting period.

### **Groundwater Chemistry from the Reporting Period**

Hexavalent chromium concentrations for monitoring wells in the vicinity of the MW-20 bench are presented in plan view for the three zones of UA and vertically along hydrogeologic section B1. These figures are included as Attachment 3. Analytical results from the most recent sampling event are included for each monitoring well.

Hexavalent chromium concentration trend graphs for February 2004 through February 2005 are presented in tandem with hydrographs for each monitoring well in the vicinity of the MW-20 bench. These graphs are included as Attachment 4.

### **Future Activities**

Reporting of Interim Measures No. 2 activities will continue as described in the *Final Interim Measures Work Plan No. 2*. The next status report will be submitted on April 15th, 2005 and will cover activities from March 1 to March 31, 2005.

Full-time pumping from TW-2D and MW-20-130 will continue in March 2005. The USBR projects that Davis Dam releases in March 2005 will be increased relative to February rates. Calculations based on this projected dam release increase indicate a corresponding increase in river level of approximately 2.7 foot over the average river level measured in February 2005. Future adjustments in pump rates from TW-2D will be proposed based on expected river levels, observed groundwater gradients, potential system modifications, and other relevant factors.

Table 2  
Analytical Results - Extraction Wells  
Topock Interim Measures No. 2

| Sample Time<br>Relative to TW-2<br>Pumping Start | TW-2S          |  |                                |                                      | TW-2D          |  |                                |                                      | MW-20-130      |  |                                |                                      | TW-2 Combined  |  |                                |                                      |
|--|----------------|--|--------------------------------|--------------------------------------|----------------|--|--------------------------------|--------------------------------------|----------------|--|--------------------------------|--------------------------------------|----------------|--|--------------------------------|--------------------------------------|
|  | Sample<br>Date | Total<br>Dissolved<br>Chromium<br>mg/L | Hexavalent<br>Chromium<br>mg/L | Total<br>Dissolved<br>Solids<br>mg/L | Sample<br>Date | Total<br>Dissolved<br>Chromium<br>mg/L | Hexavalent<br>Chromium<br>mg/L | Total<br>Dissolved<br>Solids<br>mg/L | Sample<br>Date | Total<br>Dissolved<br>Chromium<br>mg/L | Hexavalent<br>Chromium<br>mg/L | Total<br>Dissolved<br>Solids<br>mg/L | Sample<br>Date | Total<br>Dissolved<br>Chromium<br>mg/L | Hexavalent<br>Chromium<br>mg/L | Total<br>Dissolved<br>Solids<br>mg/L |
| 6 days   | 19-May-04      | 6.61                                   | 7.36                           | 2,620                                | 19-May-04      | 7.06                                   | 7.77                           | 7,740                                | NS             |  |                                |                                      | 19-May-04      | 6.68                                   | 7.58                           | 5,230                                |
| 13 days  | 26-May-04      | 6.68                                   | 7.00                           | 2,700                                | 26-May-04      | 7.15                                   | 7.47                           | 7,620                                | NS             |  |                                |                                      | 26-May-04      | 7.29                                   | 7.19                           | 5,520                                |
| 20 days  | 02-Jun-04      | 7.93                                   | 7.19                           | 2,690                                | 02-Jun-04      | 7.02                                   | 7.33                           | 7,540                                | NS             |  |                                |                                      | 02-Jun-04      | 6.93                                   | 7.33                           | 5,350                                |
| 27 days  | 09-Jun-04      | 6.82                                   | 7.19                           | 2,740                                | 09-Jun-04      | 6.98                                   | 7.41                           | 7,540                                | NS             |  |                                |                                      | 09-Jun-04      | 6.81                                   | 7.50                           | 5,300                                |
| 34 days  | NS             |  |                                |                                      | 16-Jun-04      | 7.55                                   | 7.11                           | 7,400                                | NS             |  |                                |                                      | NS             |  |                                |                                      |
| 41 days  | NS             |  |                                |                                      | 23-Jun-04      | 7.11                                   | 6.75                           | 7,200                                | NS             |  |                                |                                      | NS             |  |                                |                                      |
| 48 days  | NS             |  |                                |                                      | 30-Jun-04      | 6.37                                   | 6.64                           | 7,060                                | NS             |  |                                |                                      | NS             |  |                                |                                      |
| 56 days  | NS             |  |                                |                                      | 06-Jul-04      | 7.29                                   | 6.29                           | 7,150                                | NS             |  |                                |                                      | NS             |  |                                |                                      |
| 62 days  | NS             |  |                                |                                      | 14-Jul-04      | 5.92                                   | 6.15                           | 7,020                                | NS             |  |                                |                                      | NS             |  |                                |                                      |
| 69 days  | NS             |  |                                |                                      | 21-Jul-04      | 5.74                                   | 6.20                           | 6,830                                | NS             |  |                                |                                      | NS             |  |                                |                                      |
| 76 days  | NS             |  |                                |                                      | 28-Jul-04      | 5.66                                   | 6.01                           | 6,760                                | NS             |  |                                |                                      | NS             |  |                                |                                      |
| 83 days  | NS             |  |                                |                                      | 04-Aug-04      | 5.95                                   | 6.06                           | 7,140                                | NS             |  |                                |                                      | NS             |  |                                |                                      |
| 98 days  | NS             |  |                                |                                      | 19-Aug-04      | 7.61                                   | 6.20                           | 6,700                                | NS             |  |                                |                                      | NS             |  |                                |                                      |
| 105 days   | NS             |  |                                |                                      | 26-Aug-04      | 5.31                                   | 6.03                           | 6,620                                | NS             |  |                                |                                      | NS             |  |                                |                                      |
| 111 days   | NS             |  |                                |                                      | 01-Sep-04      | 6.26                                   | 6.03                           | 6,730                                | NS             |  |                                |                                      | NS             |  |                                |                                      |
| 118 days   | NS             |  |                                |                                      | 08-Sep-04      | 6.20                                   | 6.33                           | 6,960                                | NS             |  |                                |                                      | NS             |  |                                |                                      |
| 119 days   | NS             |  |                                |                                      | 09-Sep-04      | 6.47                                   | 6.17                           | 6,520                                | NS             |  |                                |                                      | NS             |  |                                |                                      |
| 125 days   | NS             |  |                                |                                      | 15-Sep-04      | 6.31                                   | 6.30                           | 6,430                                | NS             |  |                                |                                      | NS             |  |                                |                                      |
| 132 days   | NS             |  |                                |                                      | 22-Sep-04      | 6.37                                   | 6.39                           | 6,650                                | NS             |  |                                |                                      | NS             |  |                                |                                      |
| 147 days   | NS             |  |                                |                                      | 07-Oct-04      | 5.88                                   | 6.72                           | 6,770                                | NS             |  |                                |                                      | NS             |  |                                |                                      |
| 153 days   | NS             |  |                                |                                      | 13-Oct-04      | 7.02                                   | 6.77                           | 6,430                                | NS             |  |                                |                                      | NS             |  |                                |                                      |
| 160 days   | NS             |  |                                |                                      | 20-Oct-04      | 6.47                                   | 6.66                           | 6,270                                | NS             |  |                                |                                      | NS             |  |                                |                                      |
| 173 days   | NS             |  |                                |                                      | 02-Nov-04      | 6.28                                   | 6.72                           | 6,310                                | NS             |  |                                |                                      | NS             |  |                                |                                      |
| 189 days   | NS             |  |                                |                                      | 18-Nov-04      | 6.38                                   | 6.91                           | 6,140                                | NS             |  |                                |                                      | NS             |  |                                |                                      |
| 202 days   | NS             |  |                                |                                      | 01-Dec-04      | 7.98                                   | 6.50                           | 5,980                                | NS             |  |                                |                                      | NS             |  |                                |                                      |
| 209 days   | NS             |  |                                |                                      | 08-Dec-04      | 6.47                                   | 6.28                           | 6,350                                | NS             |  |                                |                                      | NS             |  |                                |                                      |
| 217 days   | NS             |  |                                |                                      | 16-Dec-04      | 6.19                                   | 6.58                           | 6,290                                | NS             |  |                                |                                      | NS             |  |                                |                                      |
| 230 days   | NS             |  |                                |                                      | 29-Dec-04      | 5.82                                   | 6.53                           | 5,890 <sup>3</sup>                   | NS             |  |                                |                                      | NS             |  |                                |                                      |
| 237 days   | NS             |  |                                |                                      | 05-Jan-05      | 5.58                                   | 6.39                           | 5,633 <sup>3</sup>                   | NS             |  |                                |                                      | NS             |  |                                |                                      |
| 244 days   | NS             |  |                                |                                      | 12-Jan-05      | 5.93                                   | 6.20 <sup>4</sup>              | 5,750                                | NS             |  |                                |                                      | NS             |  |                                |                                      |
| 251 days   | NS             |  |                                |                                      | 19-Jan-05      | 6.24                                   | 6.50                           | 6,120                                | NS             |  |                                |                                      | NS             |  |                                |                                      |
| 259 days   | NS             |  |                                |                                      | 27-Jan-05      | 5.91                                   | 6.11                           | 5,240                                | NS             |  |                                |                                      | NS             |  |                                |                                      |
| 272 days   | NS             |  |                                |                                      | 09-Feb-05      | 5.91                                   | 5.87                           | 5,450                                | NS             |  |                                |                                      | NS             |  |                                |                                      |
| 286 days   | NS             |  |                                |                                      | 23-Feb-05      | 5.68                                   | 6.09                           | 5,330                                | 23-Feb-05      | 9.55                                   | 10.2                           | 7,470                                | NS             |  |                                |                                      |

Notes:

1. NS = Not Sampled; MW-20-130 was not sampled for the purpose of IM2 system operations between May 19, 2004 and February 22, 2005
2. Sampling of TW-2S and TW-2 combined were halted when pumping from TW-2S was temporarily terminated on June 11, 2004 per DTSC direction.
3. Value is based on re-analysis conducted after 14 day holding time.
4. Value is estimated because sample exceeded 24-hour holding time before analysis.



**Table 3**  
**Predicted and Actual Monthly Average Davis Dam Discharge and Colorado River Elevation at I-3**  
**PG&E Topock**

| Month          | Davis Dam Release<br>(cfs) |        |            | Colorado River Elevation at I-3<br>(ft AMSL or ft) |        |            |
|----------------|----------------------------|--------|------------|--|--------|------------|
|                | Projected                  | Actual | Difference | Predicted  | Actual | Difference |
| 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                     | --     | --         | 455.8  | --     | --         |

**Notes:**

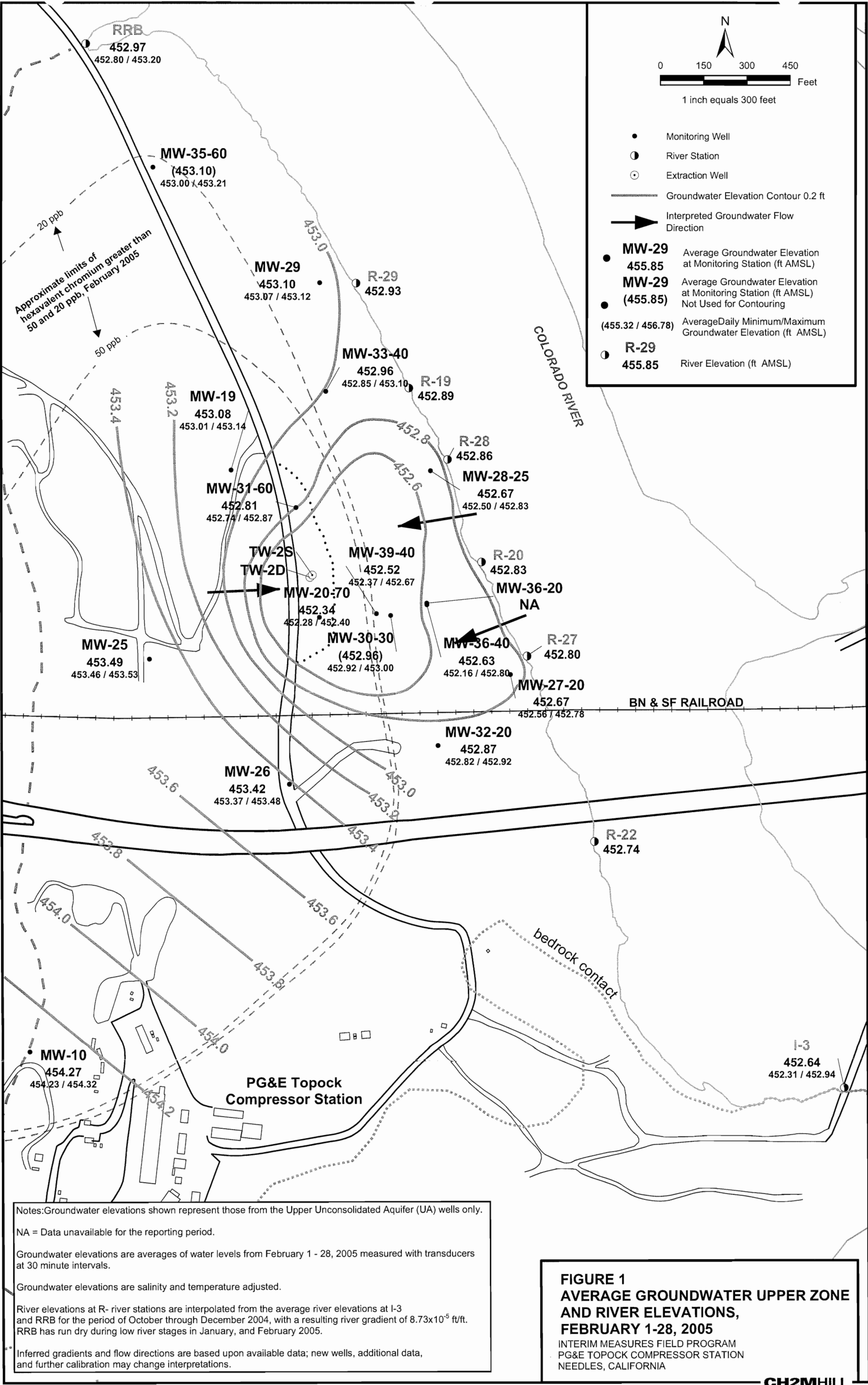
Projected Davis Dam Releases, updated monthly, are reported by the US Department of Interior, Bureau of Reclamation at <http://www.usbr.gov/lc/region/g4000/24mo.pdf>; listed projections for April through July are from April 2004, and the remainder were from the beginning of each respective month

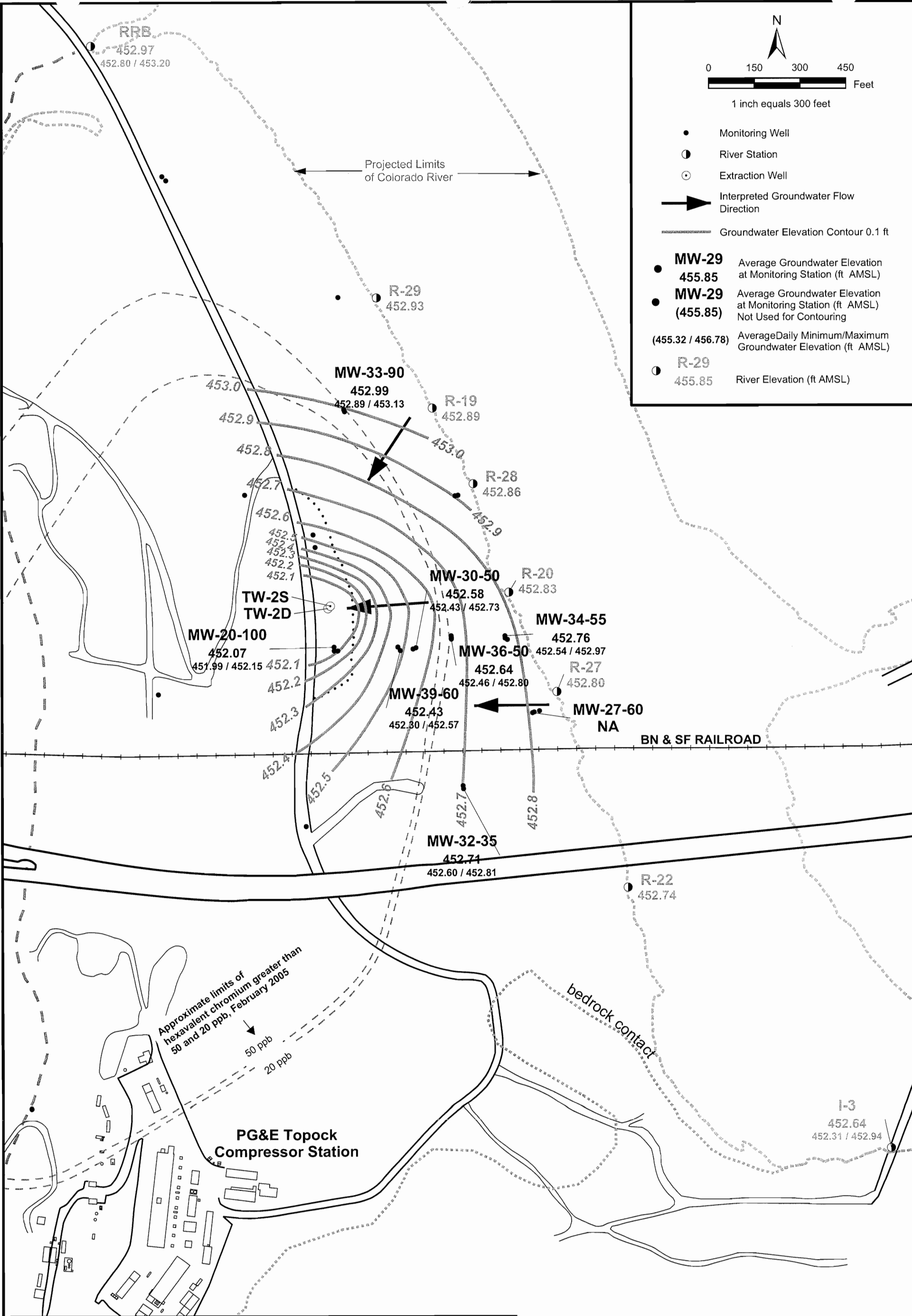
Colorado River levels at I-3 are predicted from a linear regression between historical dam releases and measured river levels at I-3 (updated monthly)

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

## Figures

---





Notes: Groundwater elevations shown represent those from the Middle Unconsolidated Aquifer (UA) wells only.

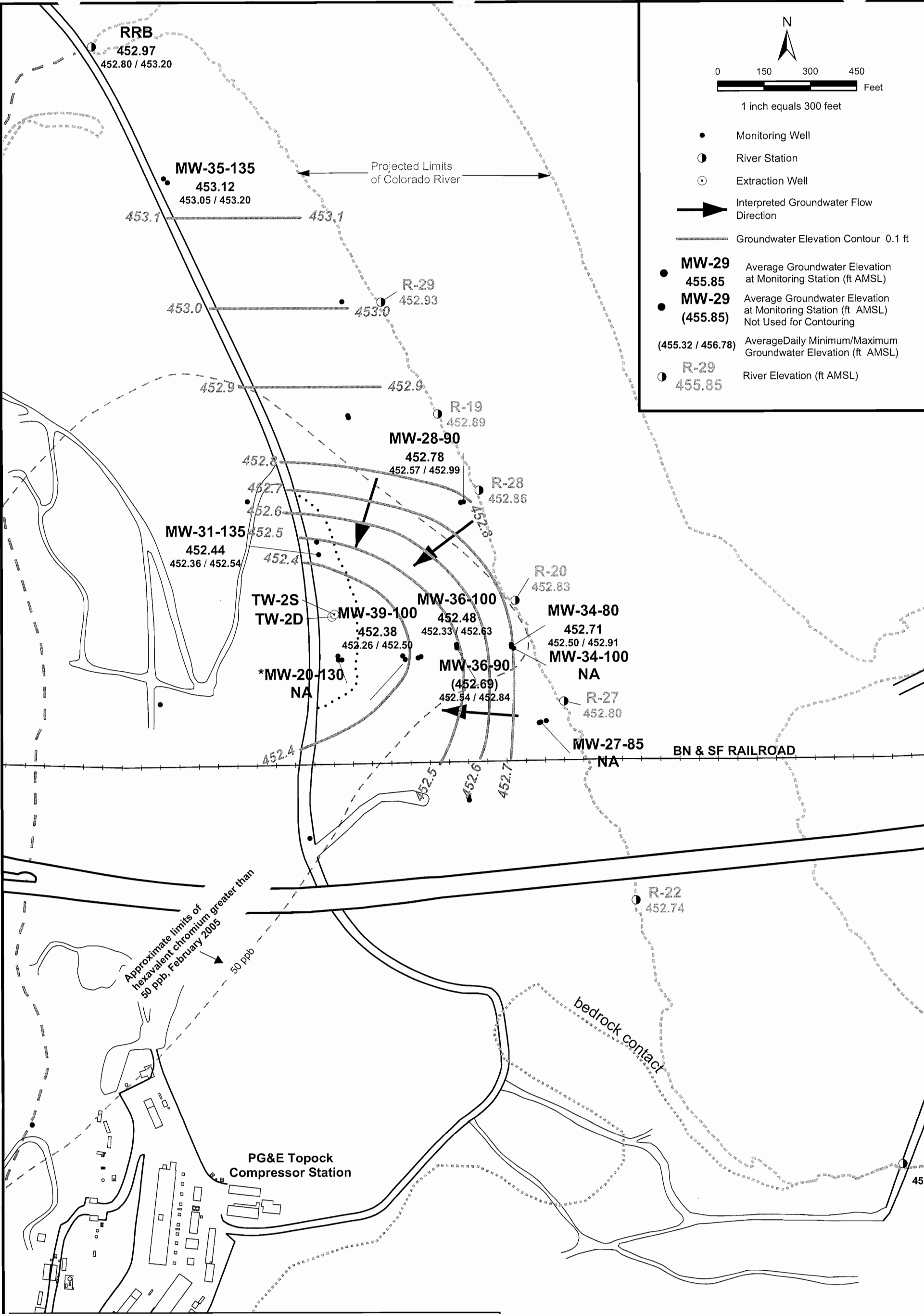
NA = Data unavailable for the reporting period.

Groundwater elevations are averages of water levels from February 1-28, 2005 measured with transducers at 30 minute intervals.

Groundwater elevations are salinity and temperature adjusted.

Inferred gradients and flow directions are based upon available data; new wells, additional data, and further calibration may change interpretations.

**FIGURE 2**  
**AVERAGE GROUNDWATER MIDDLE ZONE**  
**AND RIVER ELEVATIONS,**  
**FEBRUARY 1-28, 2005**  
INTERIM MEASURES FIELD PROGRAM  
PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA



Notes:  
Groundwater elevations shown represent those from the Lower Unconsolidated Aquifer (UA) wells only.

\*MW-20-130 used as an extraction well beginning 3/21/2005.  
NA = Data unavailable for reporting period

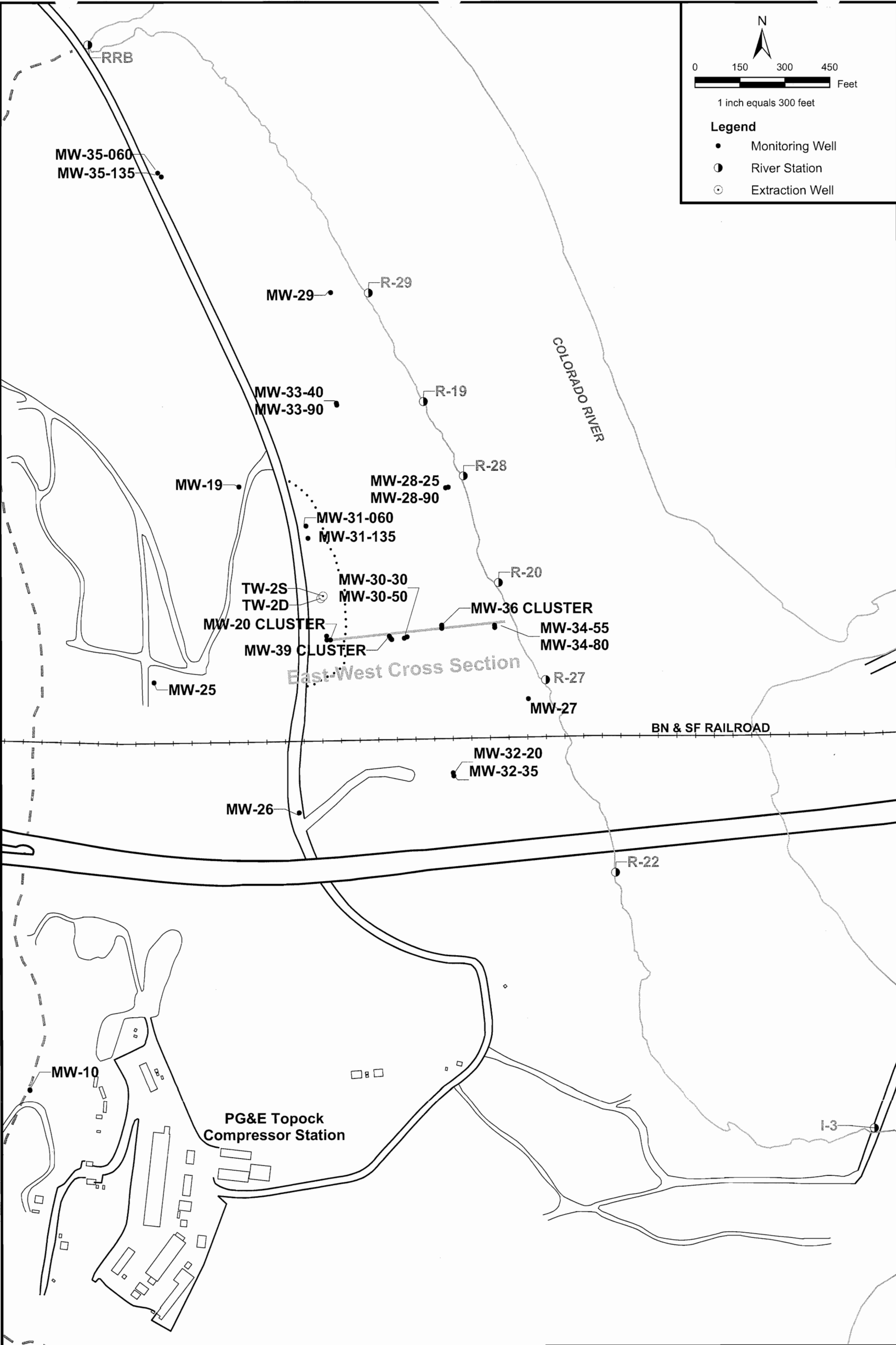
Groundwater elevations are averages of water levels from February 1-28, 2005 measured with transducers at 30 minute intervals.

Groundwater elevations are salinity and temperature adjusted.

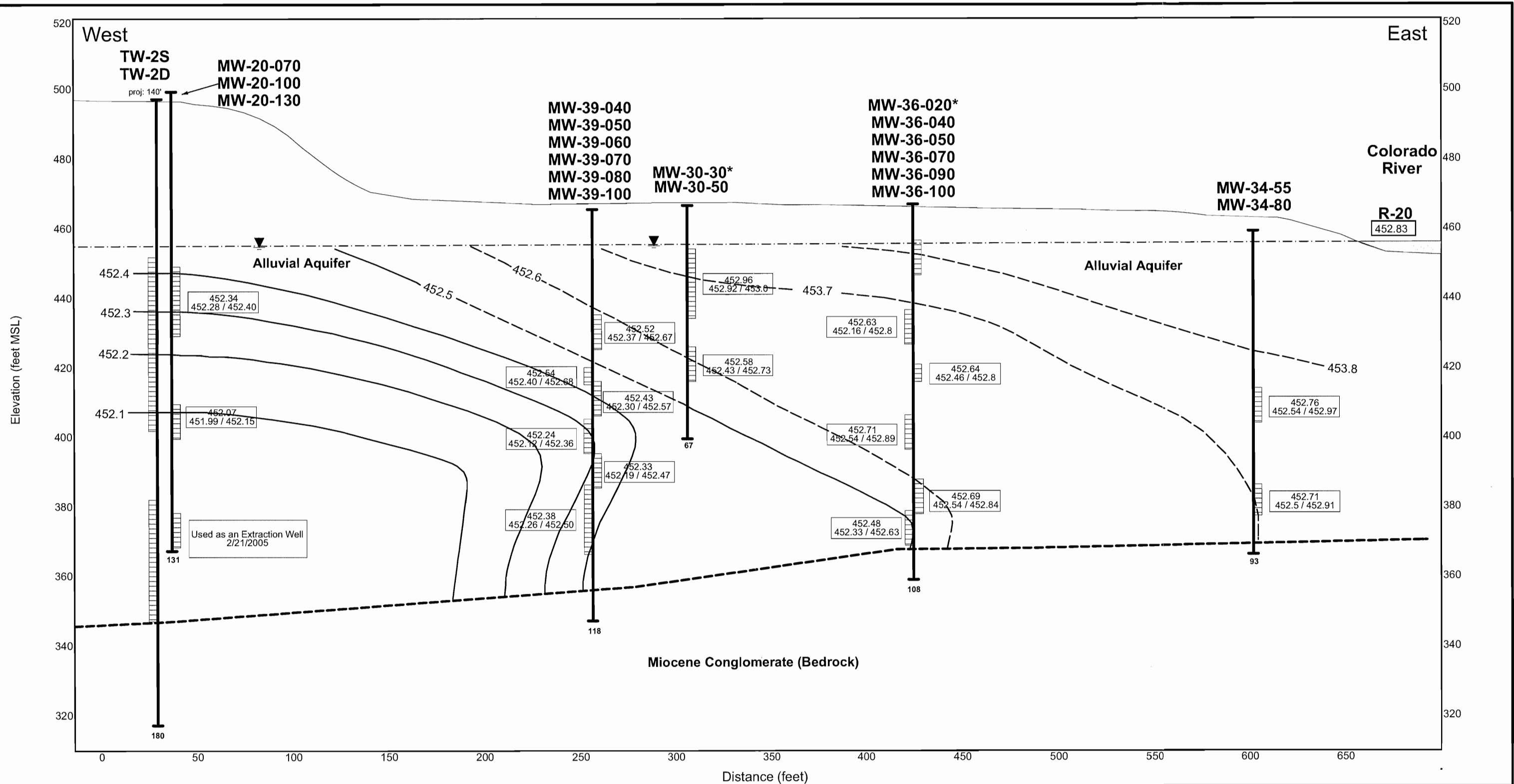
Inferred gradients and flow directions are based upon available data; new wells, additional data, and further calibration may change interpretations.

**FIGURE 3  
AVERAGE GROUNDWATER LOWER ZONE  
AND RIVER ELEVATIONS  
FEBRUARY 1-28, 2005**

INTERIM MEASURES FIELD PROGRAM  
PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

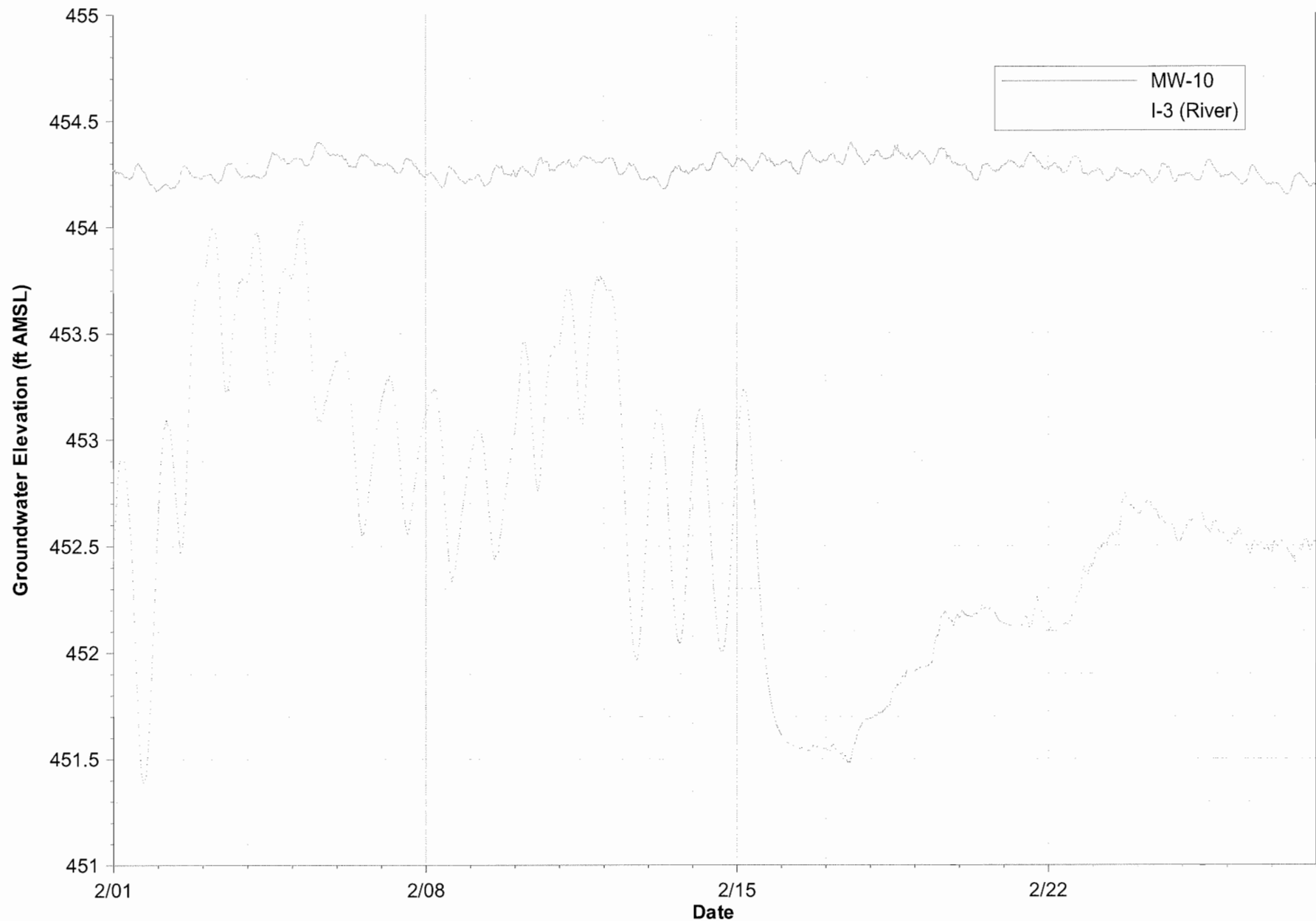


**FIGURE 4**  
**LOCATION OF EAST-WEST CROSS SECTION**  
Interim Measures Field Program  
PG&E Topock Compressor Station  
Needles, California



**Figure 5**  
**East-West Hydrogeologic Section**  
**Average Groundwater Elevation**  
**February 1-28, 2005**

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

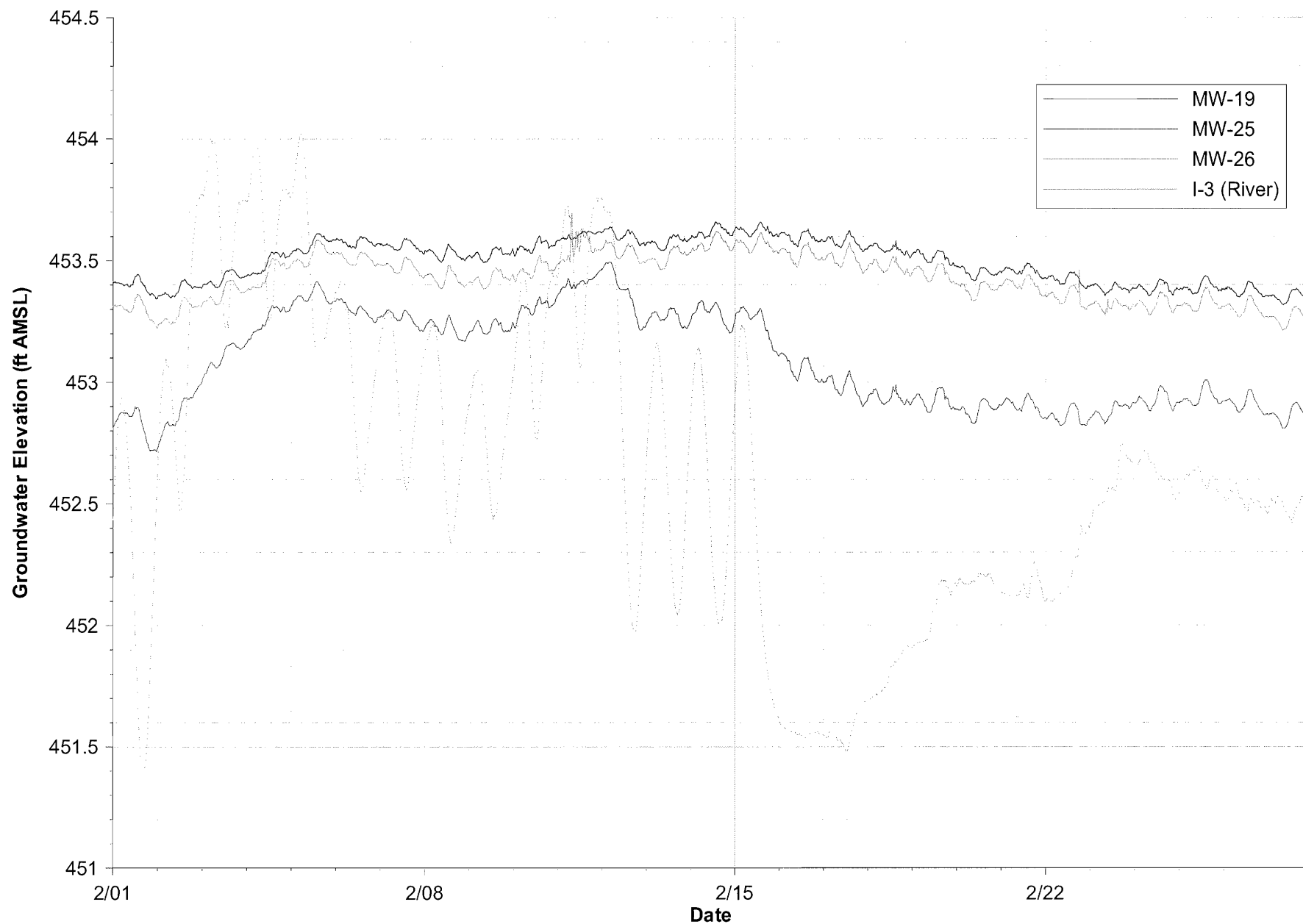


Note: Data subject to review.

Hydrograph  
PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

**CH2MHILL**

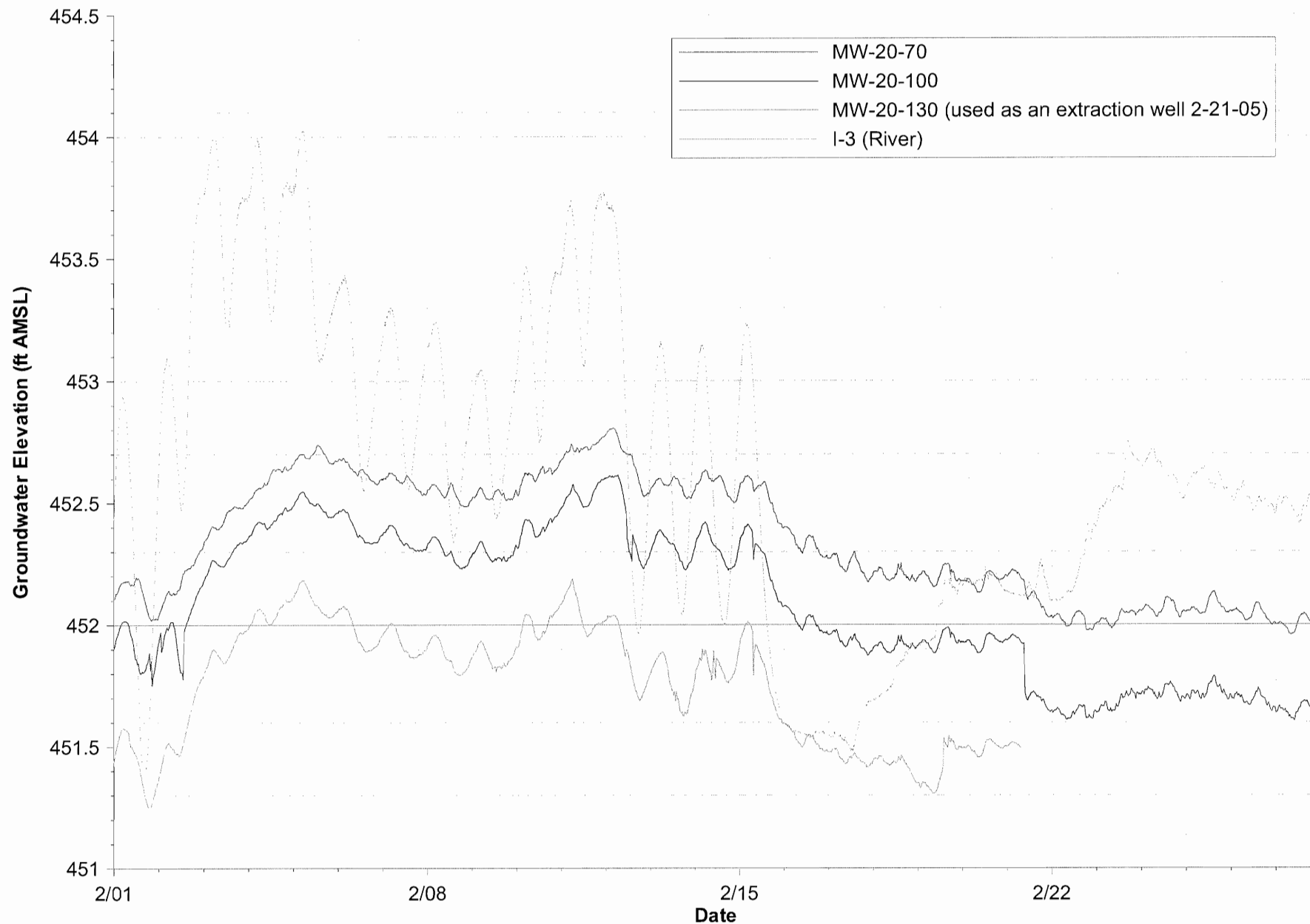




Note: Data subject to review.

Hydrograph  
PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

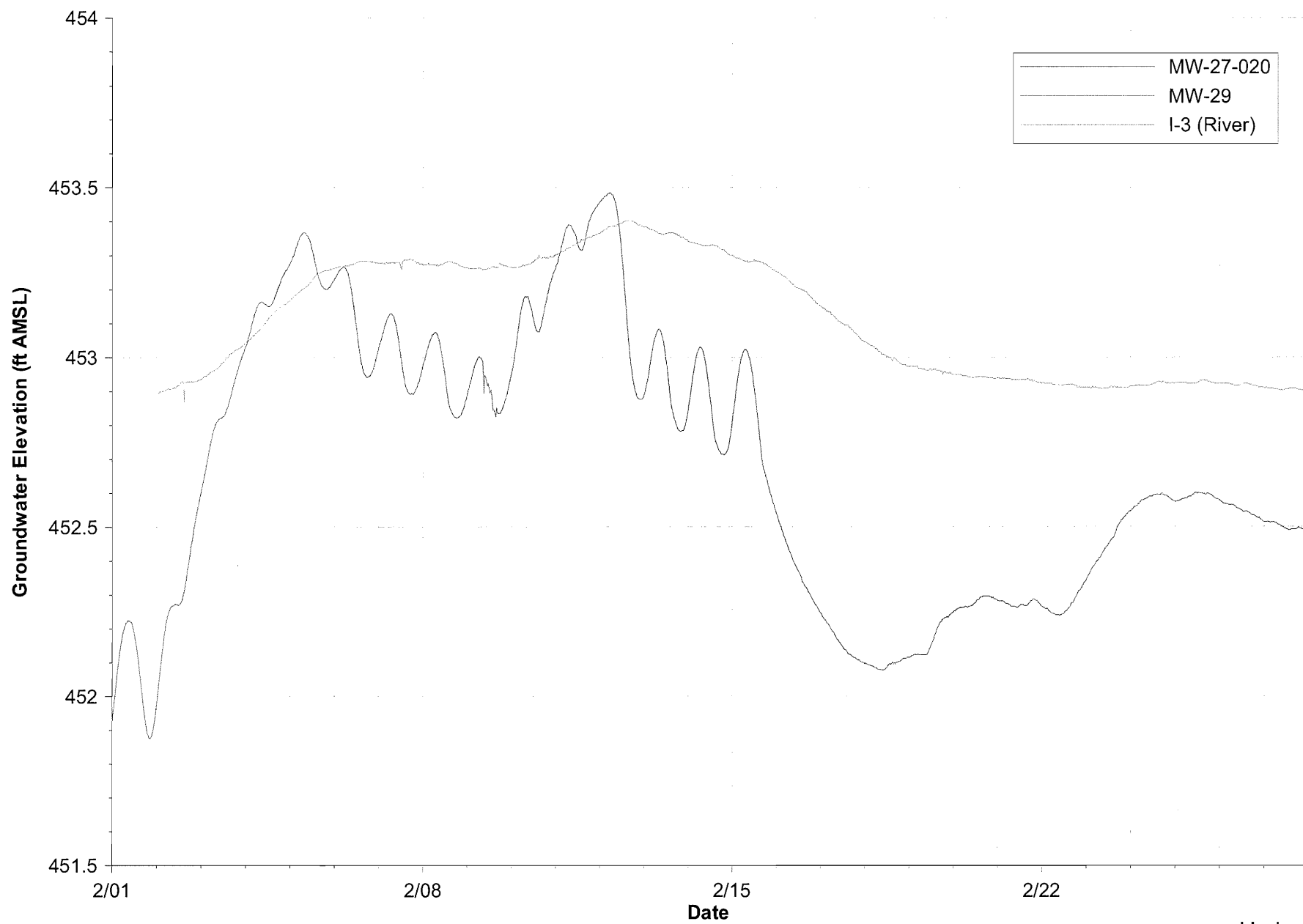
CH2M HILL



Note: Data subject to review.

Hydrograph  
PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

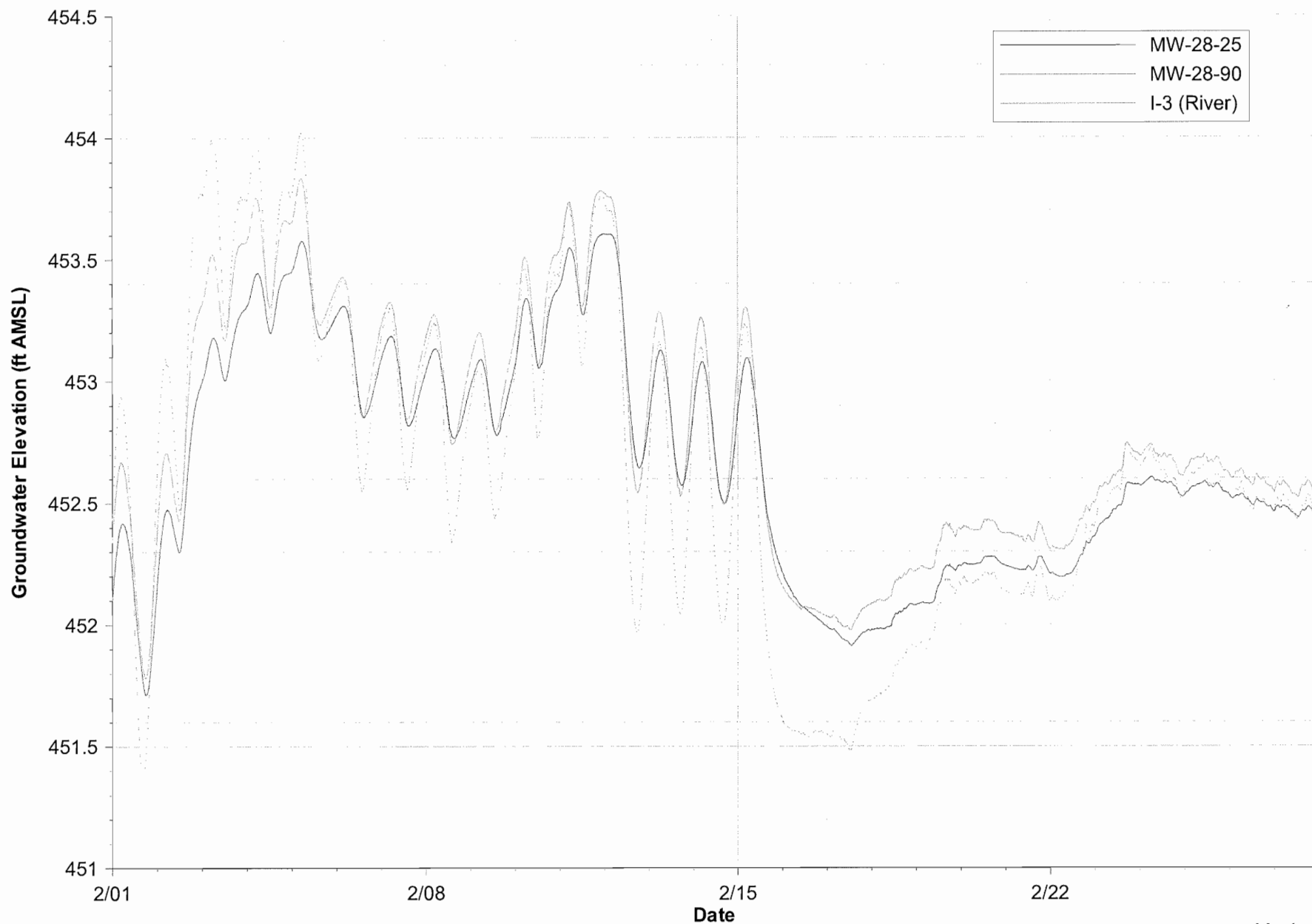
**CH2MHILL**



Note: Data subject to review.

Hydrograph  
PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

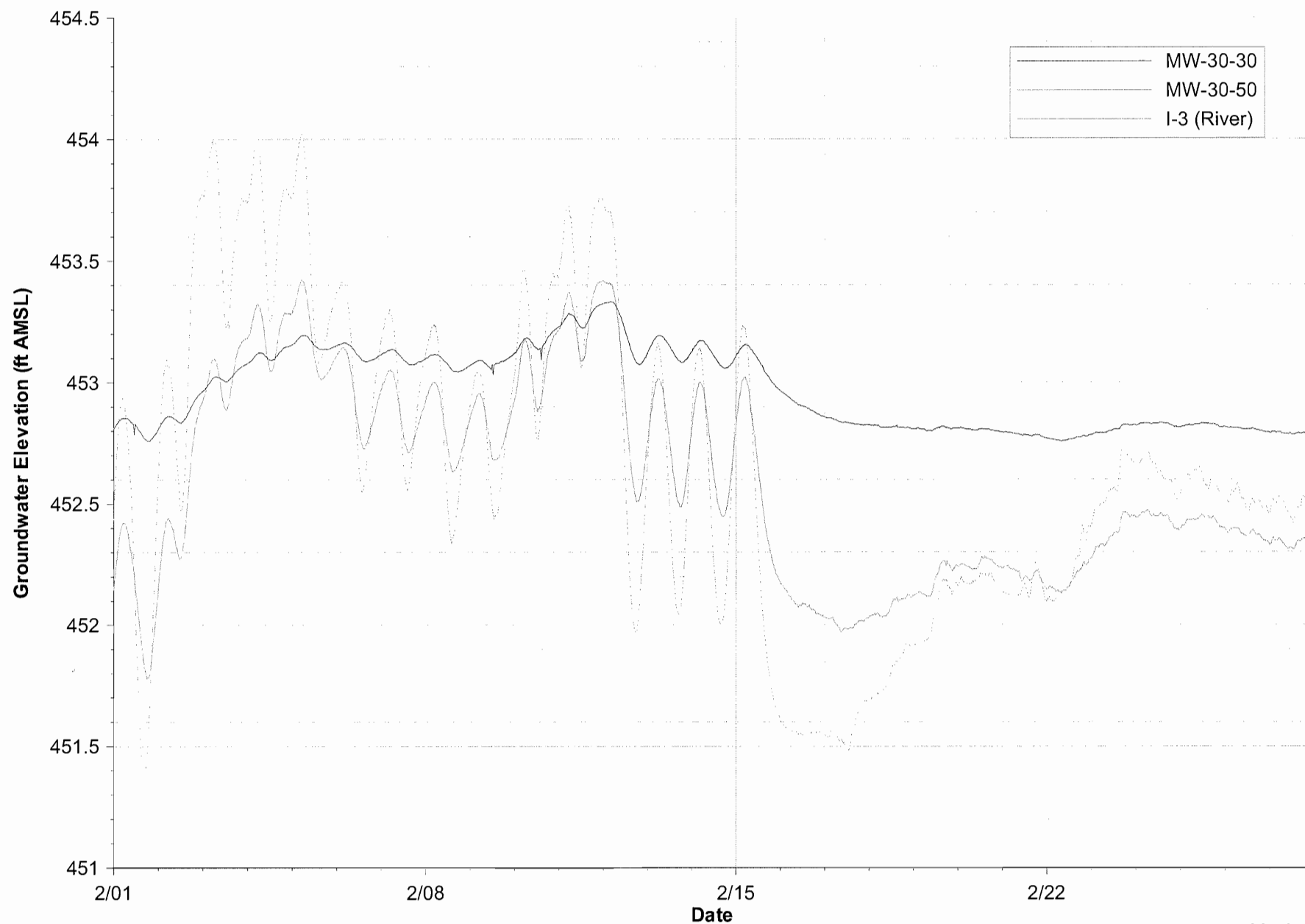
CH2M HILL



Note: Data subject to review.

Hydrograph  
PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

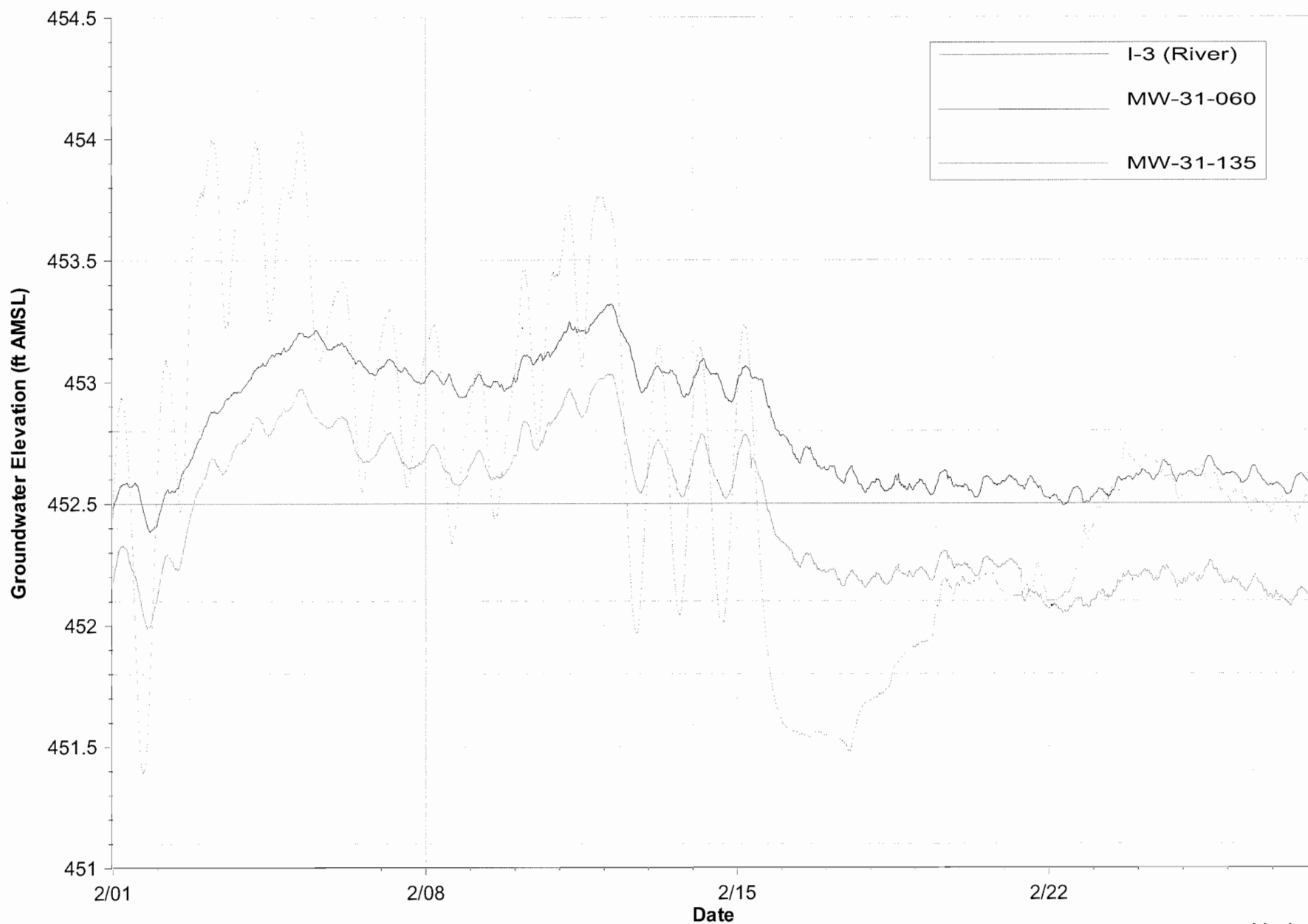
**CH2MHILL**



Note: Data subject to review.

Hydrograph  
PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

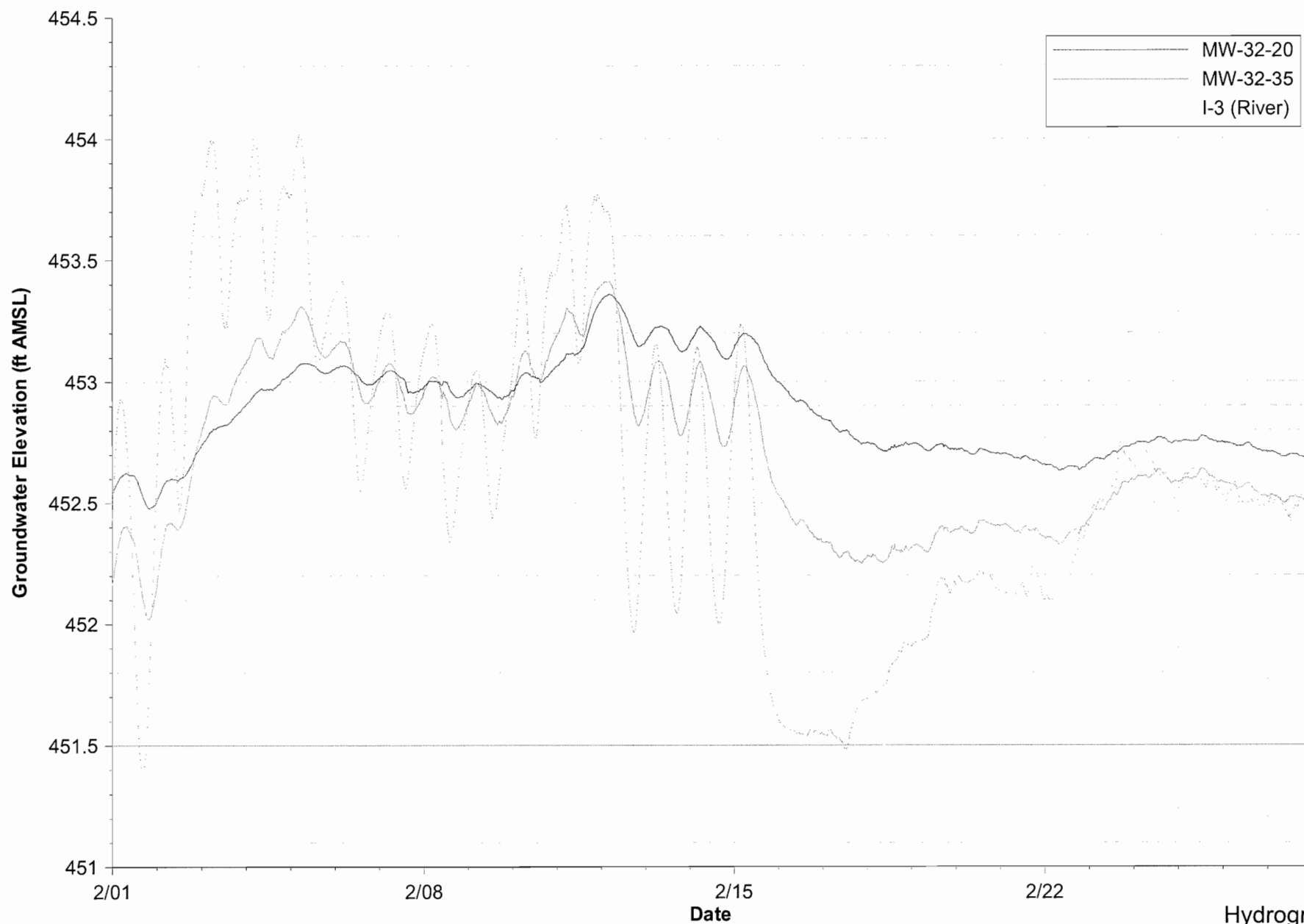
CH2M HILL



Note: Data subject to review.

Hydrograph  
PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

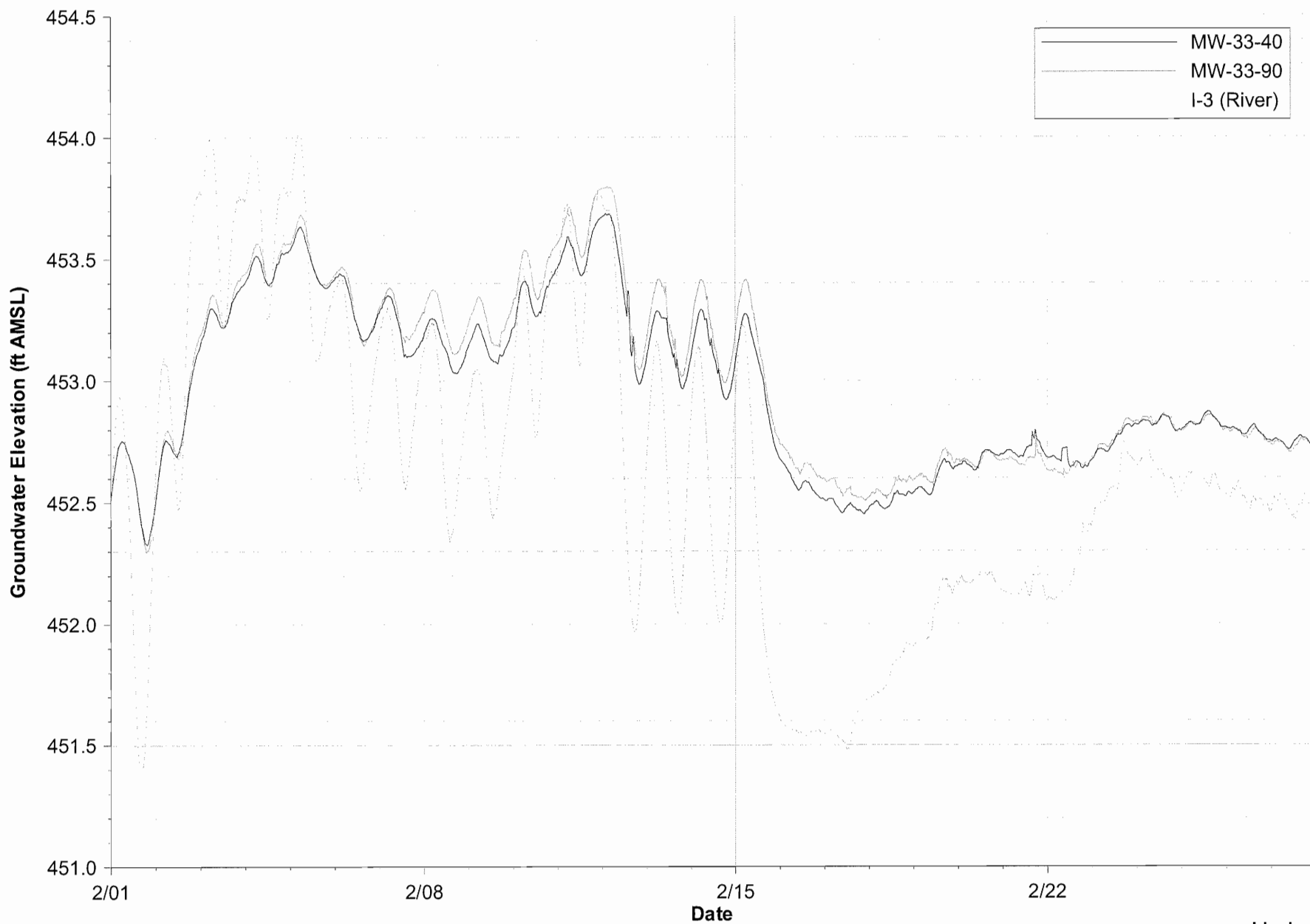
**CH2MHILL**



Note: Data subject to review.

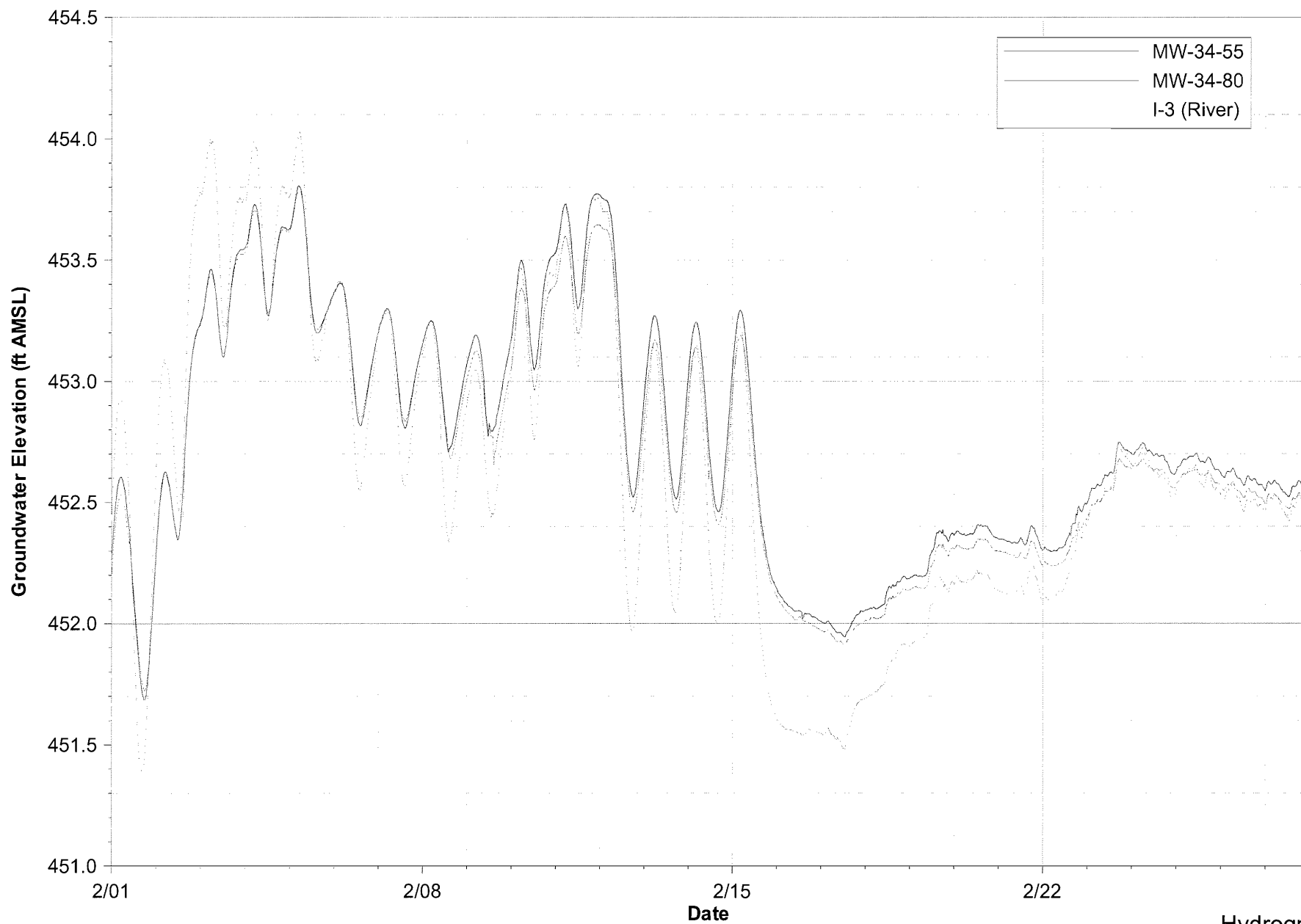
Hydrograph  
PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

CH2M HILL



Hydrograph  
PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

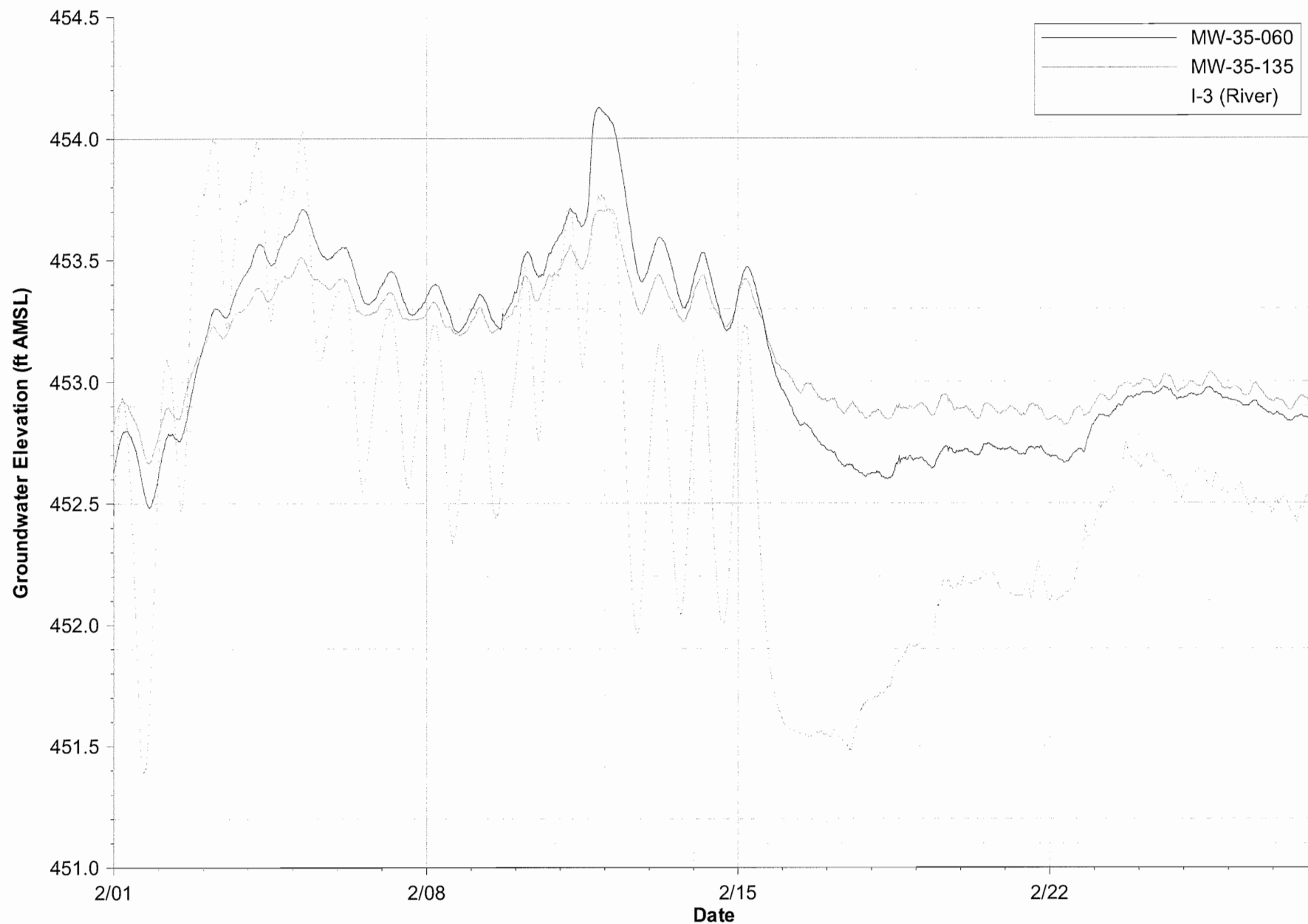




Note: Data subject to review.

Hydrograph  
PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

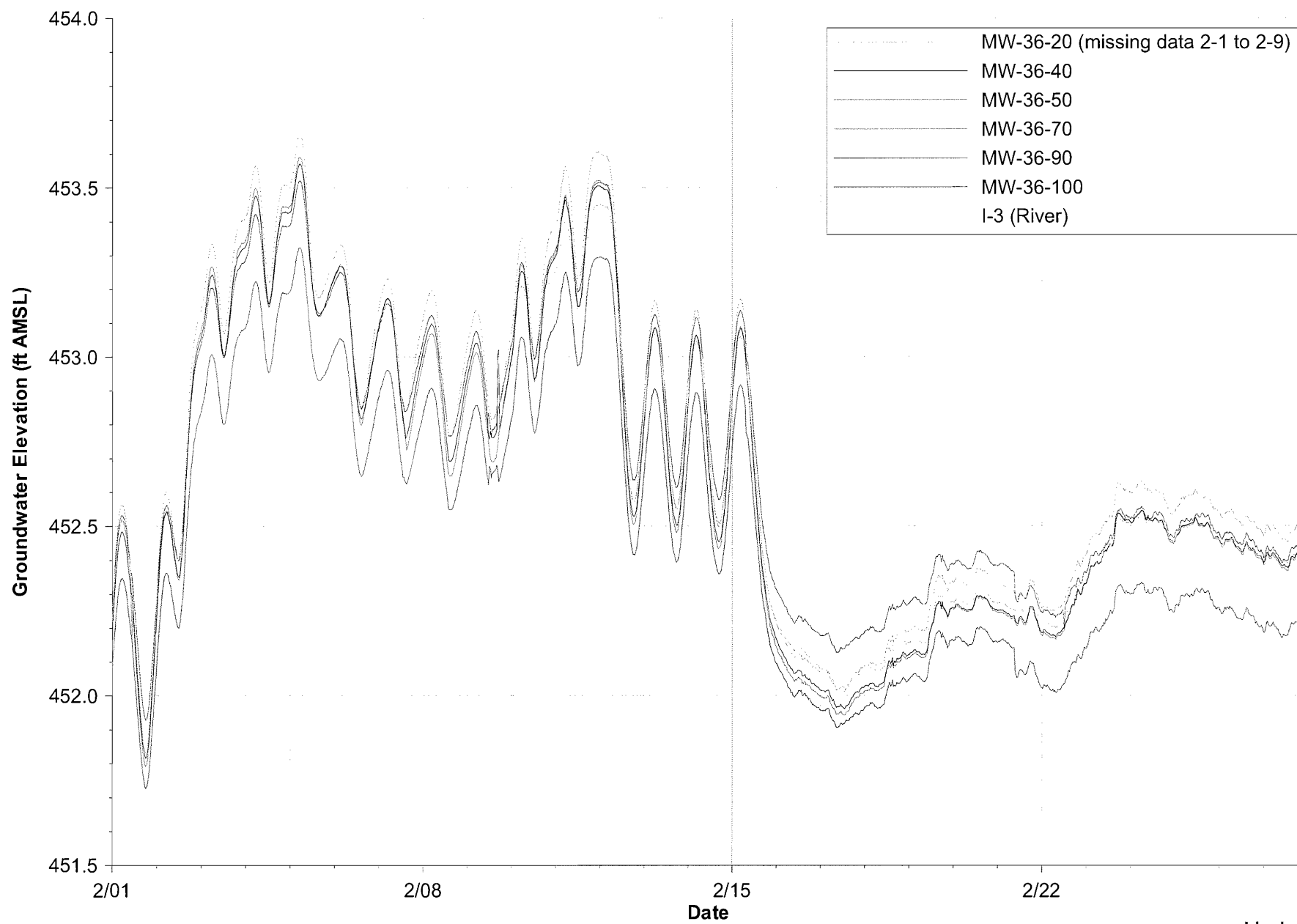




Note: Data subject to review.

Hydrograph  
PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

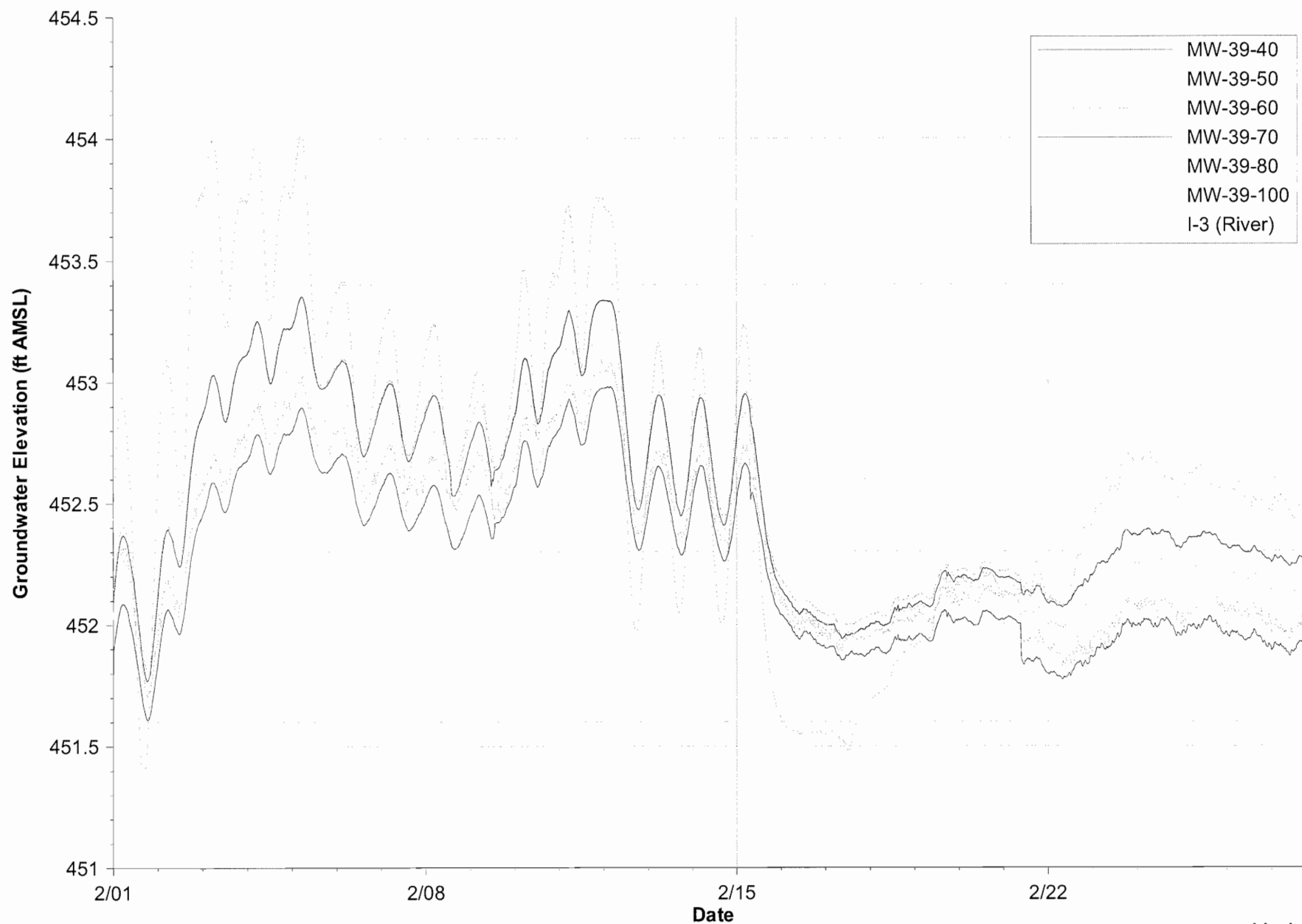
**CH2MHILL**



Note: Data subject to review.

Hydrograph  
PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

CH2M HILL



Note: Data subject to review.

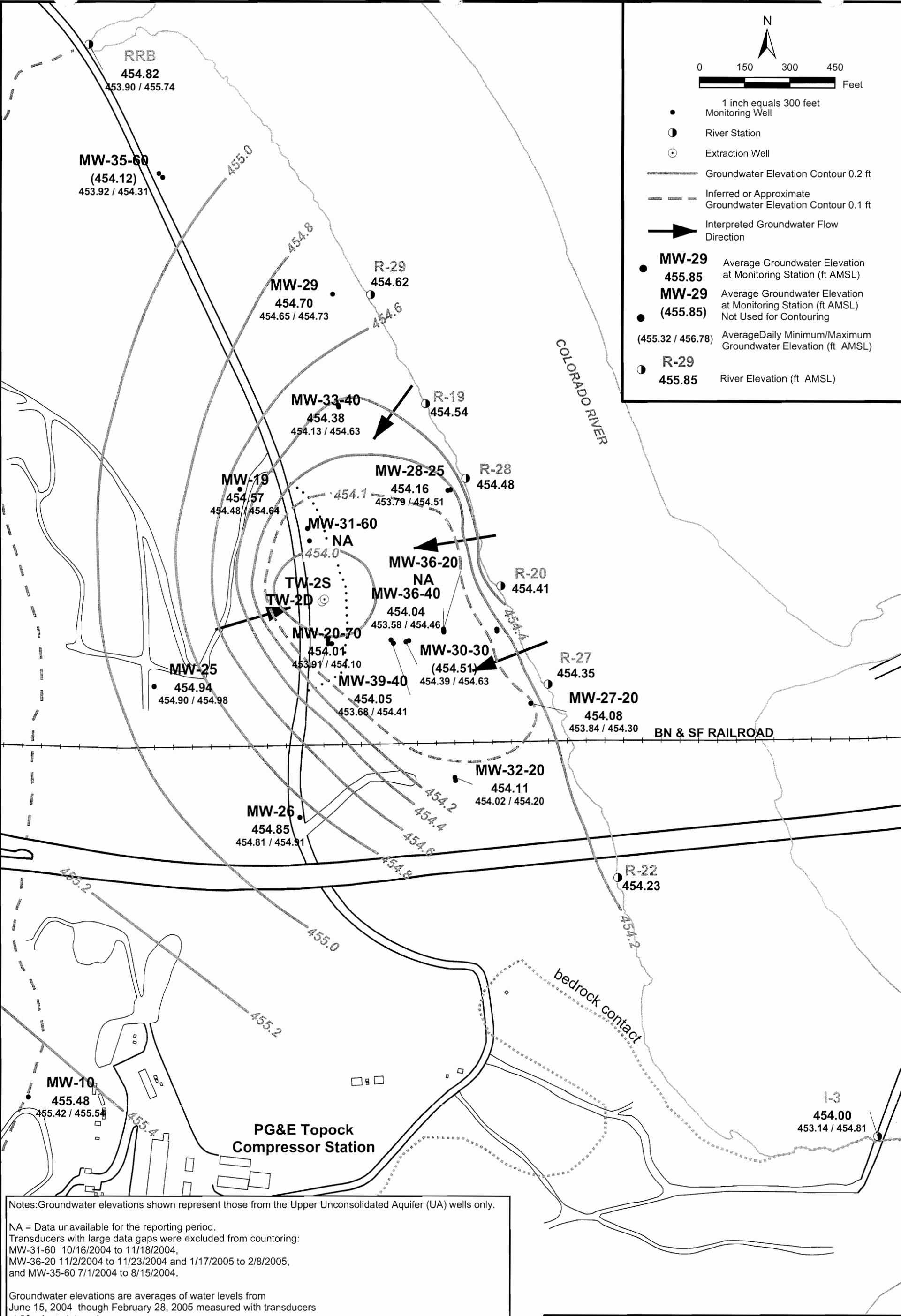
Hydrograph  
PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

**CH2MHILL**

## **Attachment 2**

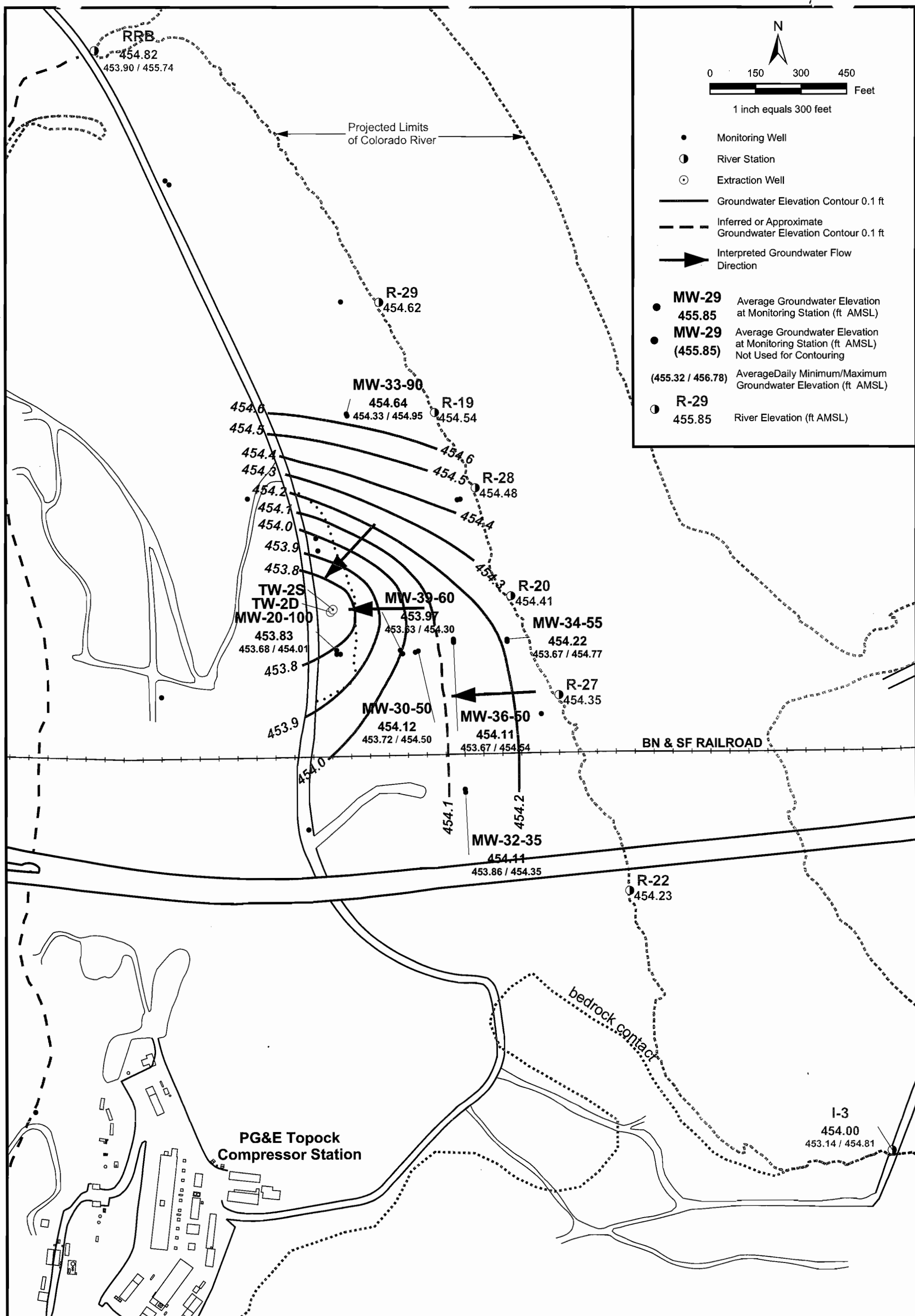
# **Long-term Groundwater Gradients**

---



**FIGURE 1**  
**AVERAGE GROUNDWATER**  
**UPPER ZONE AND RIVER ELEVATIONS,**  
**JUNE 15, 2004 THROUGH FEBRUARY 28, 2005**

INTERIM MEASURES PROGRAM  
PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA



Notes: Groundwater elevations shown represent those from the Middle Unconsolidated Aquifer (UA) wells only.

NA = Data unavailable for the reporting period.

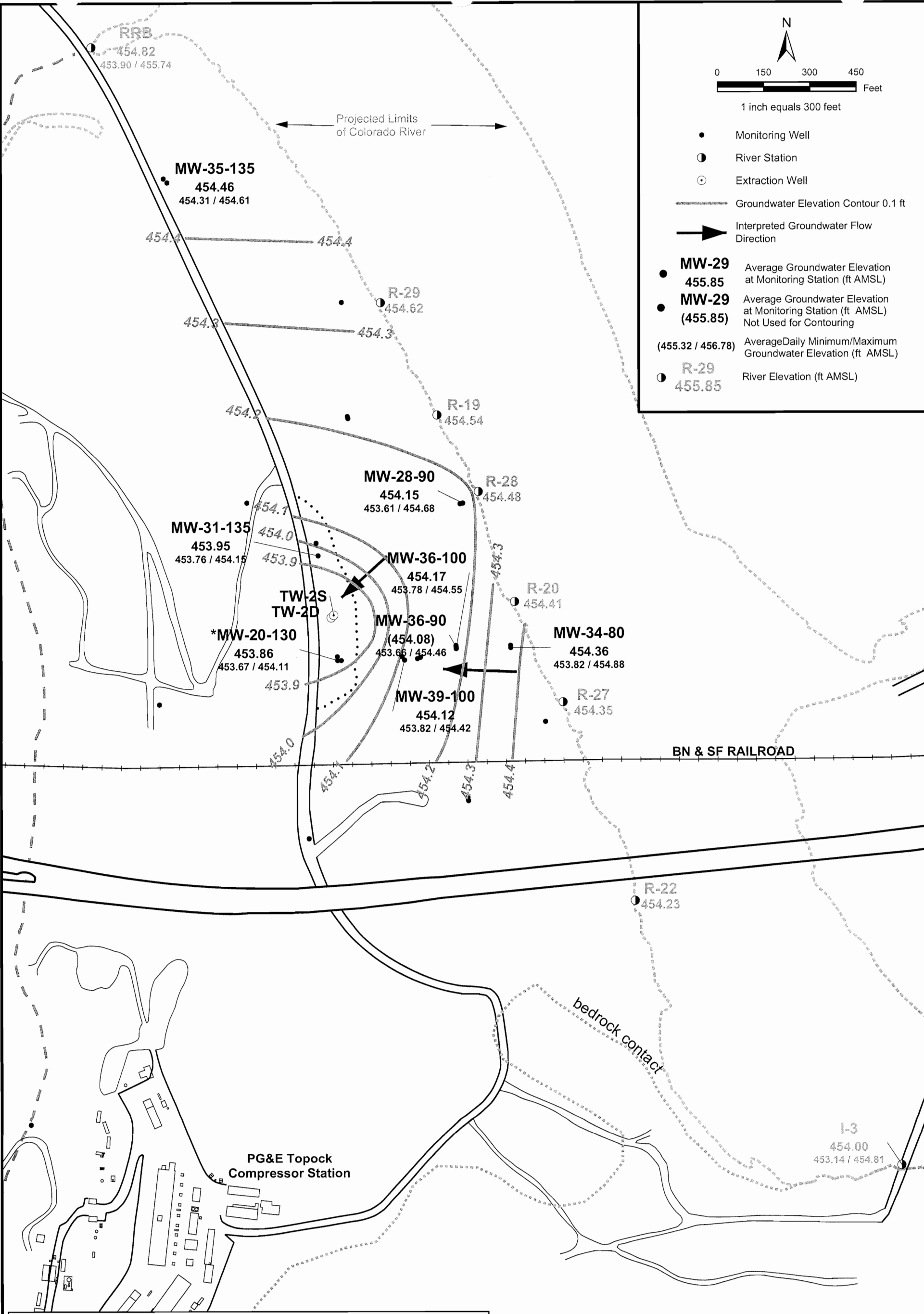
Groundwater elevations are averages of water levels from June 15, 2004 through February 28, 2005 measured with transducers at 30 minute intervals.

Groundwater elevations are salinity and temperature adjusted.

Inferred gradients and flow directions are based upon available data; new wells, additional data, and further calibration may change interpretations.

**FIGURE 2**  
**AVERAGE GROUNDWATER MIDDLE ZONE**  
**AND RIVER ELEVATIONS**  
**JUNE 15, 2004 THROUGH FEBRUARY 28, 2005**  
 INTERIM MEASURES FIELD PROGRAM  
 PG&E TOPOCK COMPRESSOR STATION  
 NEEDLES, CALIFORNIA

**CH2MHILL**



Notes:  
Groundwater elevations shown represent those from the Lower Unconsolidated Aquifer (UA) wells only.

\*MW-20-130 used as an extraction well on 2/21/05.  
Data from 2/21/2005 through 2/28/05 is excluded from calculations for this well.

Groundwater elevations are averages of water levels from  
June 15 2004 through February 28, 2005 measured with transducers  
at 30 minute intervals.

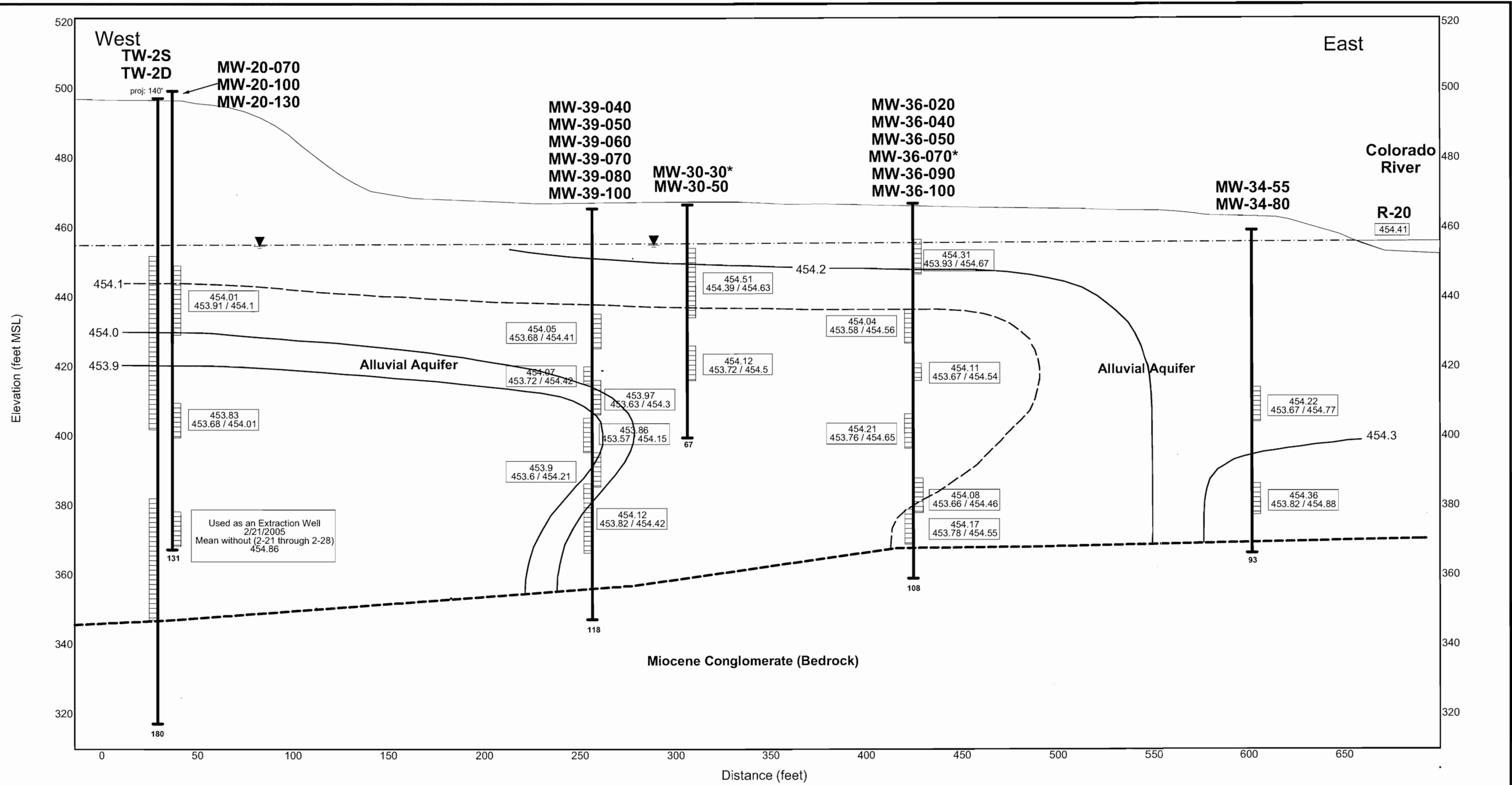
Groundwater elevations are salinity and temperature adjusted.

Inferred gradients and flow directions are based upon available data; new wells, additional data,  
and further calibration may change interpretations.

**FIGURE 3  
AVERAGE GROUNDWATER LOWER ZONE  
AND RIVER ELEVATIONS  
JUNE 15, 2004 THROUGH FEBRUARY 28, 2005**

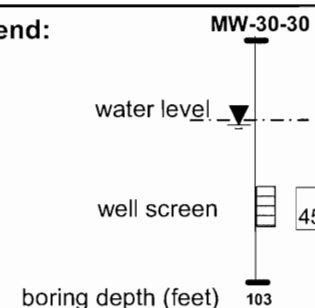
INTERIM MEASURES FIELD PROGRAM  
PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA





**Notes:**  
 Results show average ground water elevations for June 15 through February 28, 2005.  
 Ground water elevations adjusted for salinity and temperature.  
 \* Wells MW-30-30, MW-36-070 excluded from contouring.  
 Average river elevation interpolated between I-3 and RRB river station stations using the mean gradient from June 15 through December 2004.  
 RRB ran dry during low river stages in January and February 2005.  
 Data subject to review.

**Legend:**



Average groundwater elevation  
 Minimum / Maximum groundwater elevation

Groundwater elevation contour  
 Inferred groundwater elevation contour

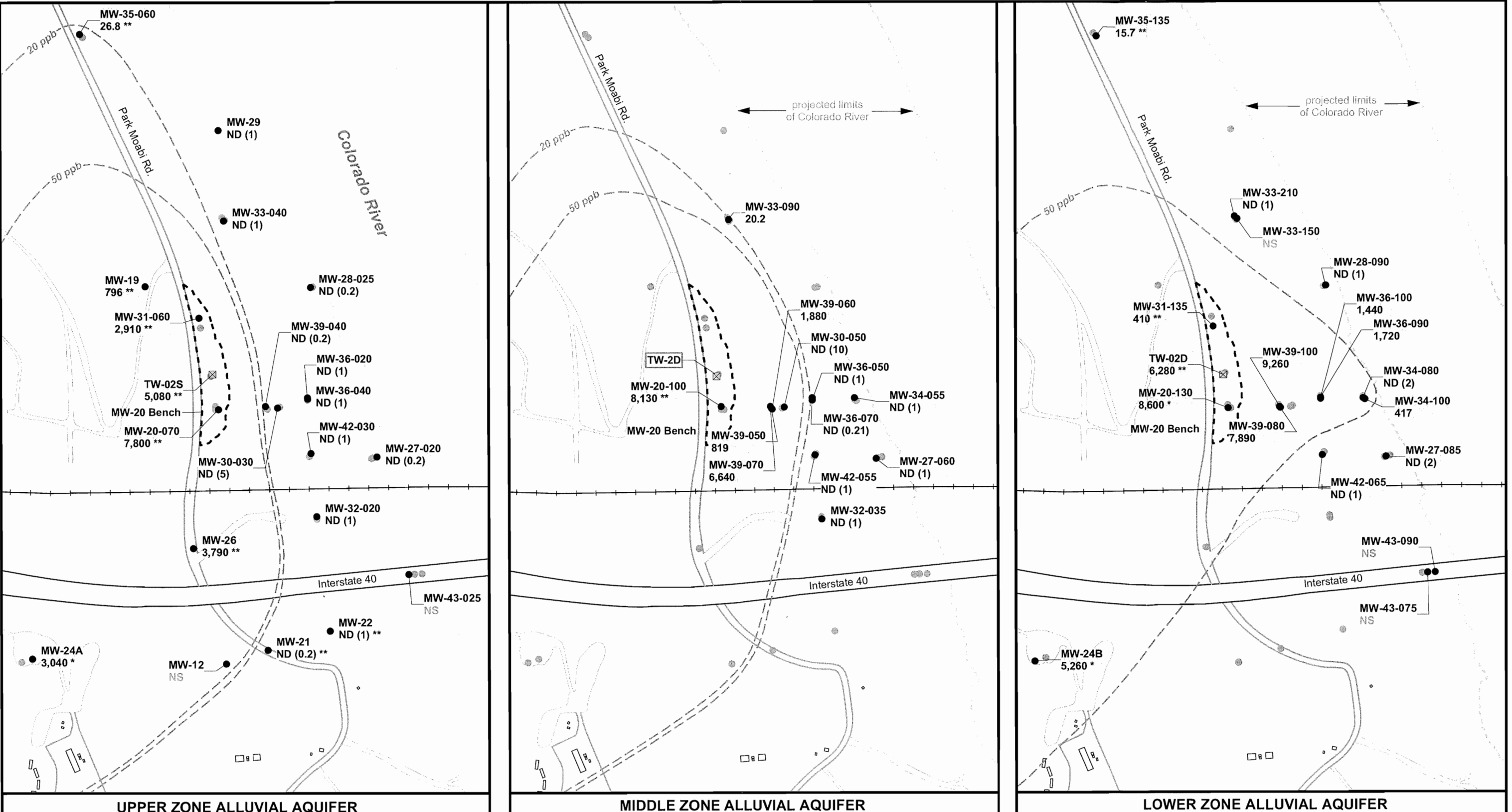
**Figure 4**  
**East West Cross Section**  
**Average Groundwater Elevations**  
**June 15, 2004 through February 28, 2005**

INTERIM MEASURES PROGRAM  
 PG&E TOPOCK PROJECT  
 NEEDLES, CALIFORNIA

## **Attachment 3**

# **Hexavalent Chromium Concentration Maps**

---



**UPPER ZONE ALLUVIAL AQUIFER**

**MIDDLE ZONE ALLUVIAL AQUIFER**

**LOWER ZONE ALLUVIAL AQUIFER**

**Notes:**  
Results listed are maximum concentrations from February 2005 sampling events.  
Results marked \* are from January 2005 sampling events.  
Results marked \*\* are from December 2005 quarterly sampling event.  
J = estimated concentration or reporting limit by laboratory or validation.  
NS = not sampled

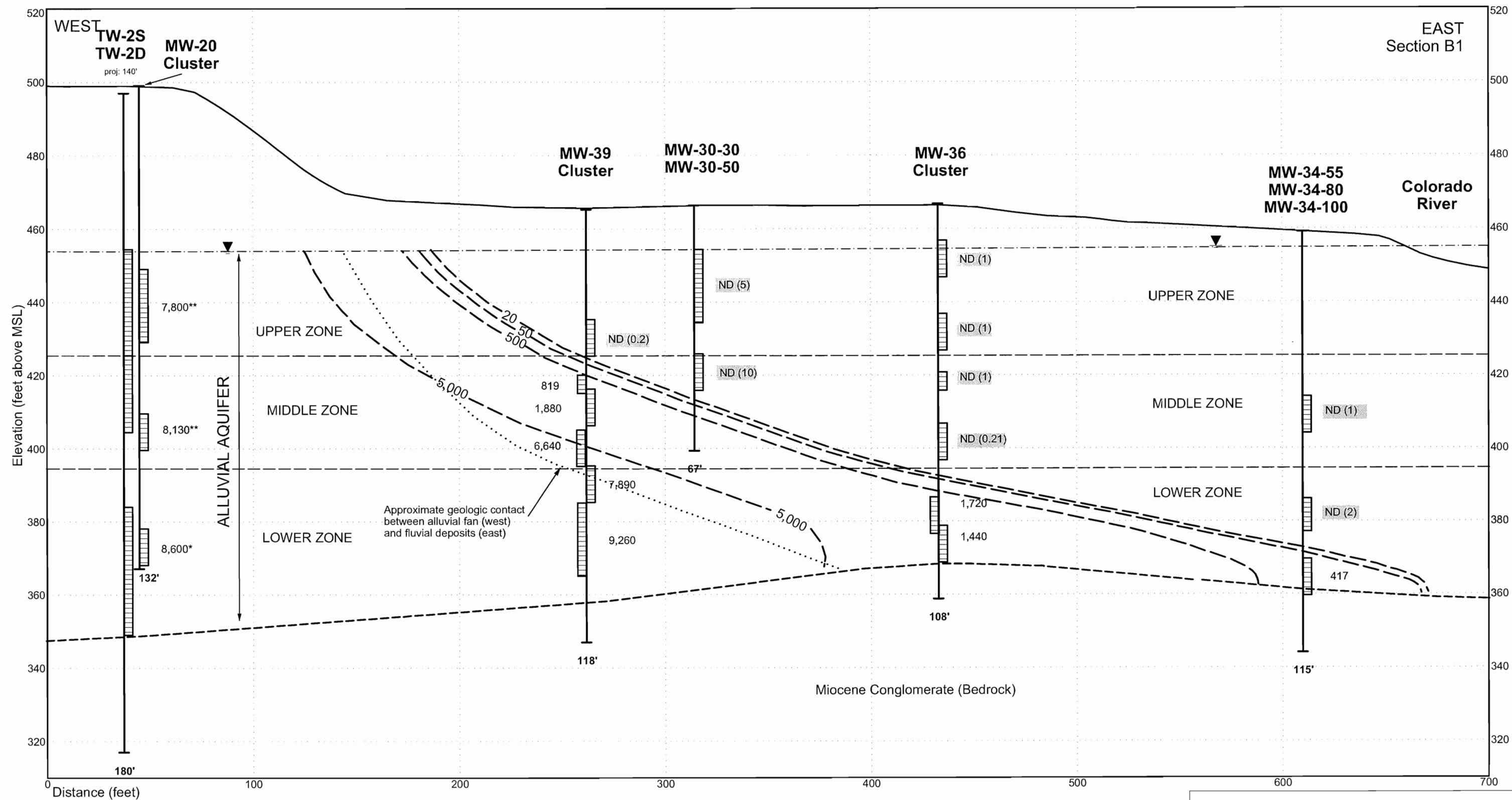
**Legend:**

|        |  |
|--------|--|
| ND (1) | Not detected at listed reporting limit (ppb) |
| 41     | Less than 50 ppb                             |
| 3,810  | Greater than 50 ppb                          |

**Hexavalent Chromium Concentrations in Groundwater**  
**February 2005 Sampling Events**  
Concentrations in micrograms per liter (µg/L)  
equivalent to parts per billion (ppb)  
ND = not detected at listed reporting limit.

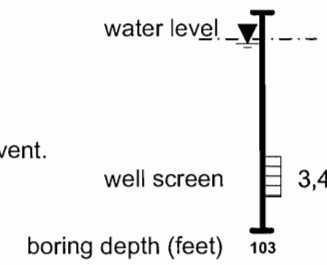
**Scale:**  
0 400 800 Feet  
1 inch equals 400 feet

**Figure 3-1**  
**HEXAVALENT CHROMIUM CONCENTRATIONS**  
**IN ALLUVIAL AQUIFER, FEBRUARY 2005**  
INTERIM MEASURES PERFORMANCE MONITORING  
PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA



Hexavalent Chromium Results, February 2005 Sampling Events

Notes:  
 Results marked \* are from January 2005 sampling events.  
 Results marked \*\* are from December 2004 quarterly monitoring event.  
 All other results are the maximum concentration detected in February 2005 sampling events.



— 50 —  
 Inferred Hexavalent Chromium Contour

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

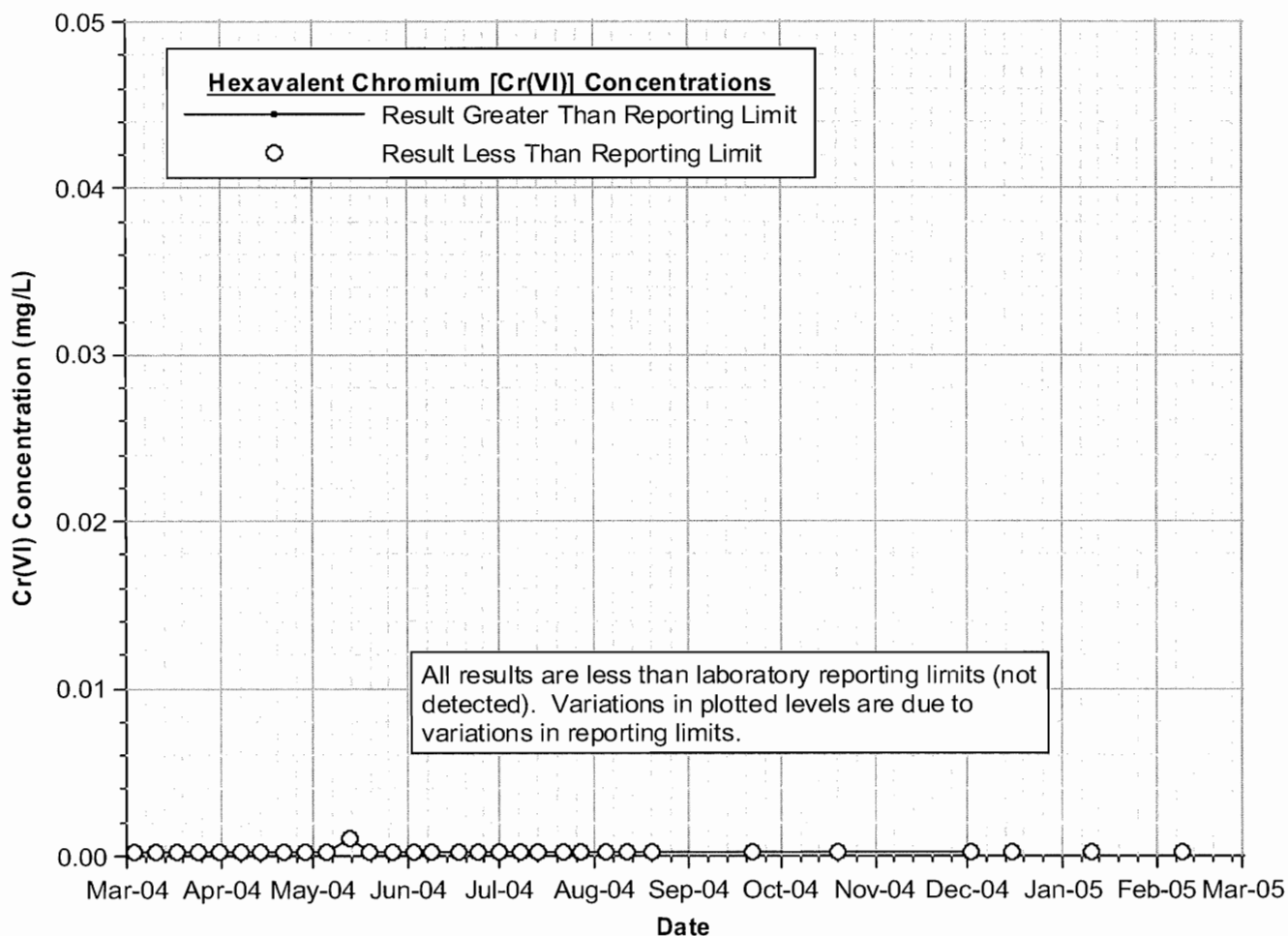
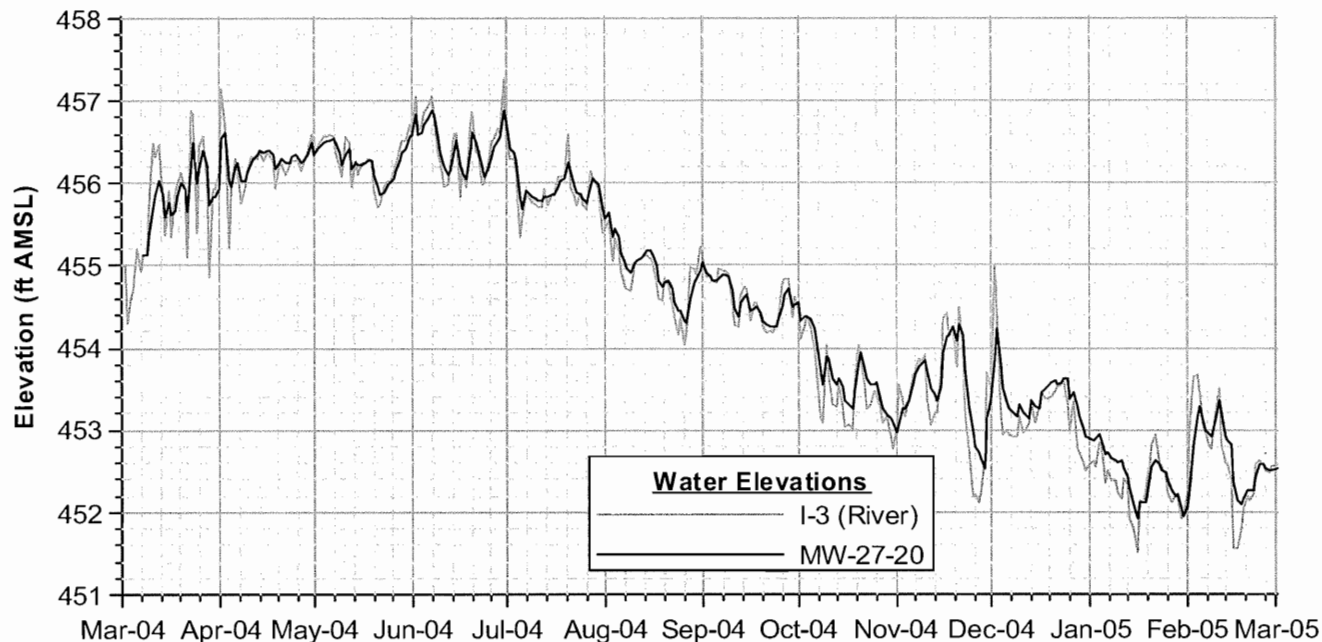
|        |  |
|--------|--|
| ND (1) | Not detected at listed reporting limit (ppb) |
| 42     | Less than 50 ppb                             |
| 3,810  | Greater than 50 ppb                          |

**FIGURE 3-2**  
**HEXAVALENT CHROMIUM CONCENTRATIONS**  
**FEBRUARY 2005**  
**HYDROGEOLOGIC SECTION B1**  
 INTERIM MEASURES PERFORMANCE MONITORING  
 PG&E TOPOCK COMPRESSOR STATION  
 NEEDLES, CALIFORNIA

## **Attachment 4**

### **Trend Graphs**

---

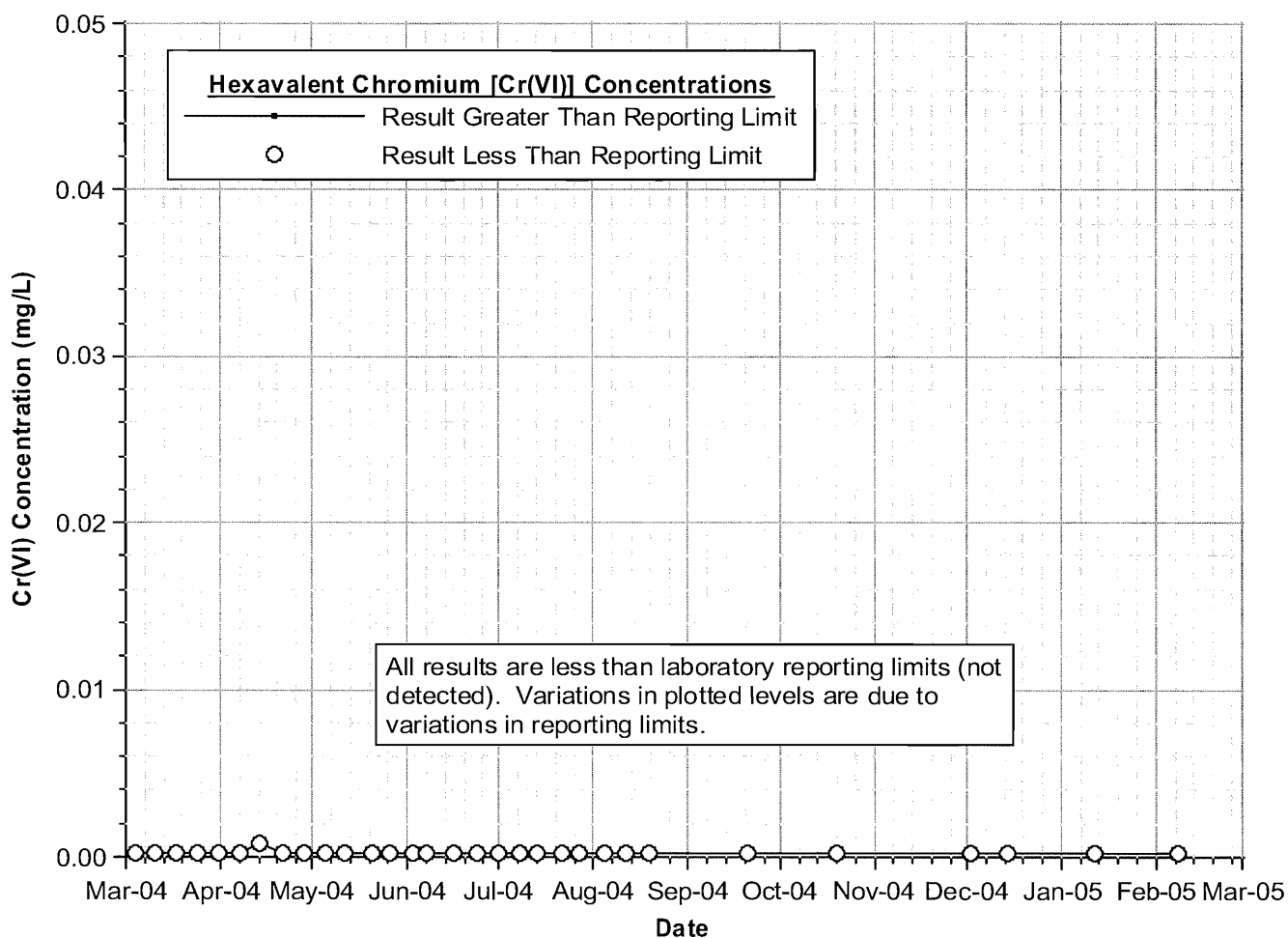
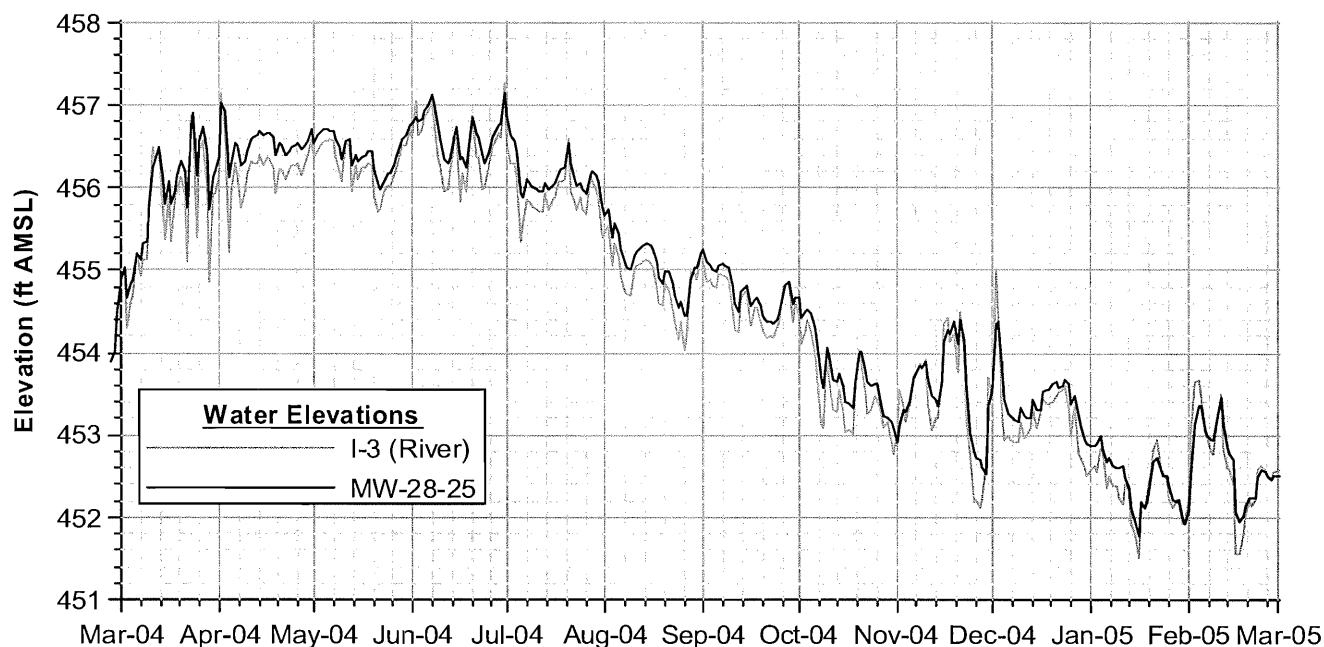


PMR No. 15 - Data Through 02/28/05  
MW-27-20 HEXAVALENT CHROMIUM  
CONCENTRATION & HYDROGRAPH

PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

**Notes**

- Beginning March 2004, groundwater samples from floodplain wells in the groundwater monitoring program are collected using the well-volume sampling method. Prior to the Feb. 17-20, 2004 sampling method comparison test, all samples from floodplain wells were collected using low-flow purging method.
- Data subject to review.



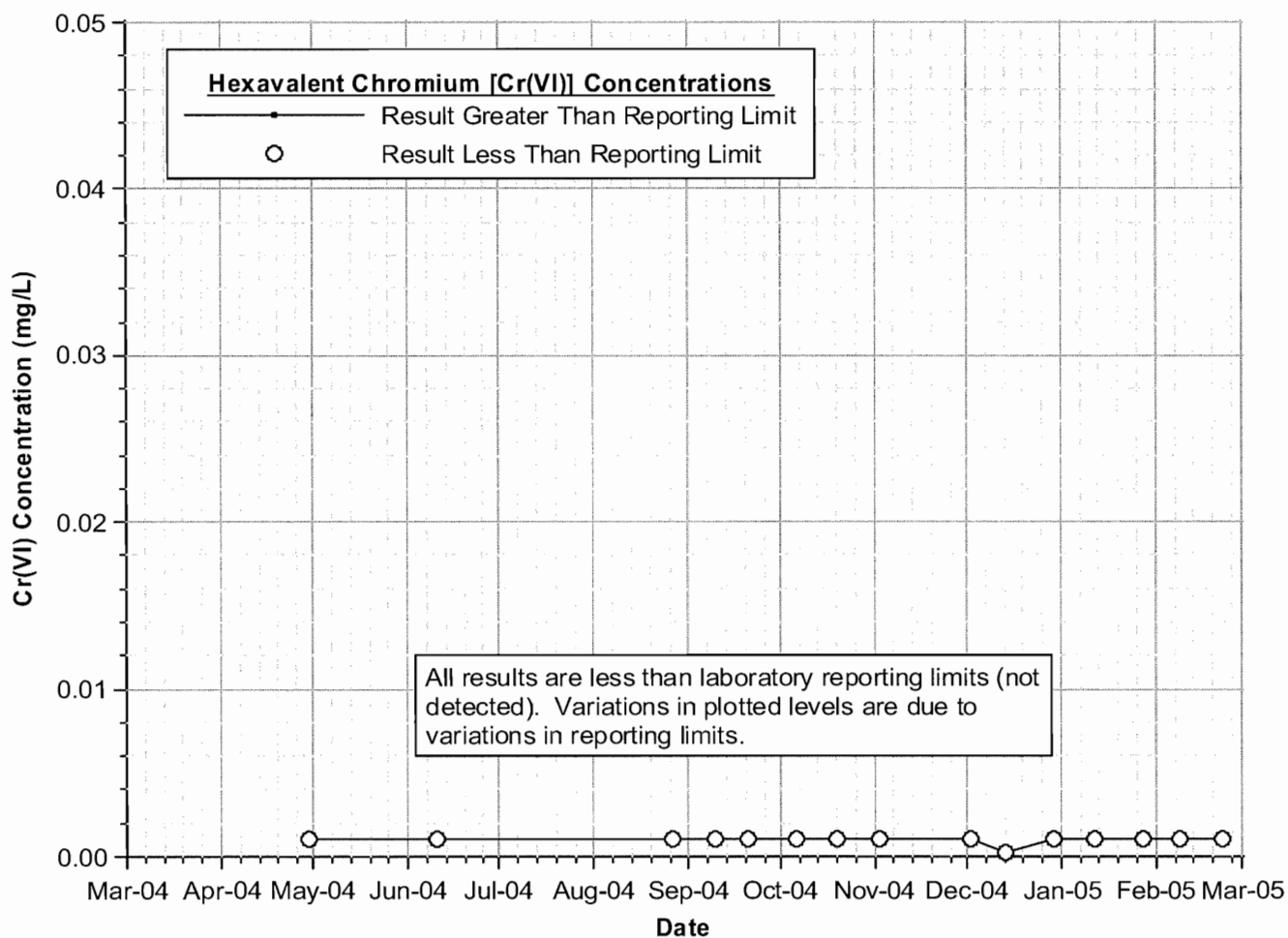
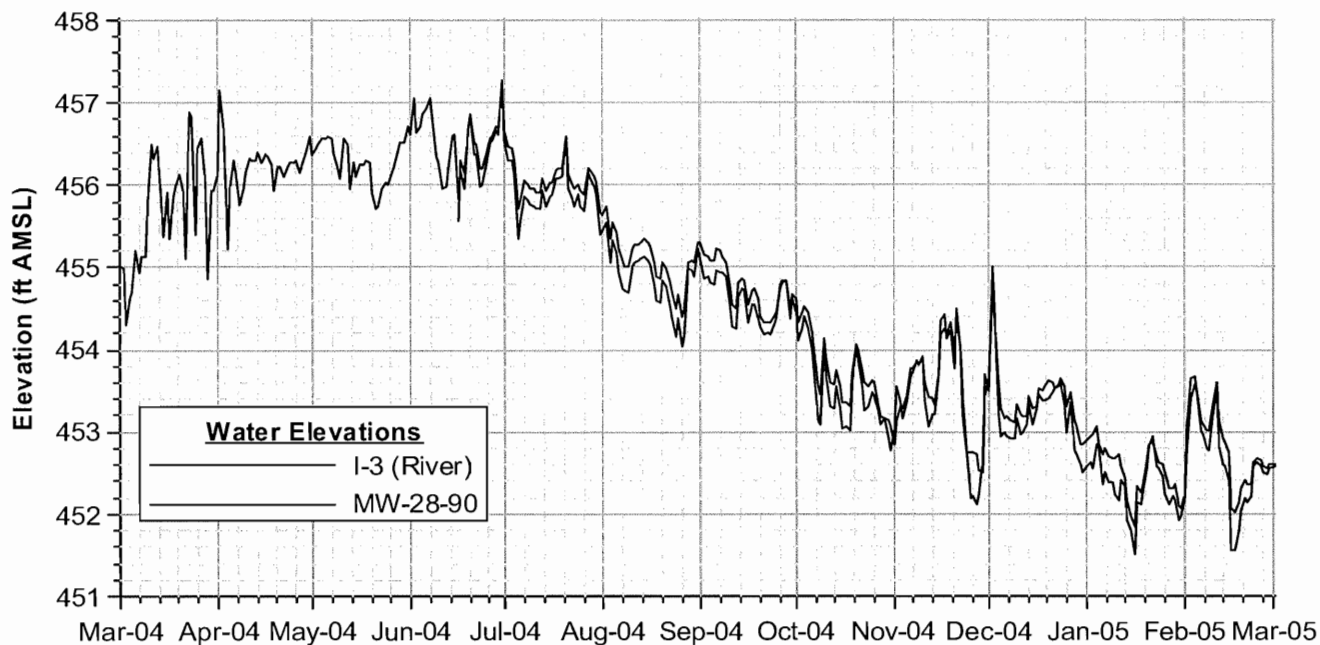
#### Notes

1. Beginning March 2004, groundwater samples from floodplain wells in the groundwater monitoring program are collected using the well-volume sampling method. Prior to the Feb. 17-20, 2004 sampling method comparison test, all samples from floodplain wells were collected using low-flow purging method.
2. Data subject to review.

PMR No.15 - Data Through 02/28/05  
MW-28-25 HEXAVALENT CHROMIUM  
CONCENTRATION & HYDROGRAPH

PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

**CH2MHILL**



PMR No.15 - Data Through 02/28/05  
MW-28-90 HEXAVALENT CHROMIUM  
CONCENTRATION & HYDROGRAPH

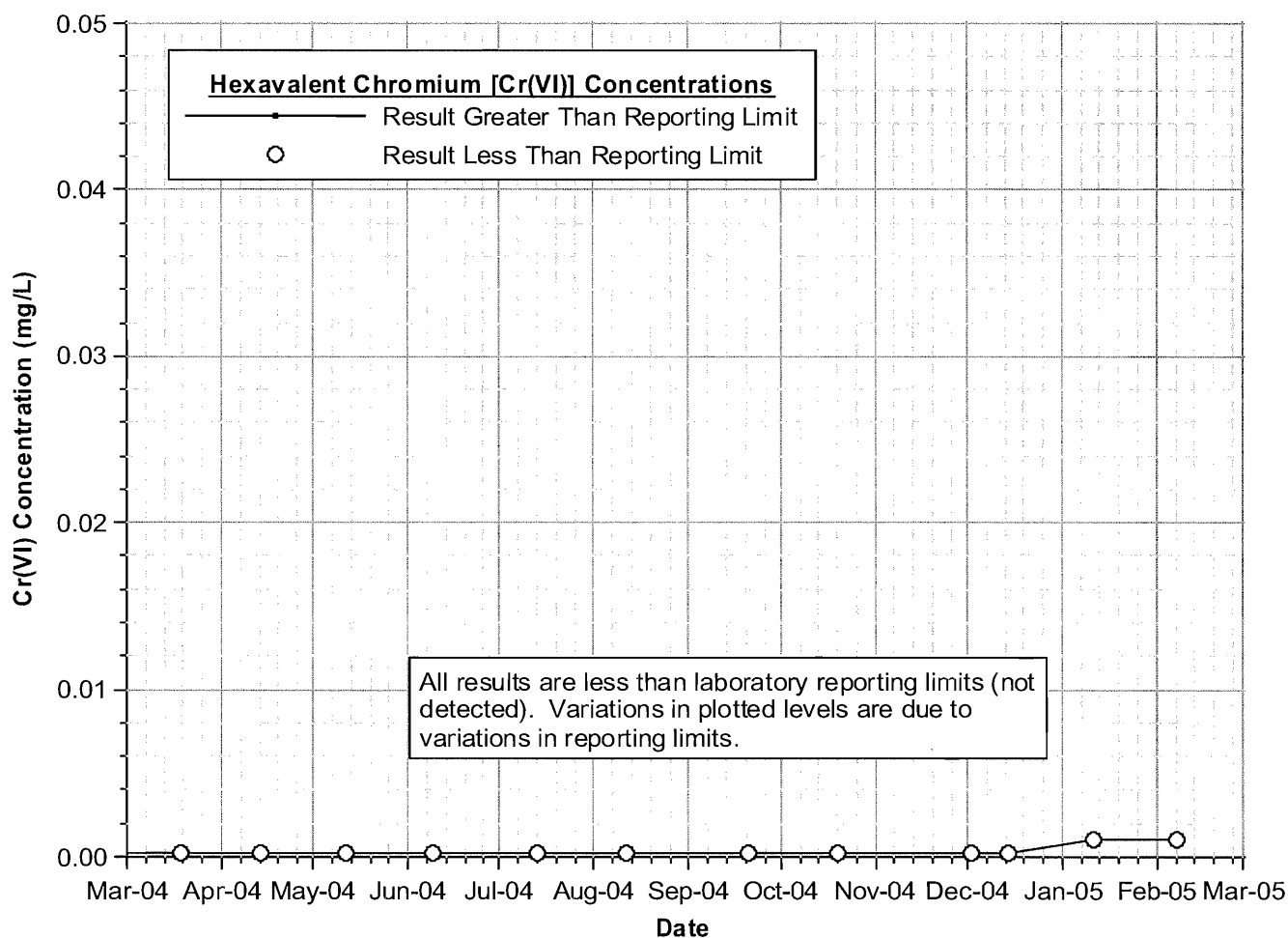
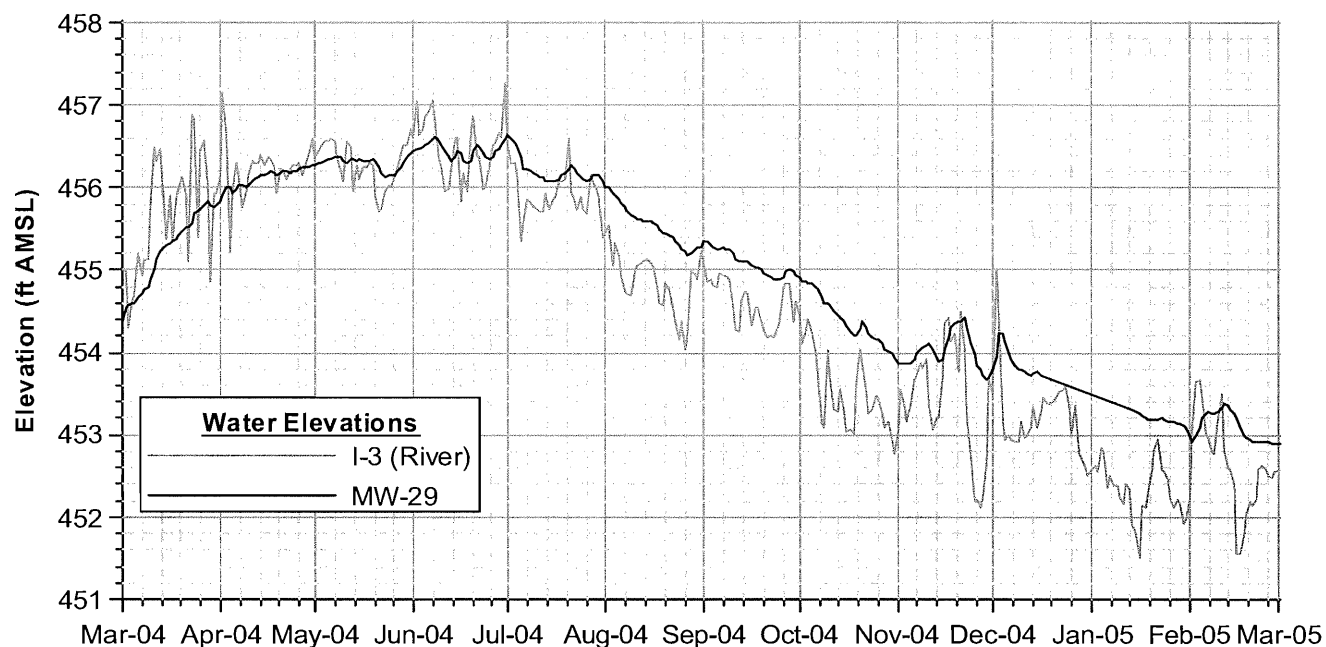
Notes

- Beginning March 2004, groundwater samples from floodplain wells in the groundwater monitoring program are collected using the well-volume sampling method. Prior to the Feb. 17-20, 2004 sampling method comparison test, all samples from floodplain wells were collected using low-flow purging method.
- Data subject to review.

PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

**CH2MHILL**





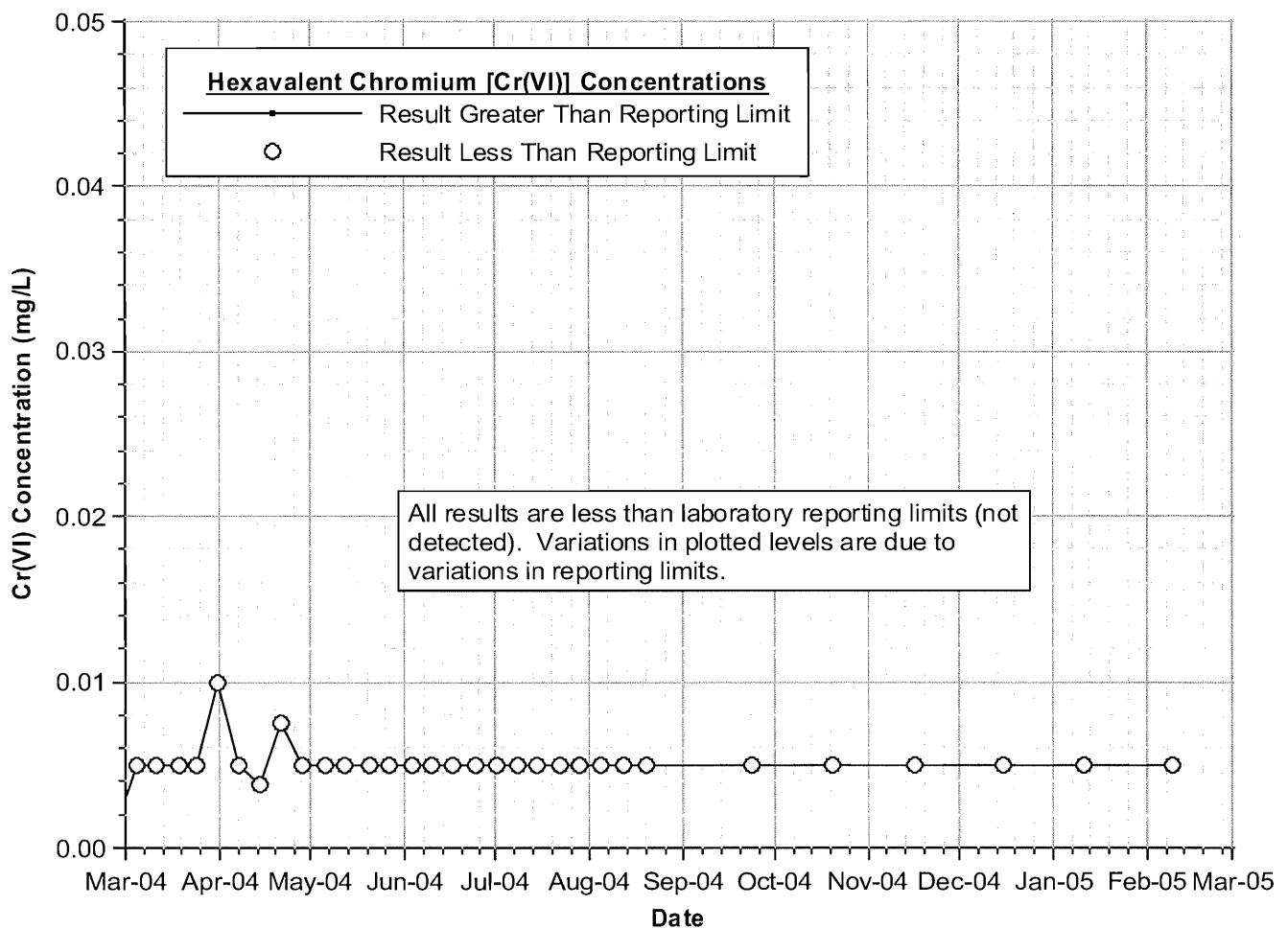
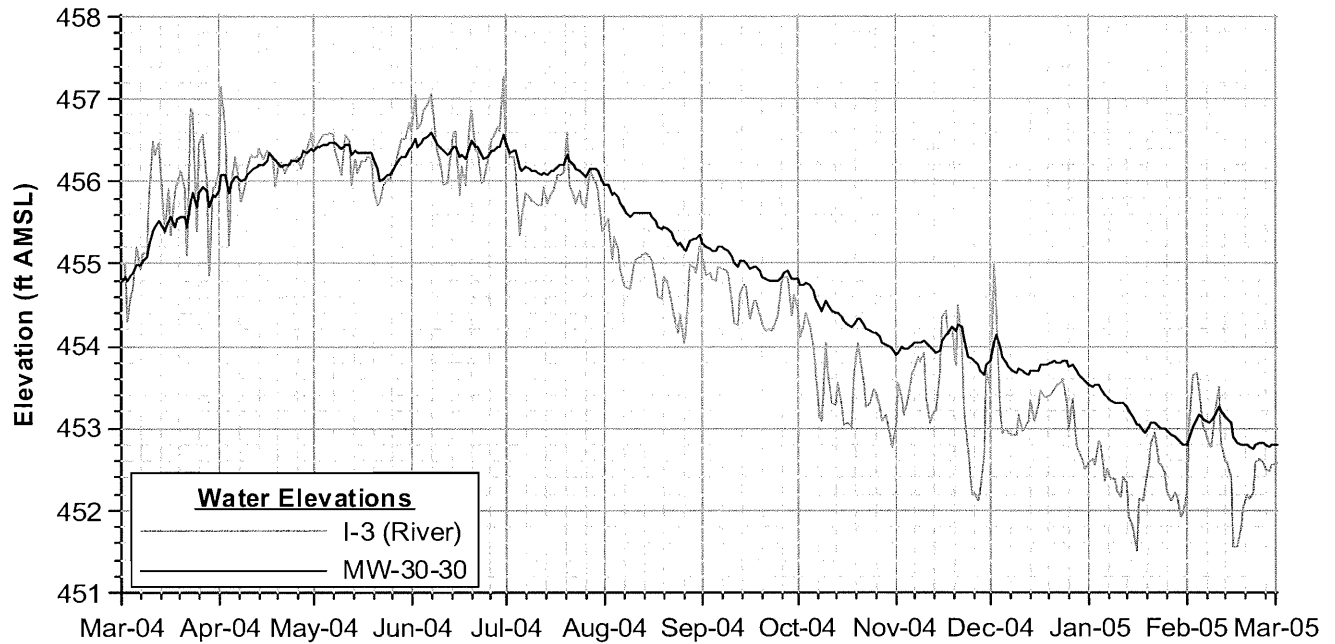
PMR No.15 - Data Through 02/28/05  
MW-29 HEXAVALENT CHROMIUM  
CONCENTRATION & HYDROGRAPH

PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

CH2MHILL

Notes

1. Beginning March 2004, groundwater samples from floodplain wells in the groundwater monitoring program are collected using the well-volume sampling method. Prior to the Feb. 17-20, 2004 sampling method comparison test, all samples from floodplain wells were collected using low-flow purging method.
2. Data subject to review.

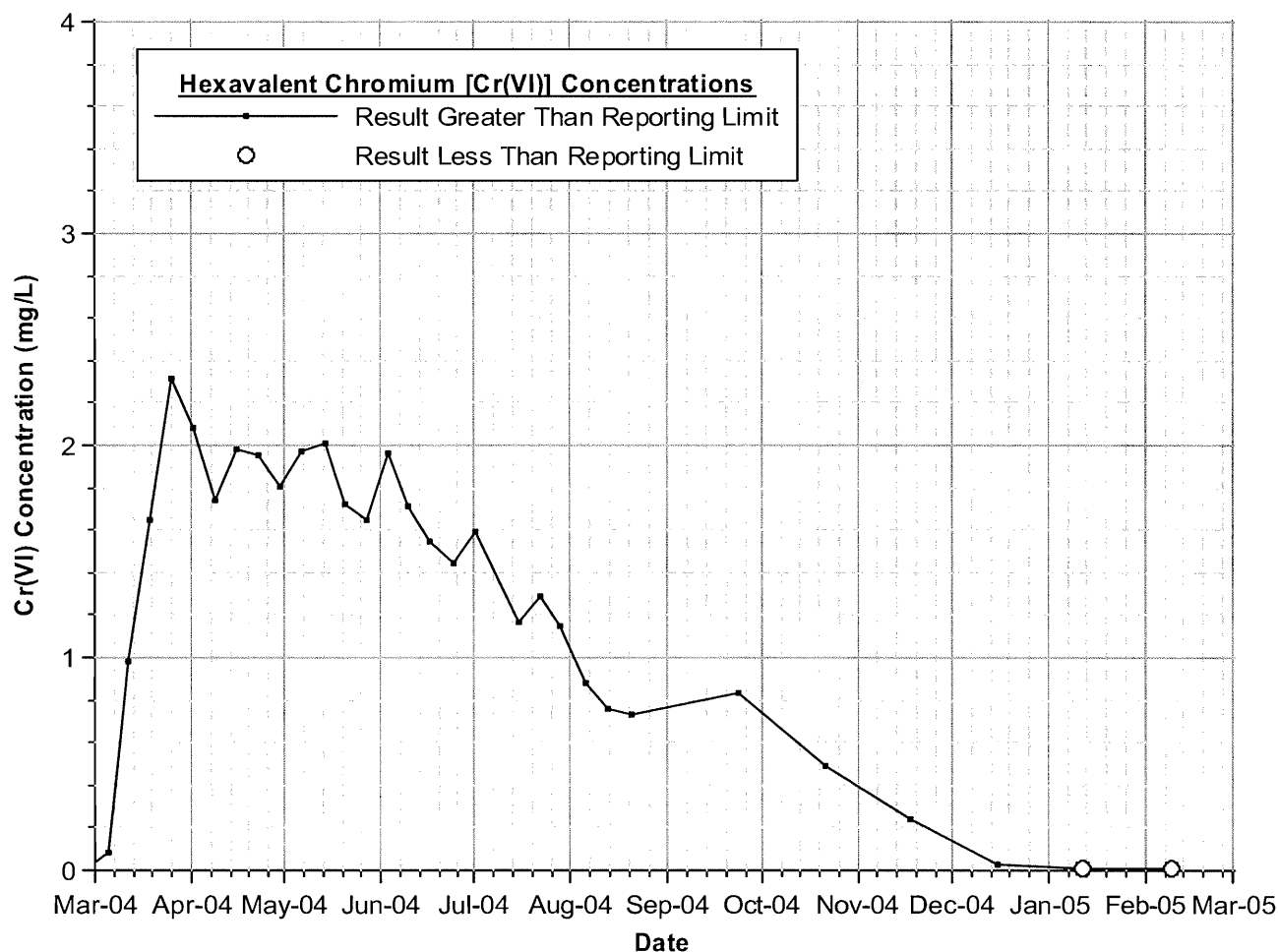
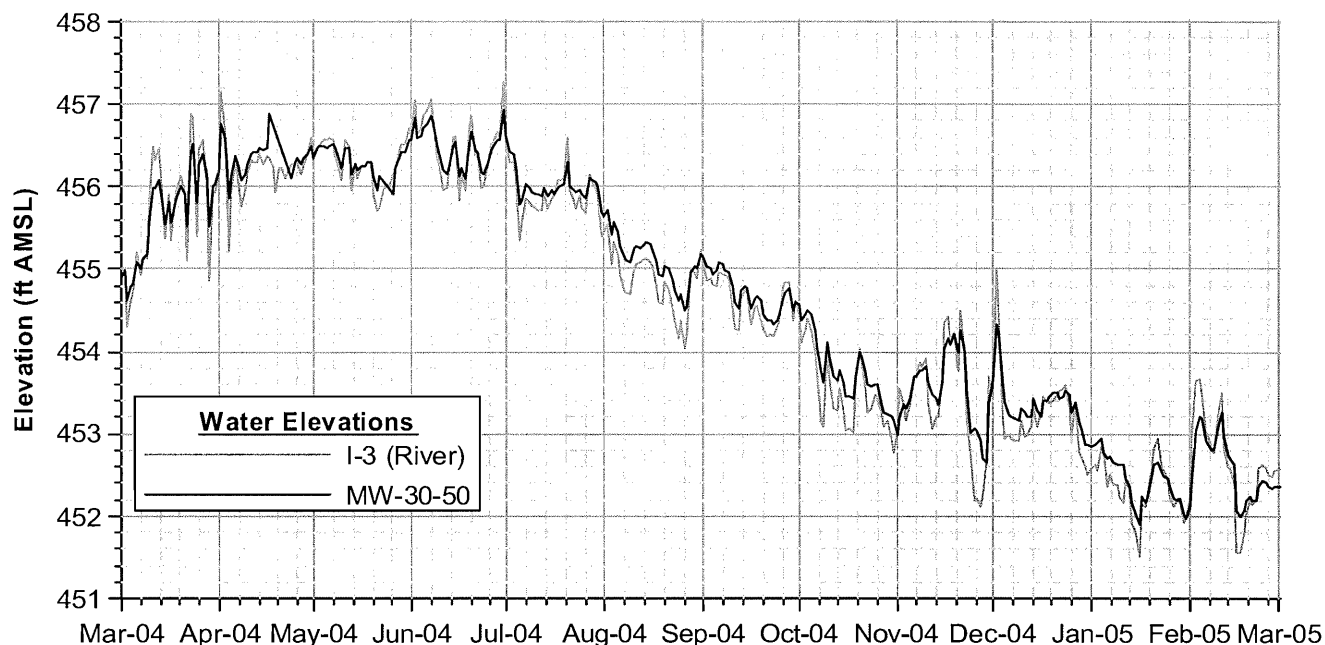


PMR No.15 - Data Through 02/28/05  
MW-30-30 HEXAVALENT CHROMIUM  
CONCENTRATION & HYDROGRAPH

PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

Notes

1. Beginning March 2004, groundwater samples from floodplain wells in the groundwater monitoring program are collected using the well-volume sampling method. Prior to the Feb. 17-20, 2004 sampling method comparison test, all samples from floodplain wells were collected using low-flow purging method.
2. Data subject to review.

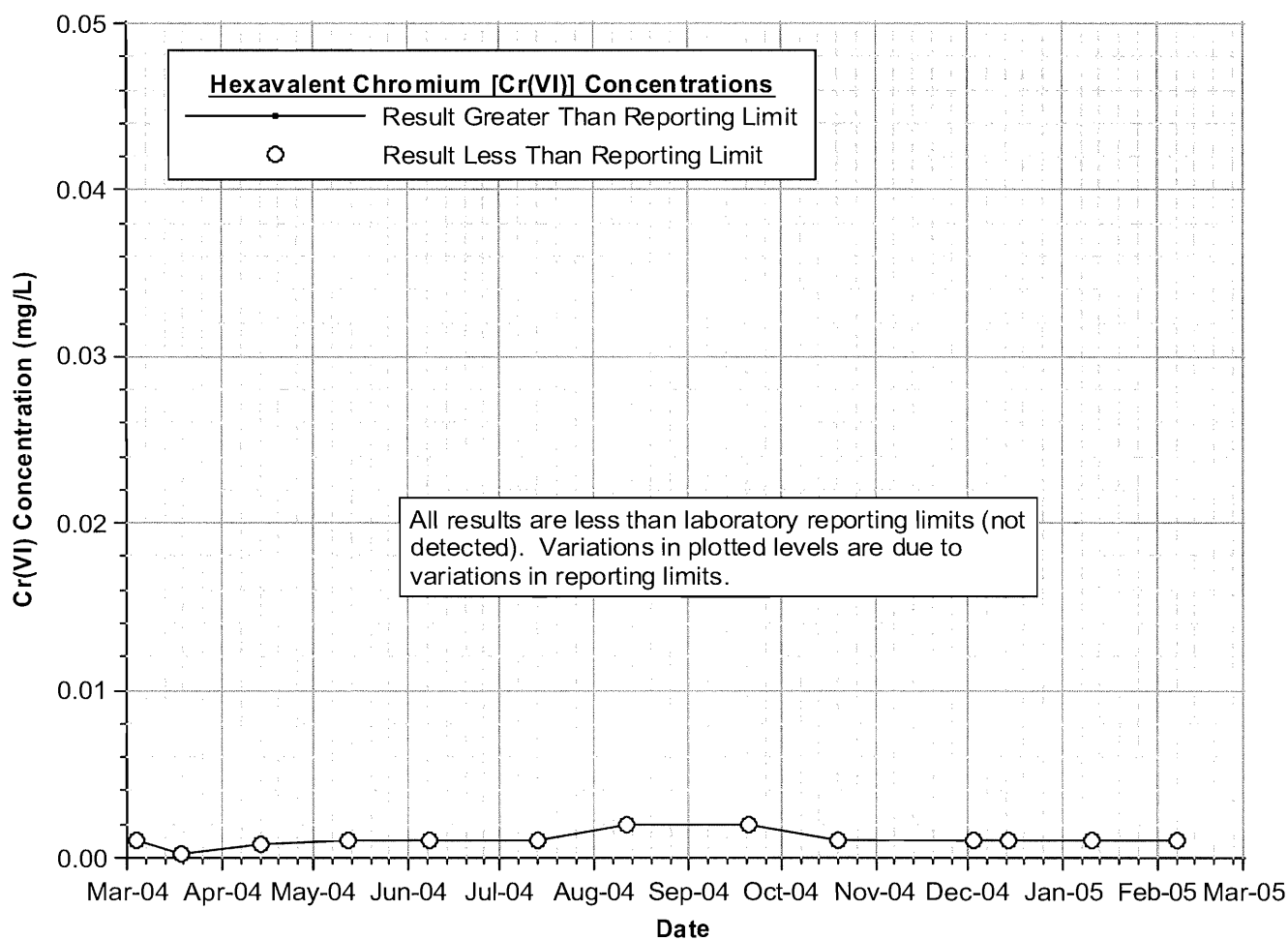
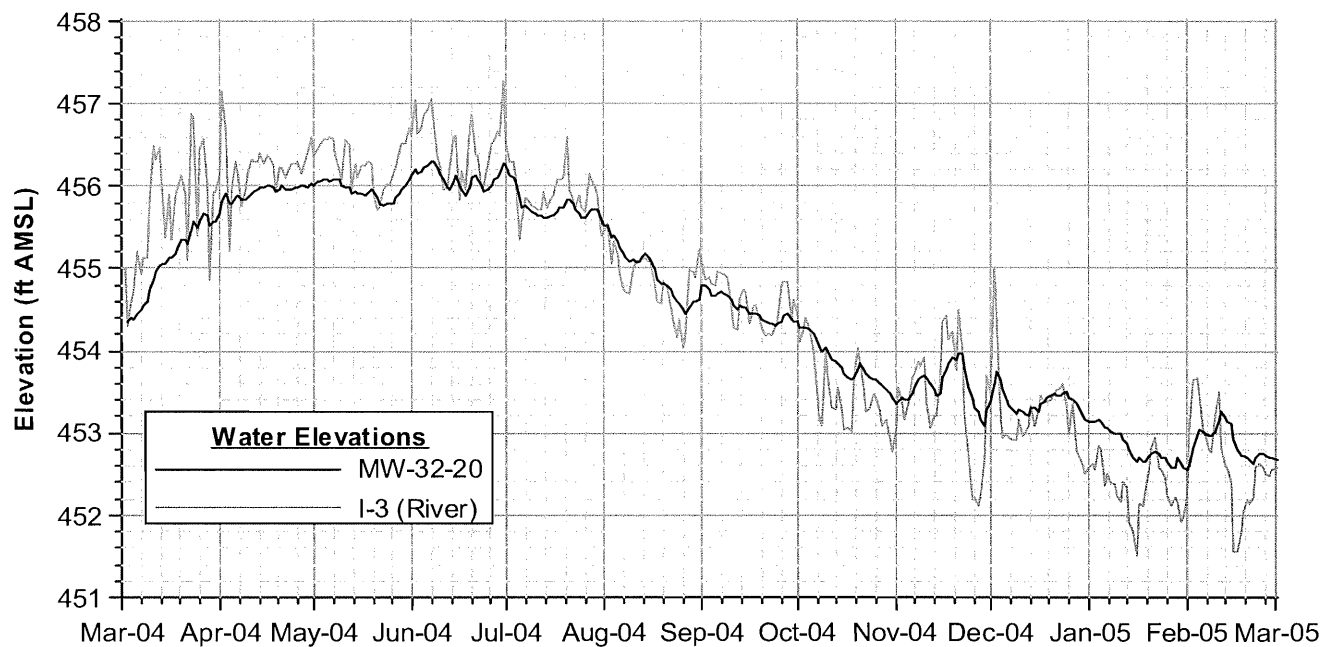


PMR No.15 - Data Through 02/28/05  
MW-30-50 HEXAVALENT CHROMIUM  
CONCENTRATION & HYDROGRAPH

PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

Notes

1. Beginning March 2004, groundwater samples from floodplain wells in the groundwater monitoring program are collected using the well-volume sampling method. Prior to the Feb. 17-20, 2004 sampling method comparison test, all samples from floodplain wells were collected using low-flow purging method.
2. Data subject to review.

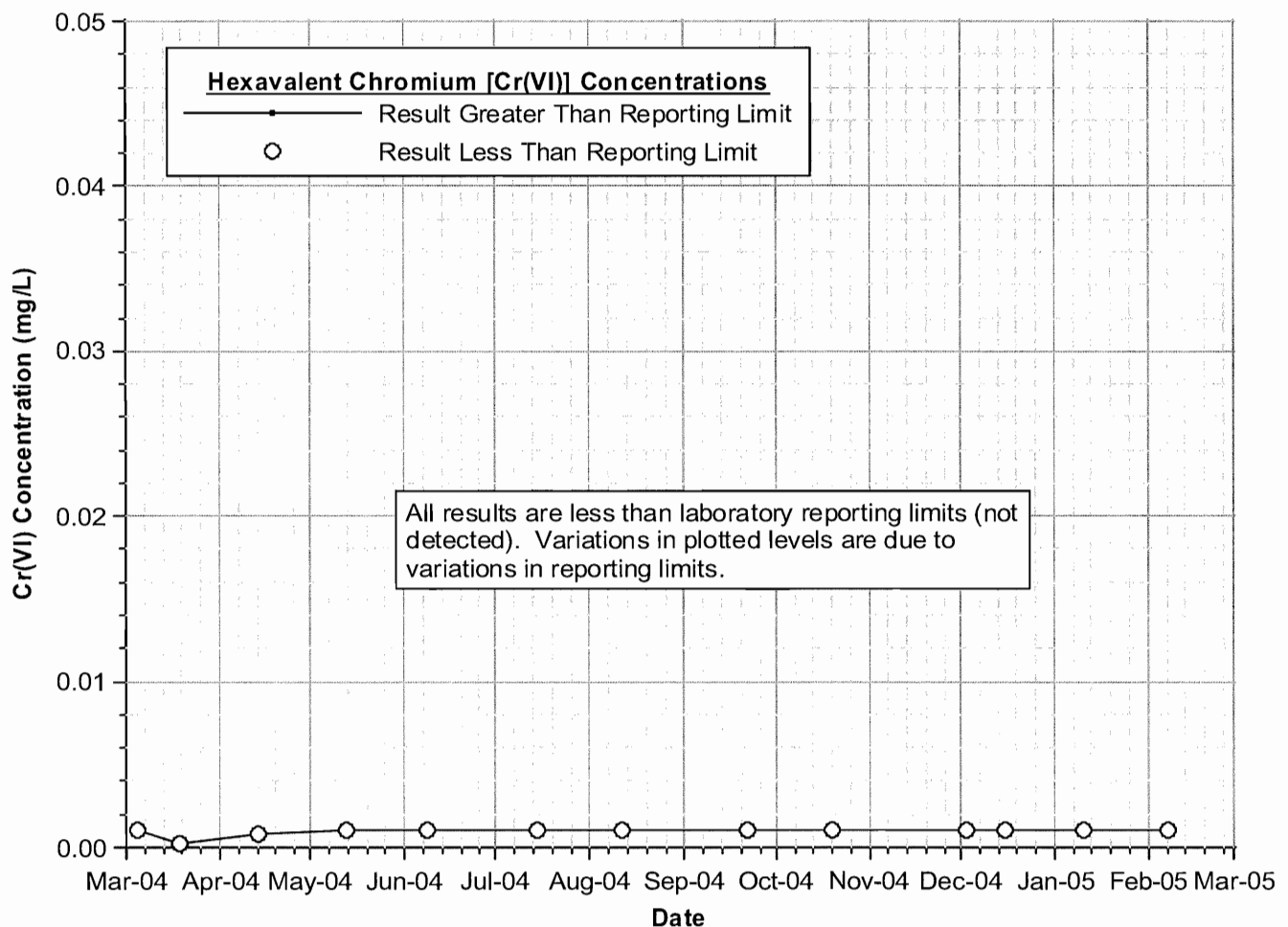
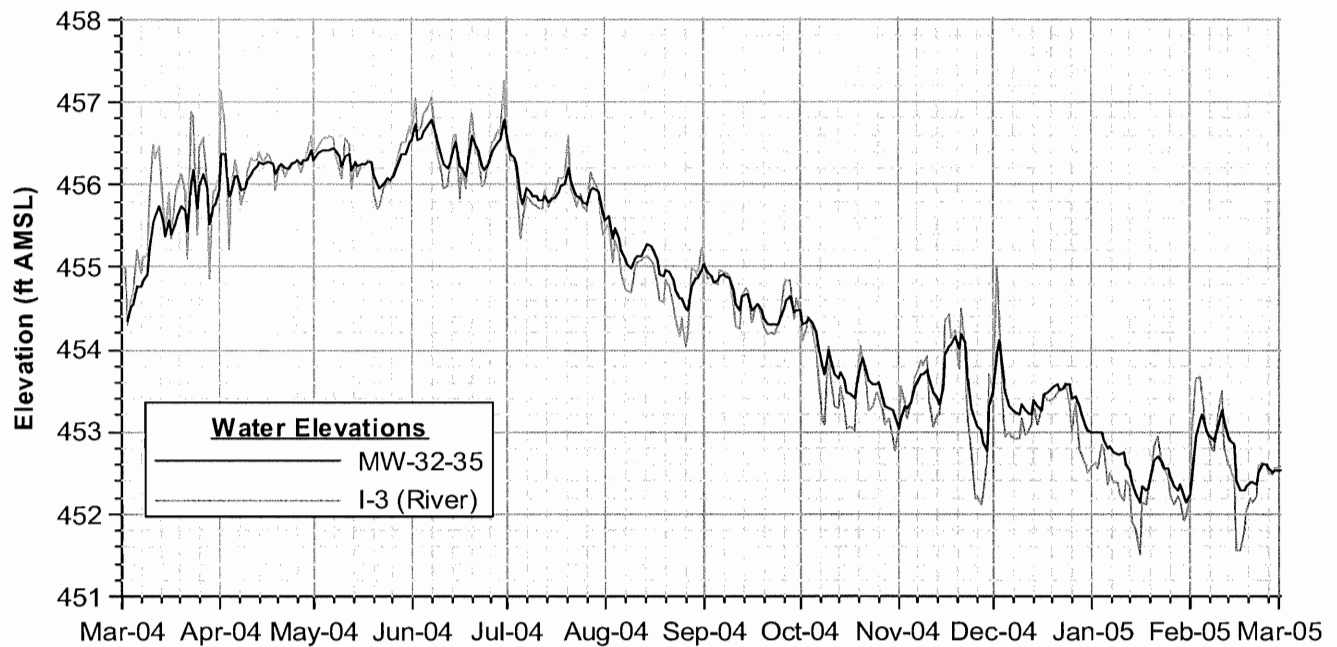


PMR No.15 - Data Through 02/28/05  
MW-32-20 HEXAVALENT CHROMIUM  
CONCENTRATION & HYDROGRAPH

**Notes**

1. Beginning March 2004, groundwater samples from floodplain wells in the groundwater monitoring program are collected using the well-volume sampling method. Prior to the Feb. 17-20, 2004 sampling method comparison test, all samples from floodplain wells were collected using low-flow purging method.
2. Data subject to review.

PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA



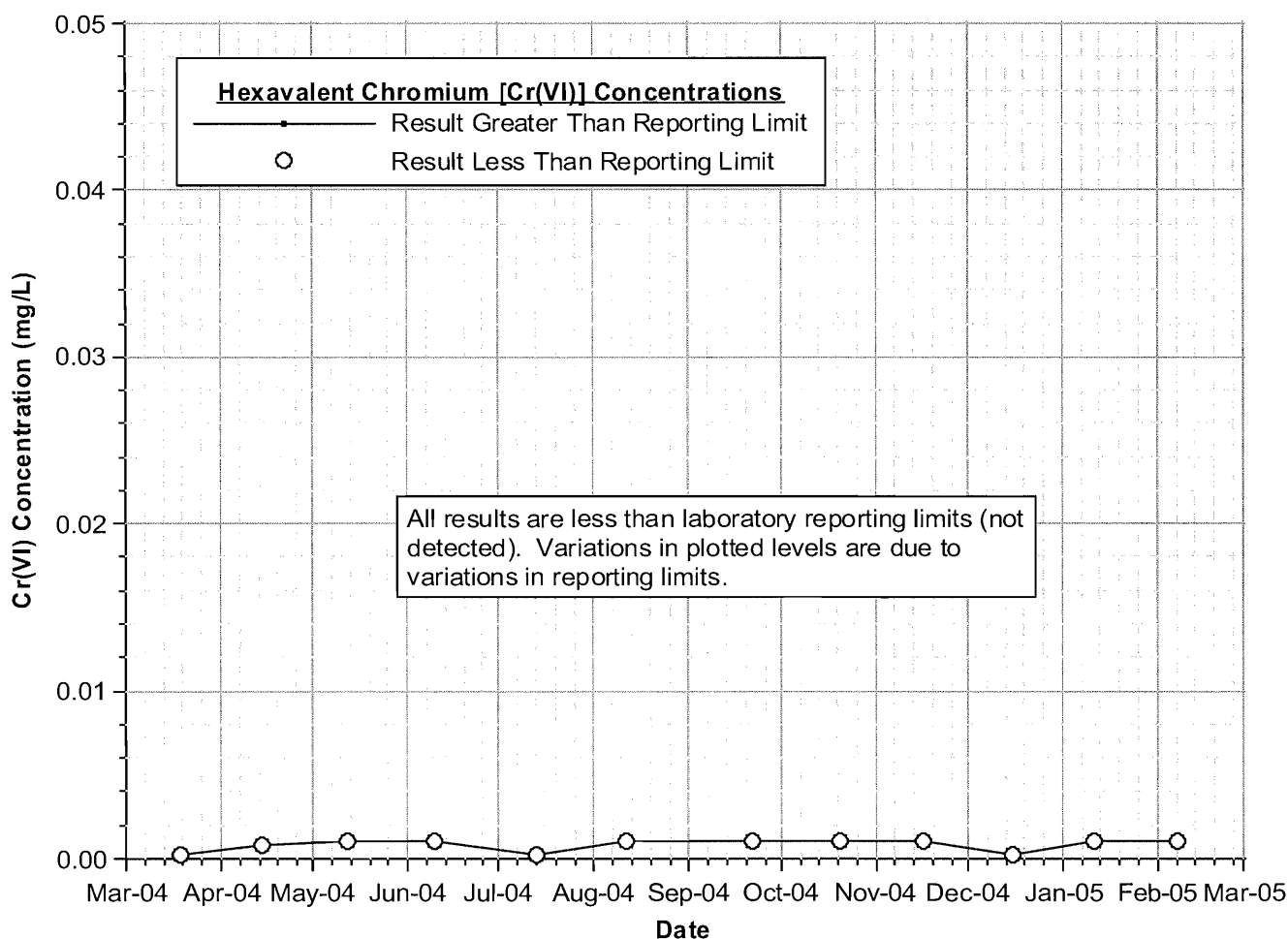
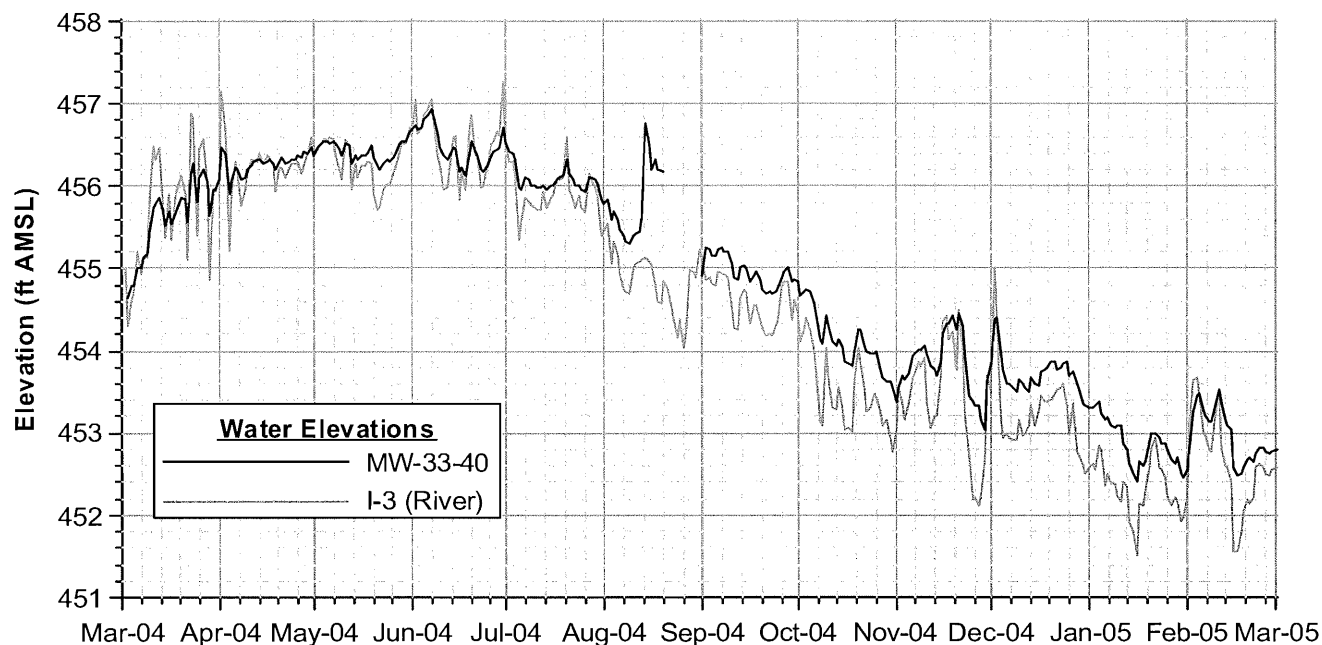
#### Notes

- Beginning March 2004, groundwater samples from floodplain wells in the groundwater monitoring program are collected using the well-volume sampling method. Prior to the Feb. 17-20, 2004 sampling method comparison test, all samples from floodplain wells were collected using low-flow purging method.
- Data subject to review.

PMR No.15 - Data Through 02/28/05  
MW-32-35 HEXAVALENT CHROMIUM  
CONCENTRATION & HYDROGRAPH

PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

CH2MHILL



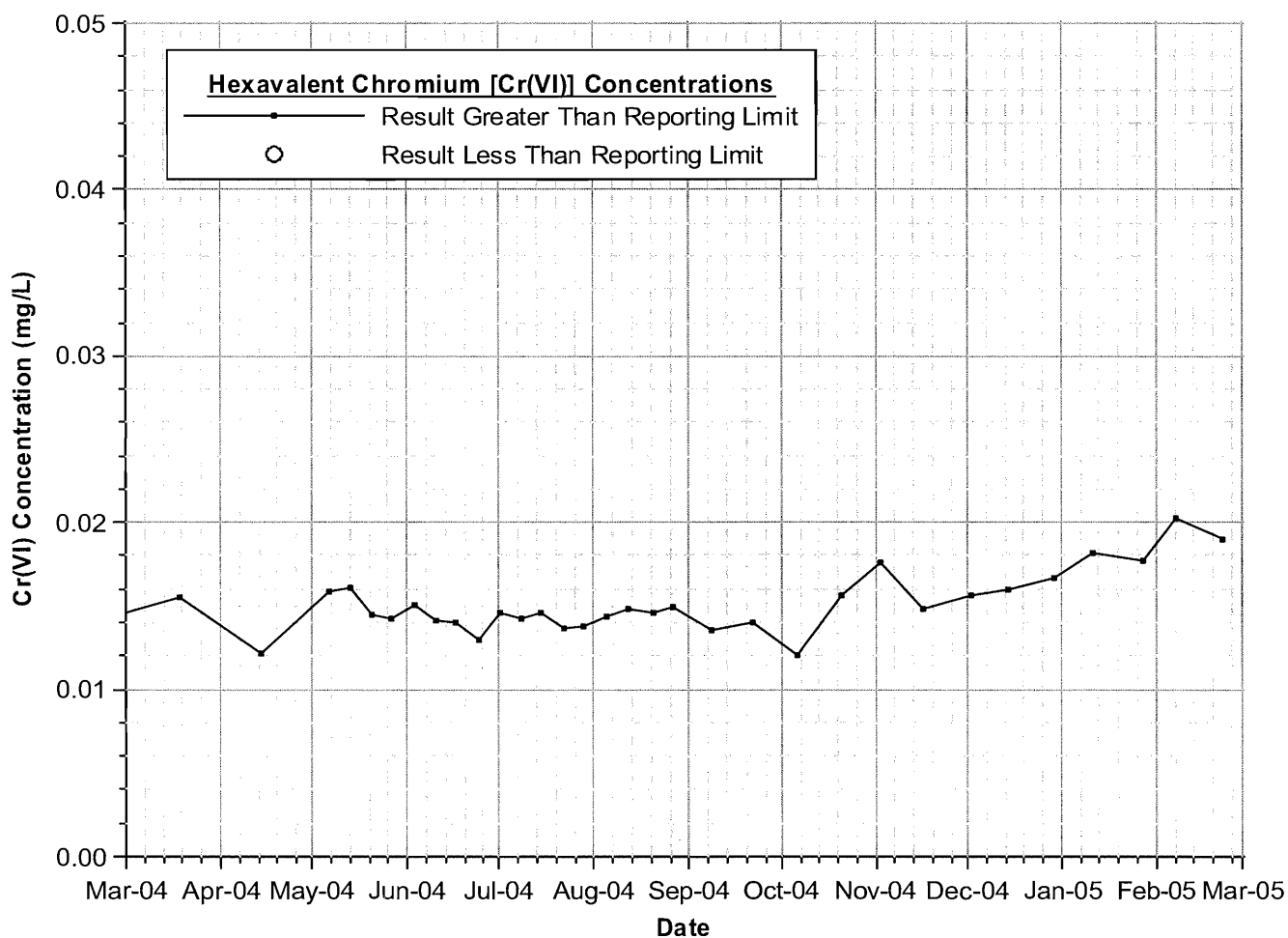
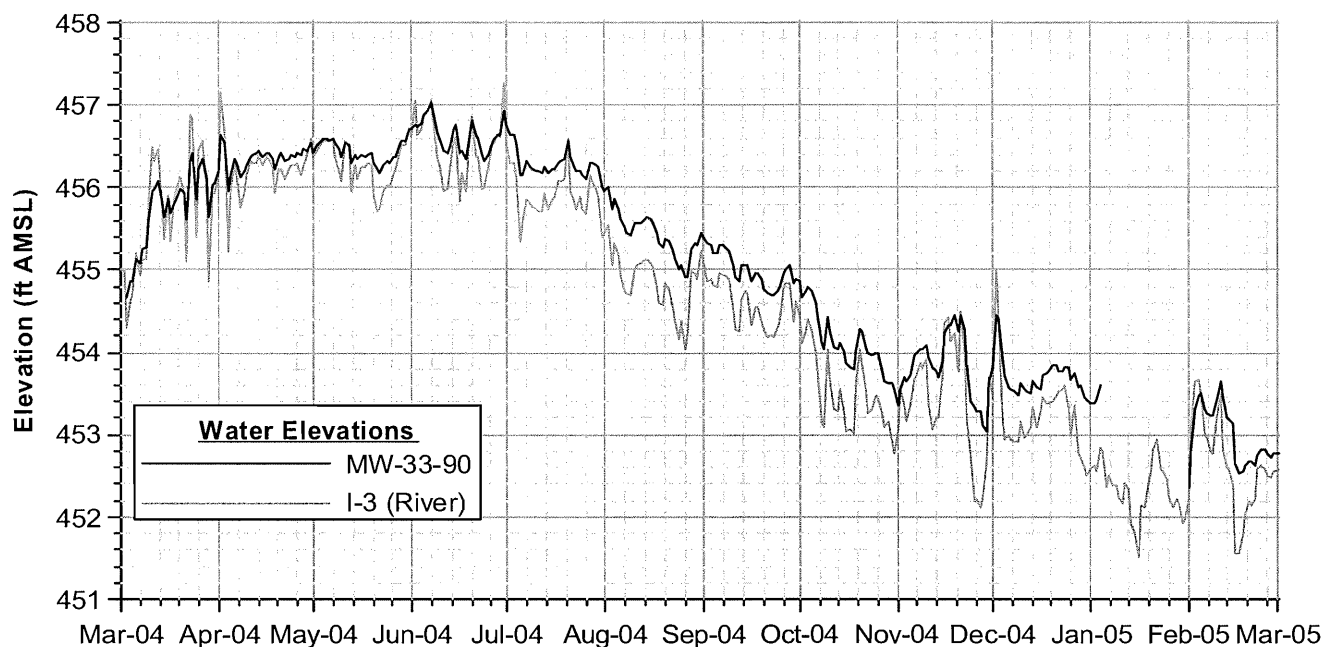
PMR No.15 - Data Through 02/28/05  
MW-33-40 HEXAVALENT CHROMIUM  
CONCENTRATION & HYDROGRAPH

Notes

1. Beginning March 2004, groundwater samples from floodplain wells in the groundwater monitoring program are collected using the well-volume sampling method. Prior to the Feb. 17-20, 2004 sampling method comparison test, all samples from floodplain wells were collected using low-flow purging method.
2. Data subject to review.

PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

**CH2MHILL**



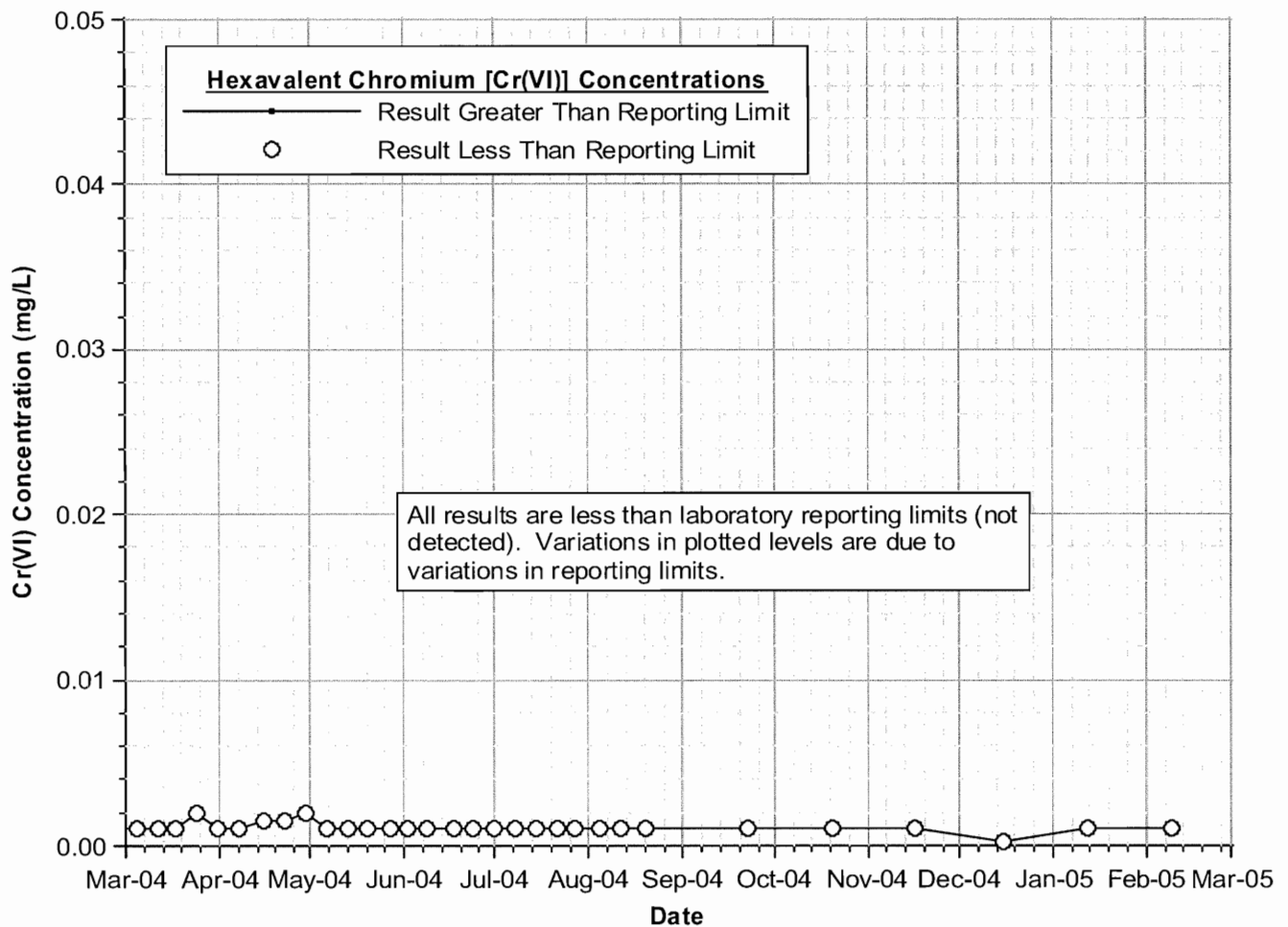
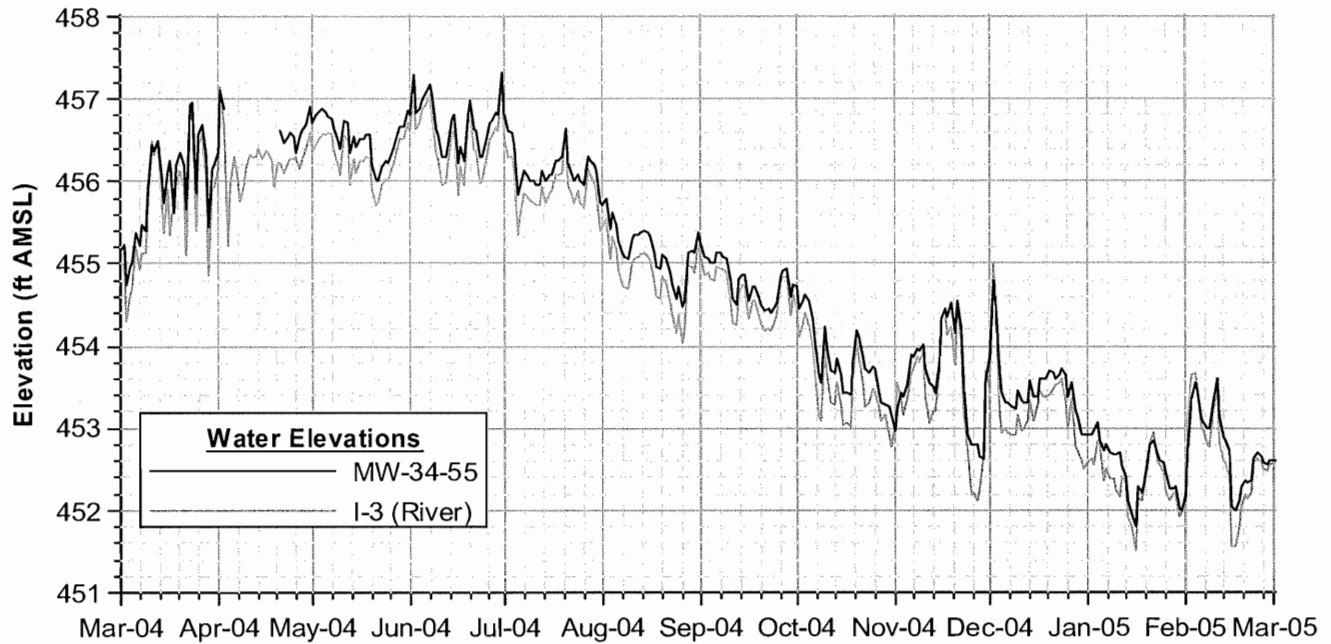
#### Notes

1. Beginning March 2004, groundwater samples from floodplain wells in the groundwater monitoring program are collected using the well-volume sampling method. Prior to the Feb. 17-20, 2004 sampling method comparison test, all samples from floodplain wells were collected using low-flow purging method.
2. Data subject to review.

PMR No.15 - Data Through 02/28/05  
 MW-33-90 HEXAVALENT CHROMIUM  
 CONCENTRATION & HYDROGRAPH

PG&E TOPOCK COMPRESSOR STATION  
 NEEDLES, CALIFORNIA

**CH2MHILL**



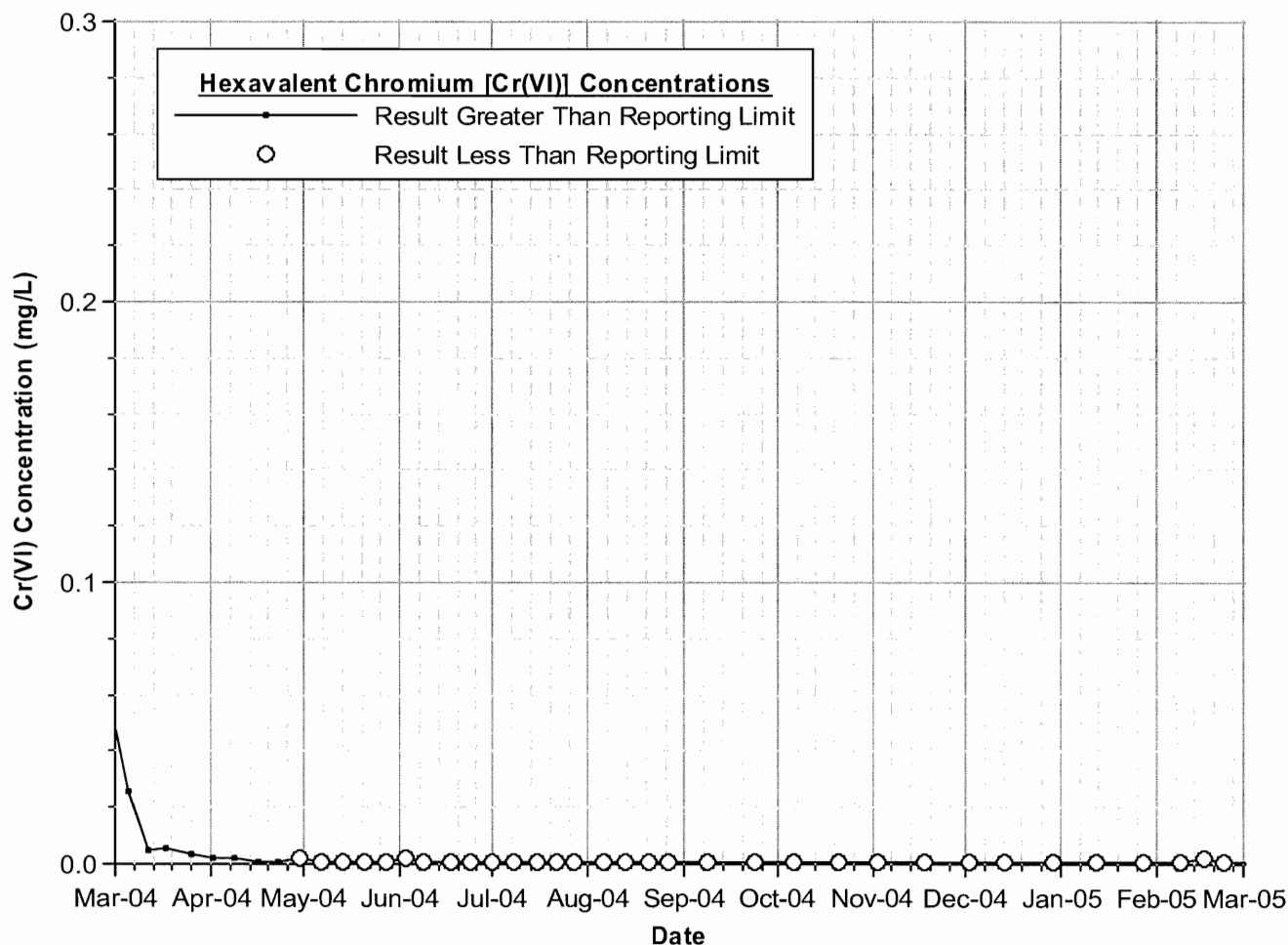
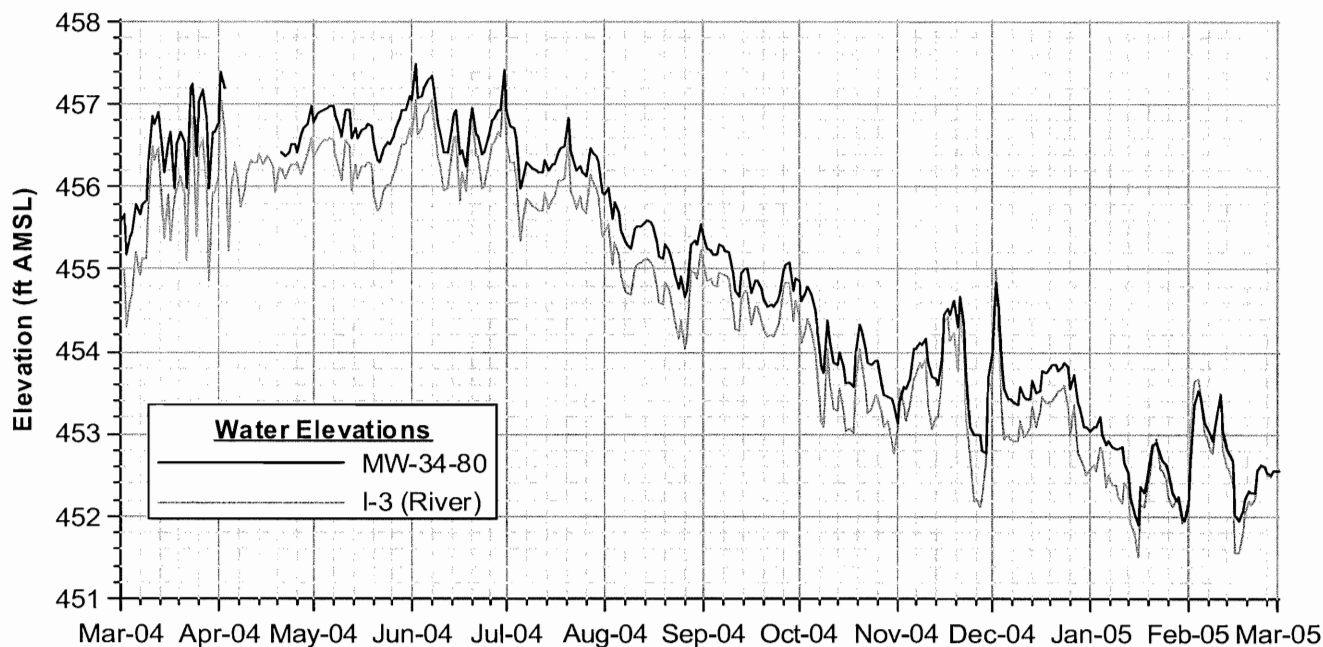
PMR No.15 - Data Through 02/28/05  
MW-34-55 HEXAVALENT CHROMIUM  
CONCENTRATION & HYDROGRAPH

PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

Notes

- Beginning March 2004, groundwater samples from floodplain wells in the groundwater monitoring program are collected using the well-volume sampling method. Prior to the Feb. 17-20, 2004 sampling method comparison test, all samples from floodplain wells were collected using low-flow purging method.
- Data subject to review.





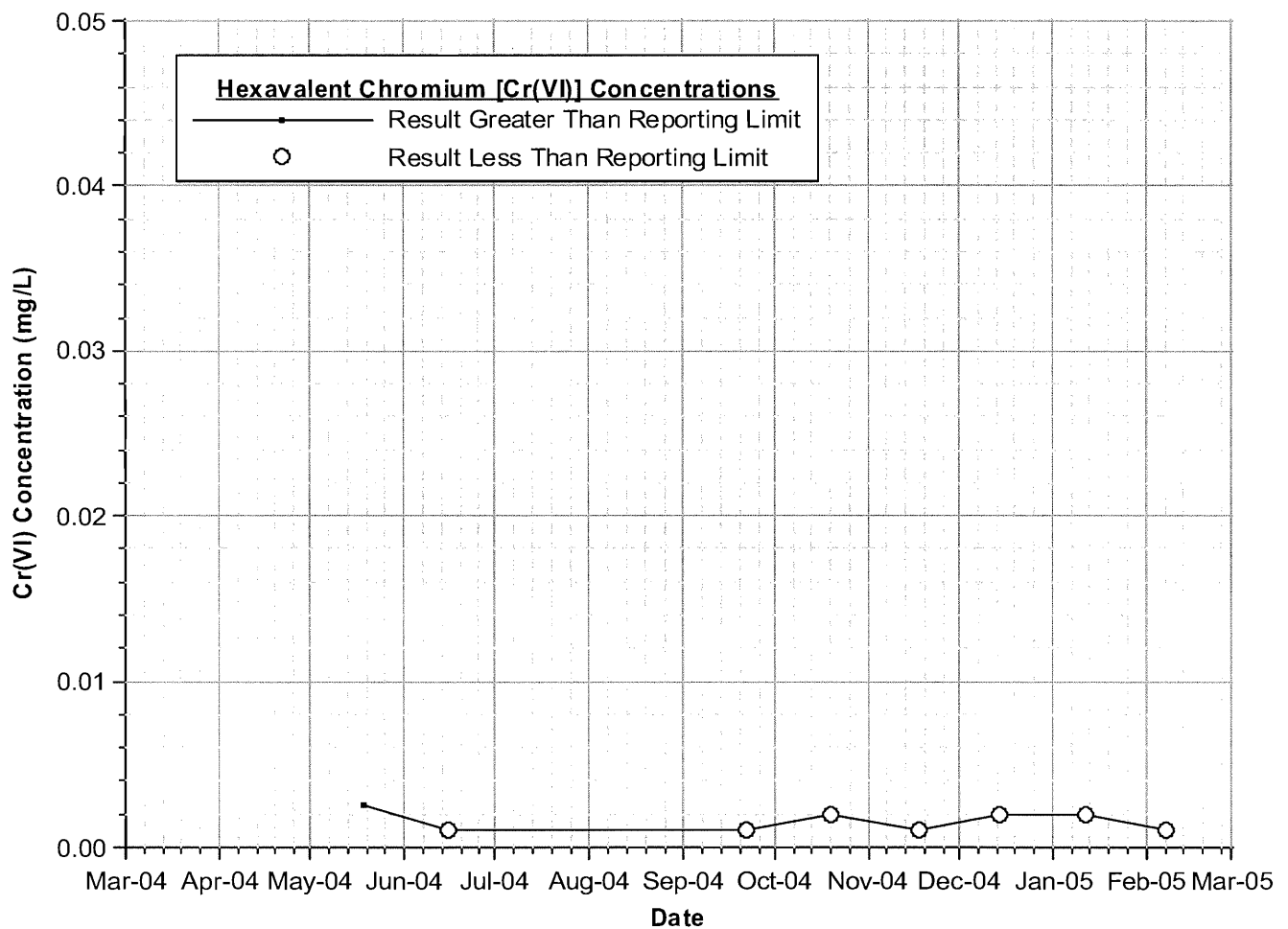
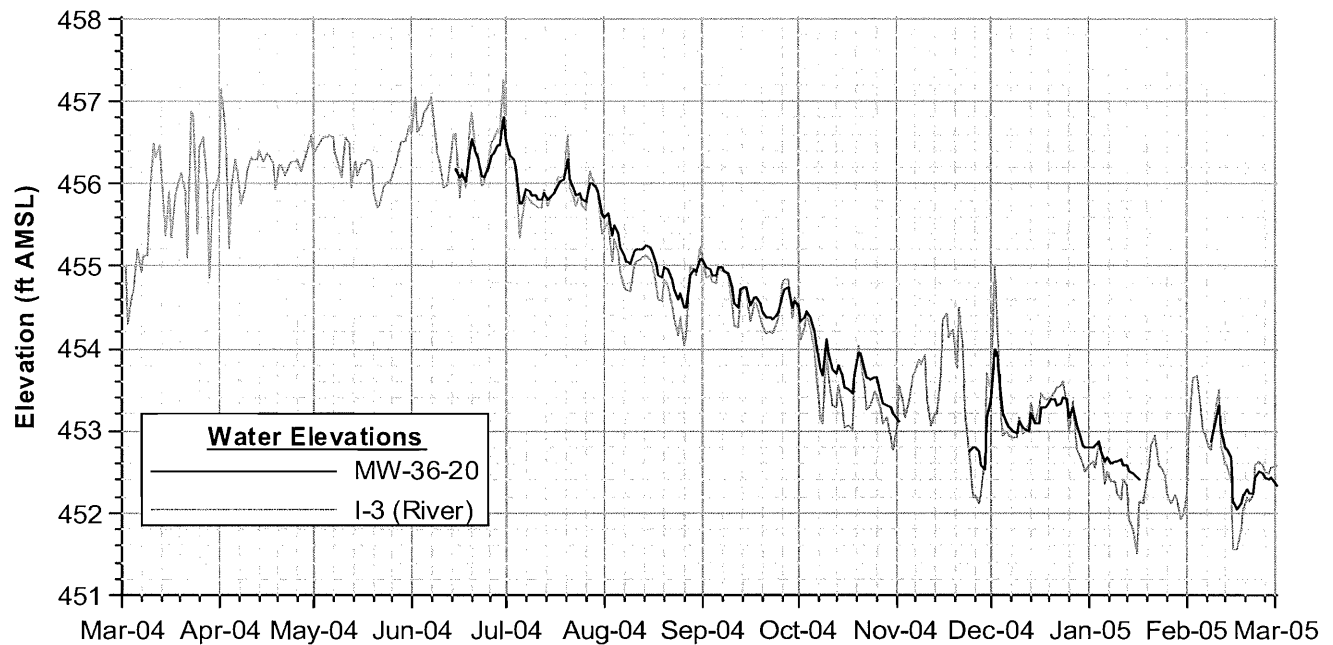
**Notes**

1. Beginning March 2004, groundwater samples from floodplain wells in the groundwater monitoring program are collected using the well-volume sampling method. Prior to the Feb. 17-20, 2004 sampling method comparison test, all samples from floodplain wells were collected using low-flow purging method.
2. Data subject to review.

PMR No.15 - Data Through 02/28/05  
MW-34-80 HEXAVALENT CHROMIUM  
CONCENTRATION & HYDROGRAPH

PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

**CH2MHILL**

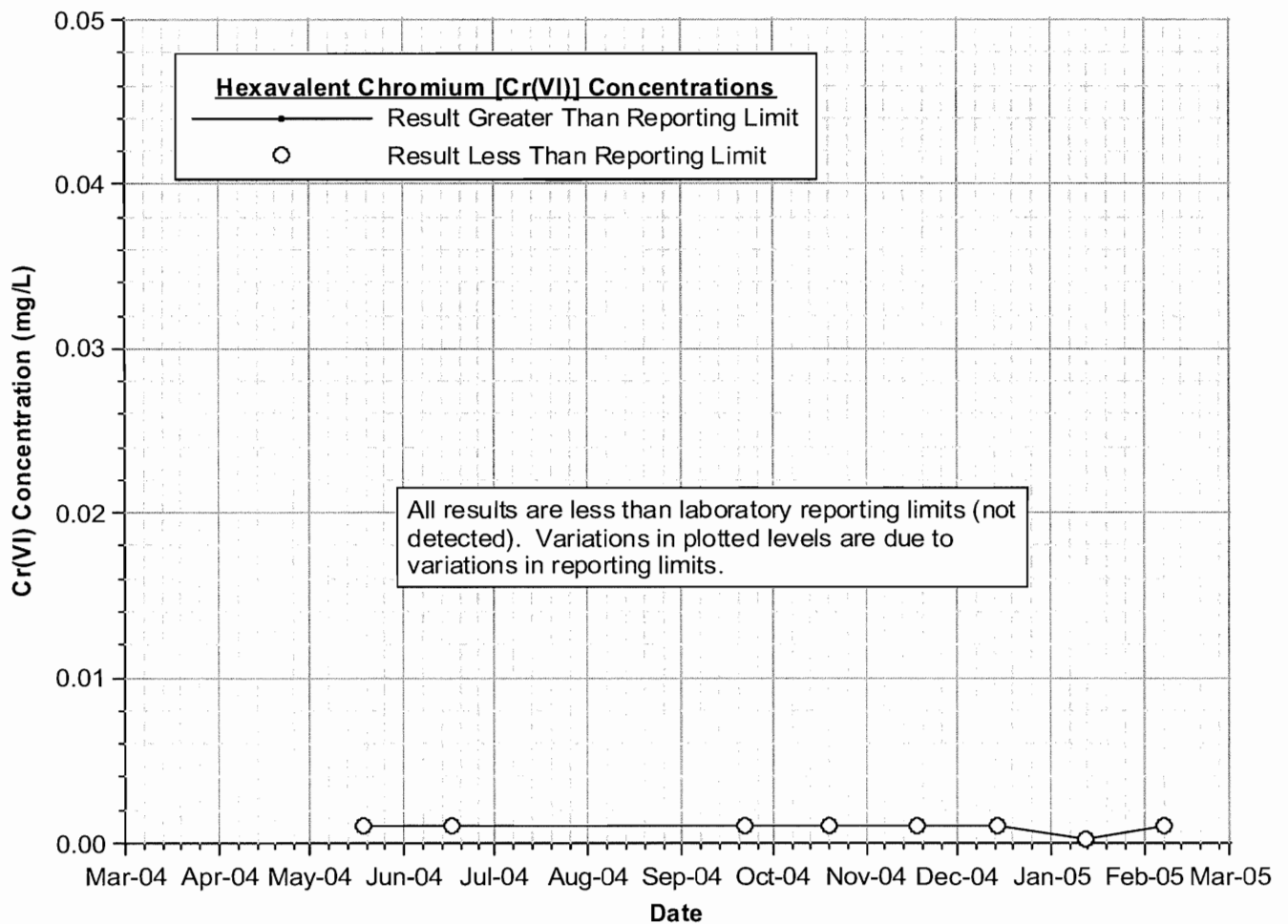
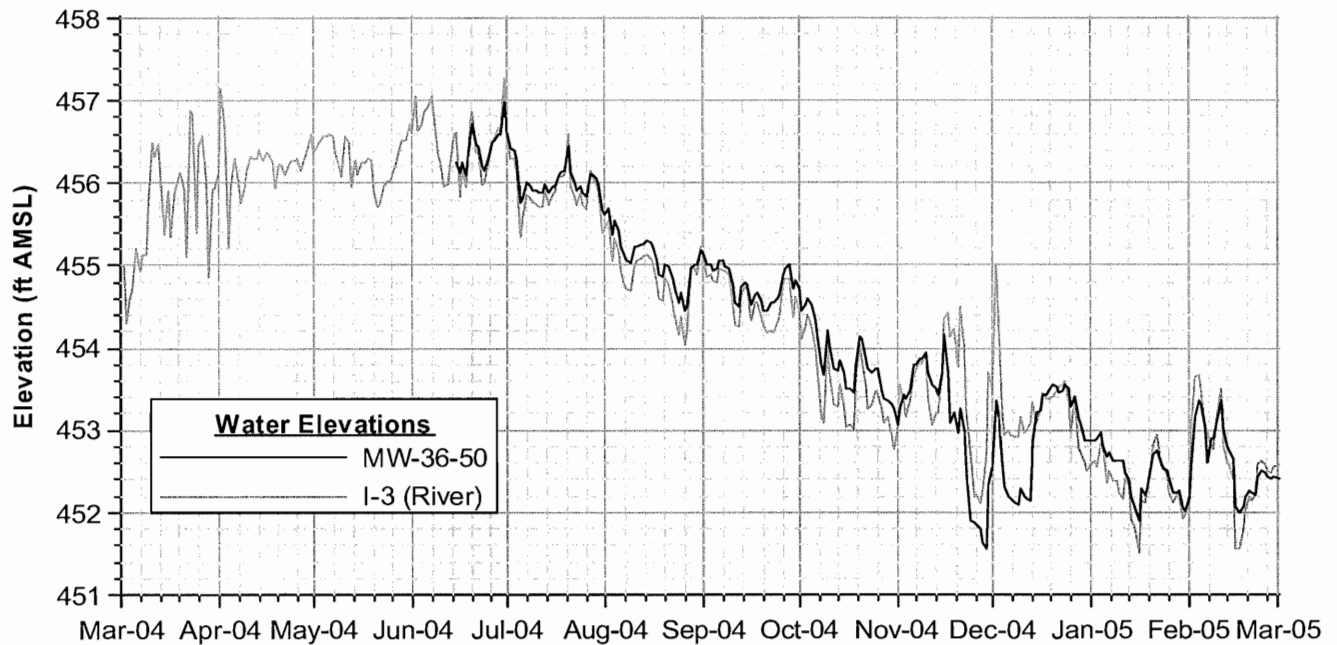


PMR No.15 - Data Through 02/28/05  
MW-36-20 HEXAVALENT CHROMIUM  
CONCENTRATION & HYDROGRAPH

PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

Notes

- Beginning March 2004, groundwater samples from floodplain wells in the groundwater monitoring program are collected using the well-volume sampling method. Prior to the Feb. 17-20, 2004 sampling method comparison test, all samples from floodplain wells were collected using low-flow purging method.
- Data subject to review.



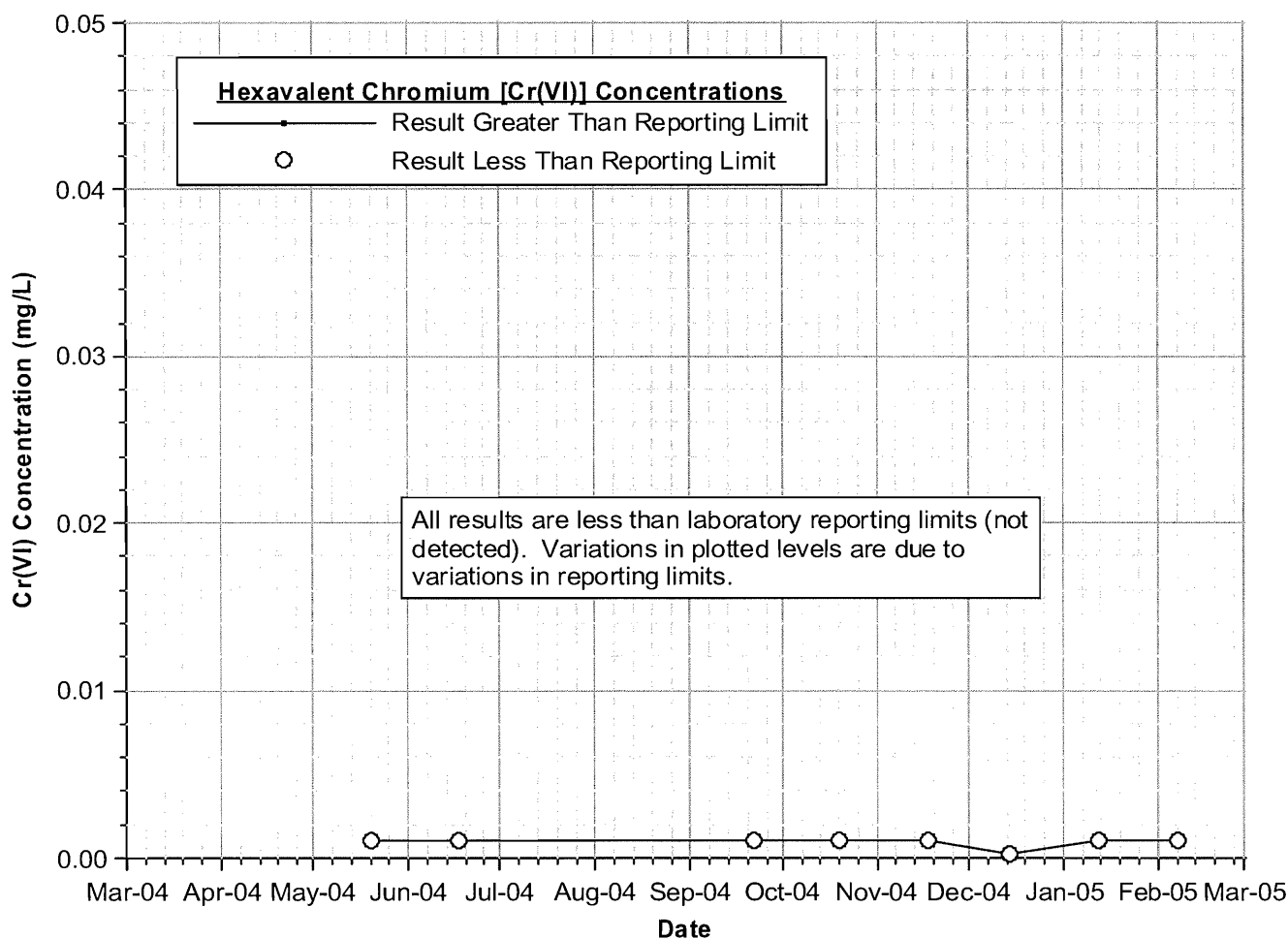
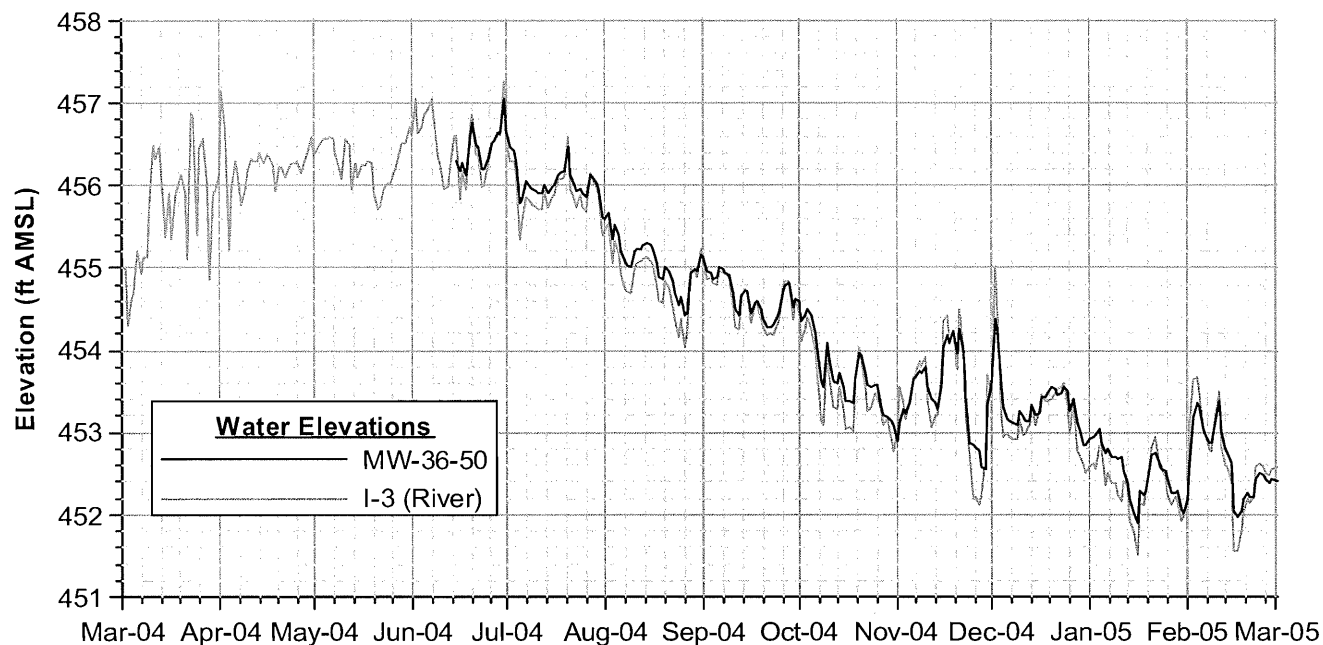
#### Notes

1. Beginning March 2004, groundwater samples from floodplain wells in the groundwater monitoring program are collected using the well-volume sampling method. Prior to the Feb. 17-20, 2004 sampling method comparison test, all samples from floodplain wells were collected using low-flow purging method.
2. Data subject to review.

PMR No.15 - Data Through 02/28/05  
MW-36-40 HEXAVALENT CHROMIUM  
CONCENTRATION & HYDROGRAPH

PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

**CH2MHILL**

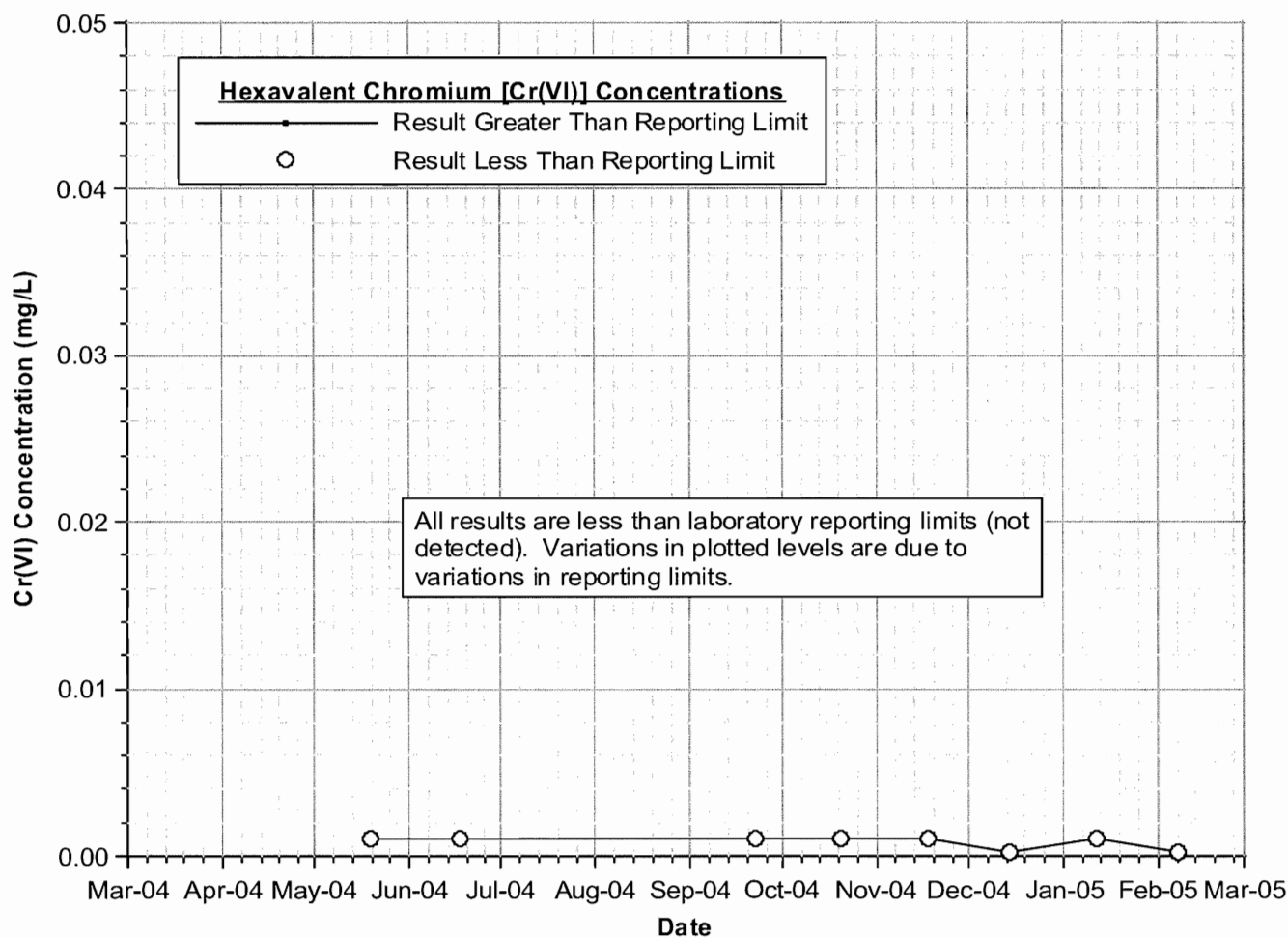
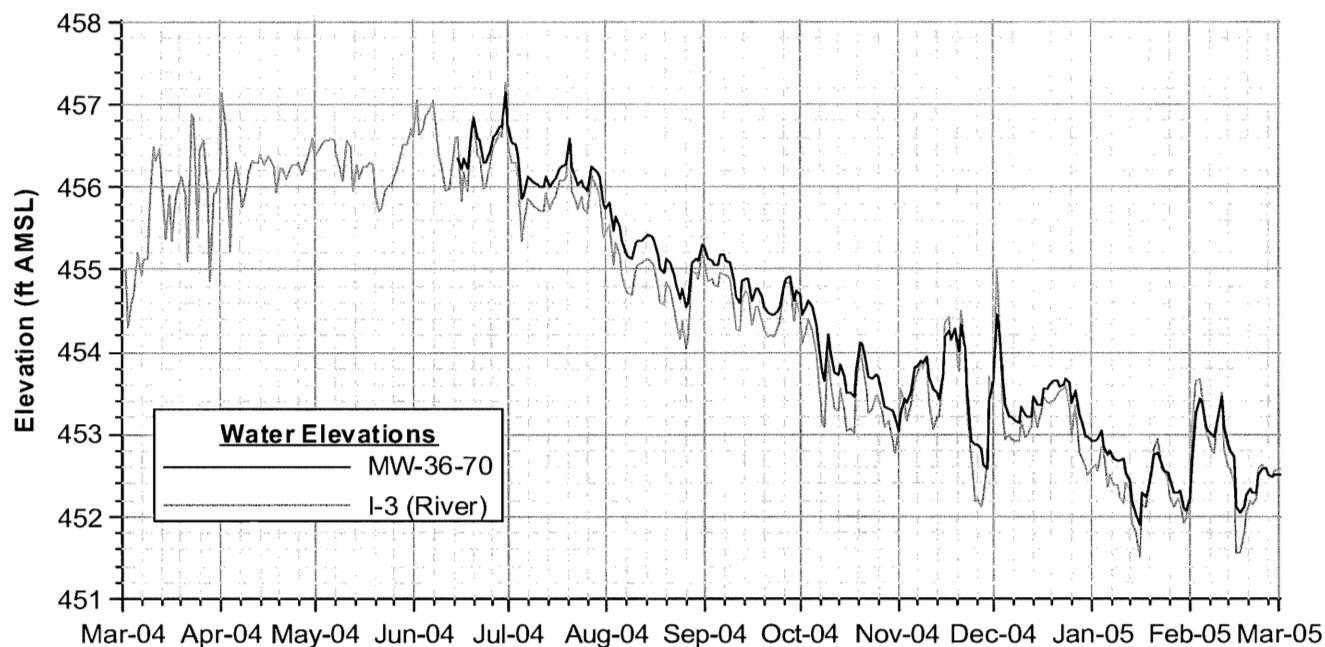


PMR No.15 - Data Through 02/28/05  
MW-36-50 HEXAVALENT CHROMIUM  
CONCENTRATION & HYDROGRAPH

Notes

1. Beginning March 2004, groundwater samples from floodplain wells in the groundwater monitoring program are collected using the well-volume sampling method. Prior to the Feb. 17-20, 2004 sampling method comparison test, all samples from floodplain wells were collected using low-flow purging method.
2. Data subject to review.

PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA



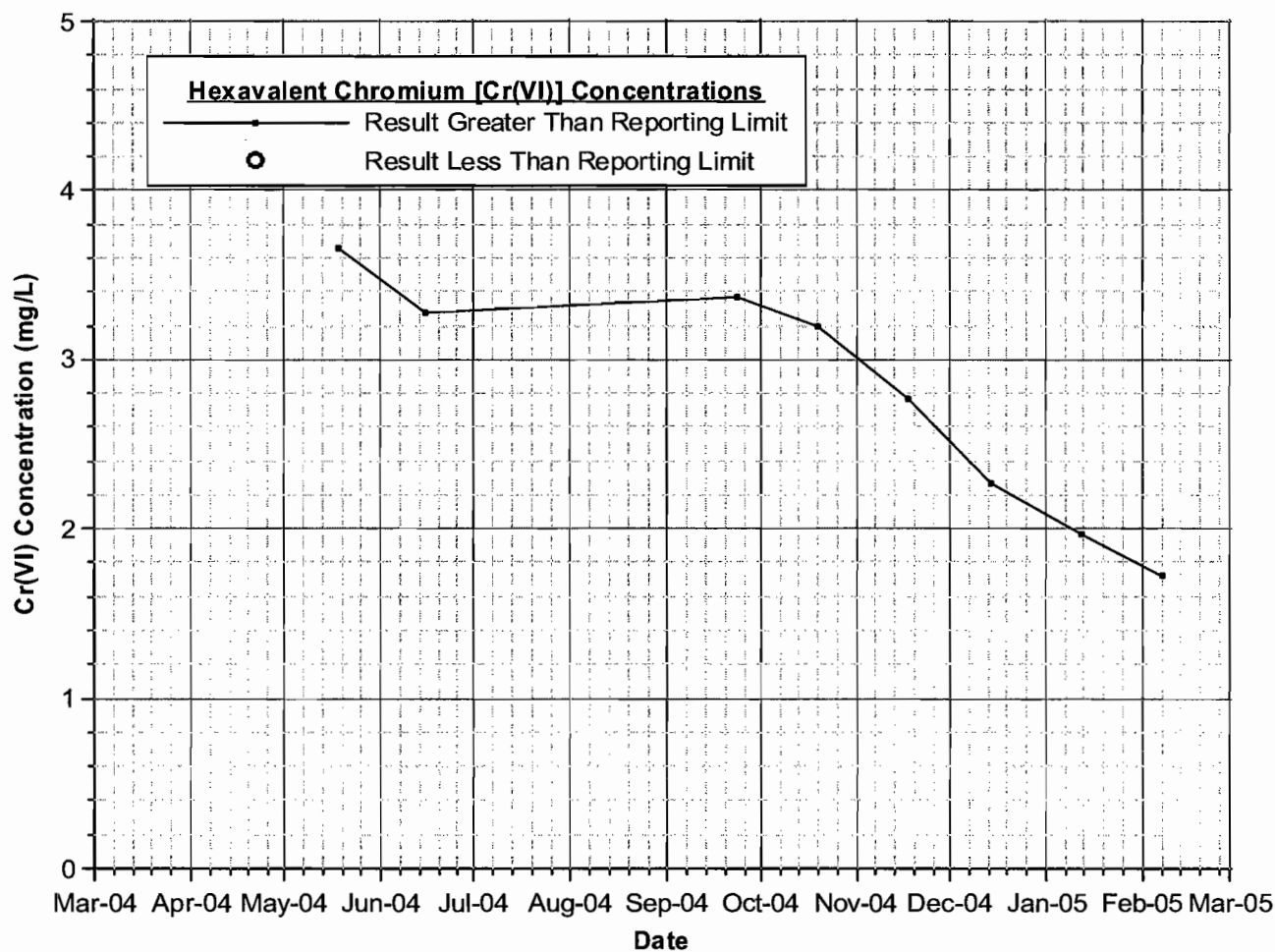
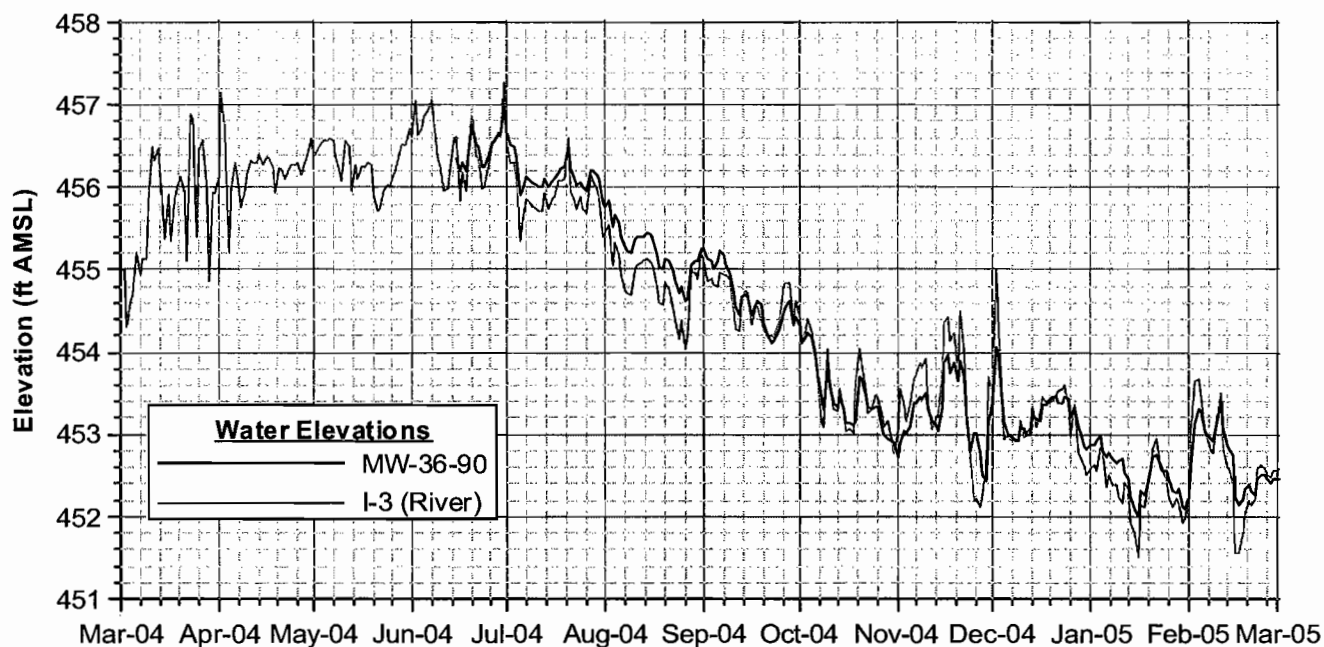
#### Notes

- Beginning March 2004, groundwater samples from floodplain wells in the groundwater monitoring program are collected using the well-volume sampling method. Prior to the Feb. 17-20, 2004 sampling method comparison test, all samples from floodplain wells were collected using low-flow purging method.
- Data subject to review.

PMR No.15 - Data Through 02/28/05  
MW-36-70 HEXAVALENT CHROMIUM  
CONCENTRATION & HYDROGRAPH

PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

CH2MHILL



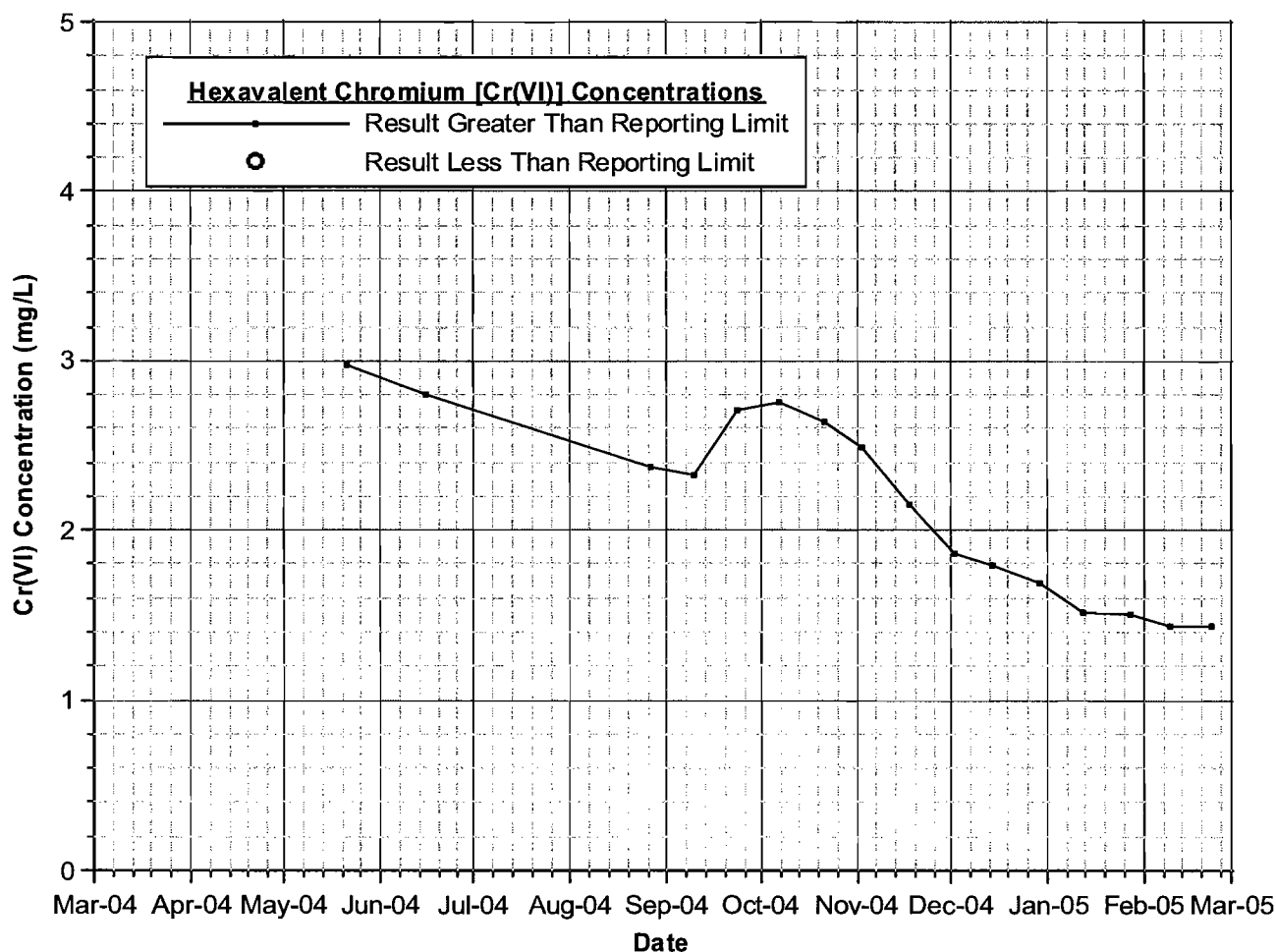
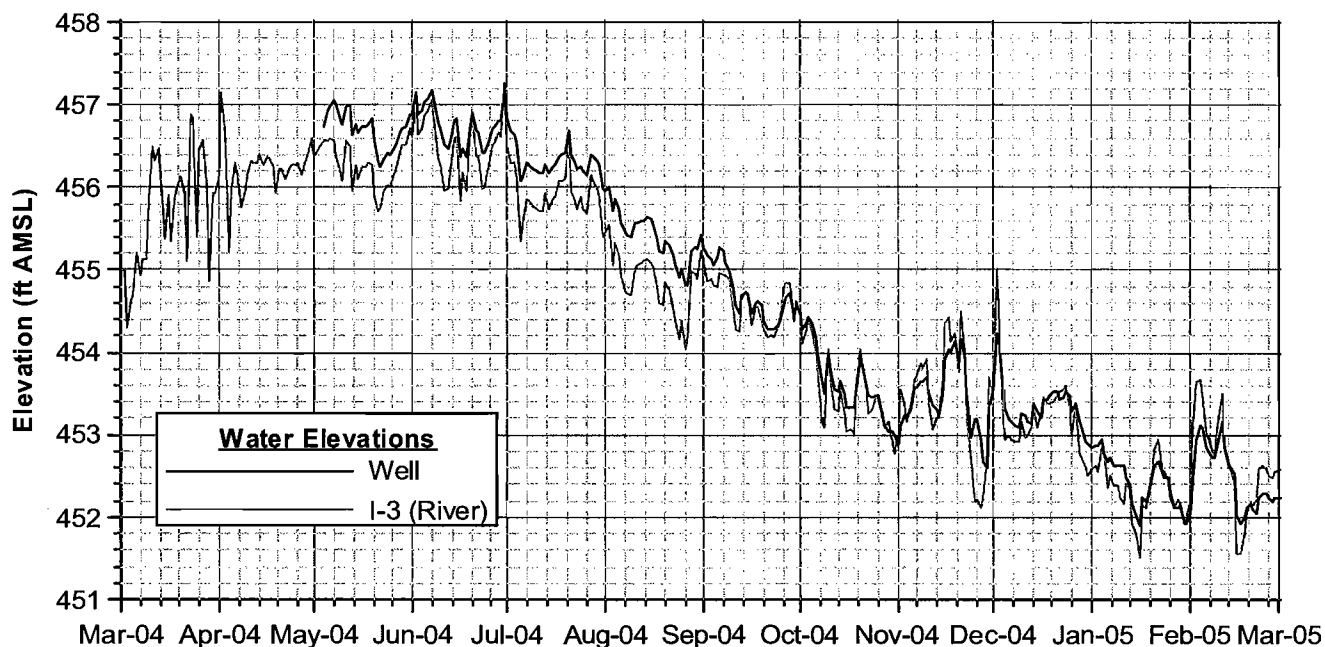
PMR No.15 - Data Through 02/28/05  
MW-36-90 HEXAVALENT CHROMIUM  
CONCENTRATION & HYDROGRAPH

Notes

1. Beginning March 2004, groundwater samples from floodplain wells in the groundwater monitoring program are collected using the well-volume sampling method. Prior to the Feb. 17-20, 2004 sampling method comparison test, all samples from floodplain wells were collected using low-flow purging method.
2. Data subject to review.

PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

**CH2MHILL**



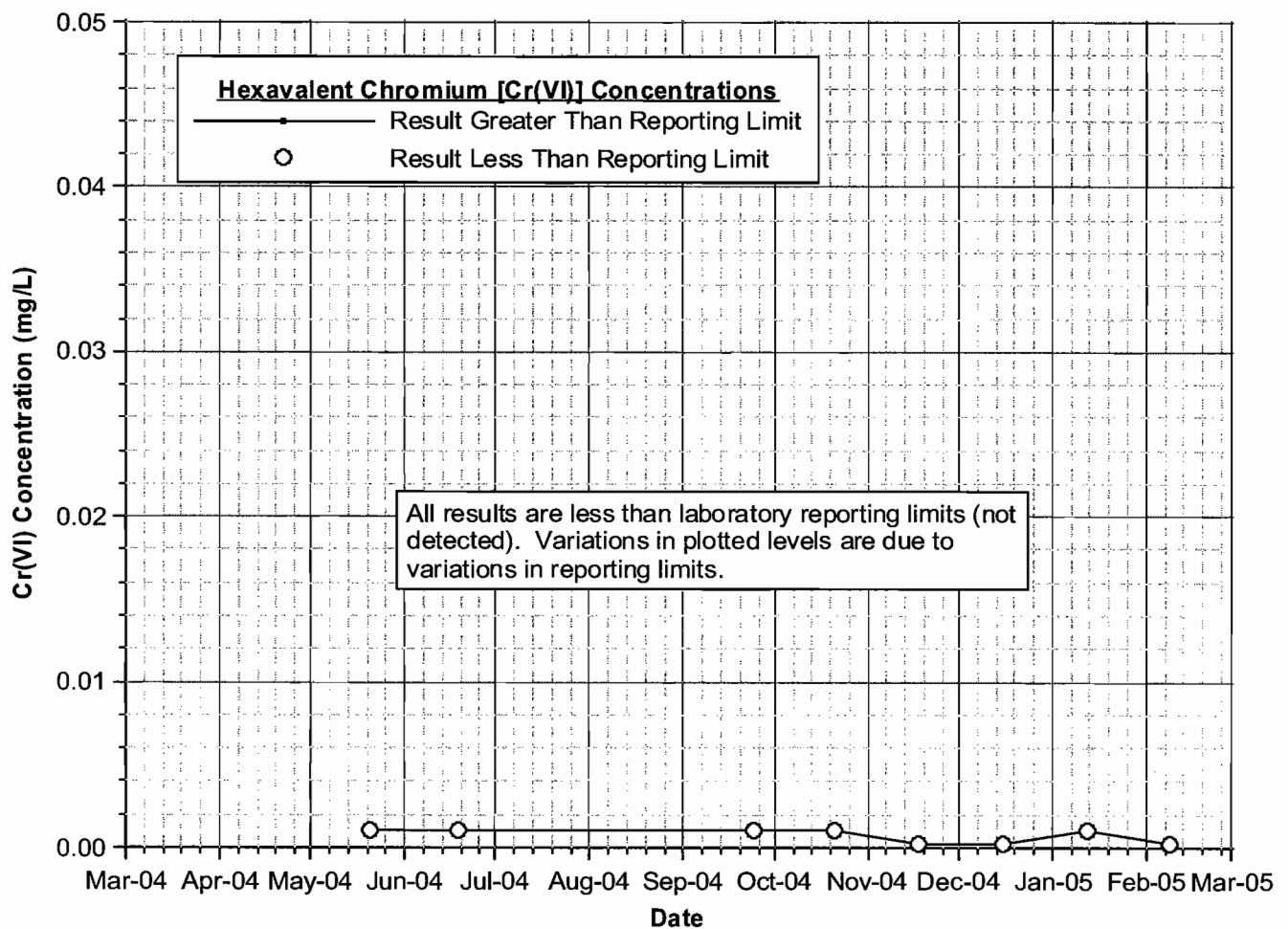
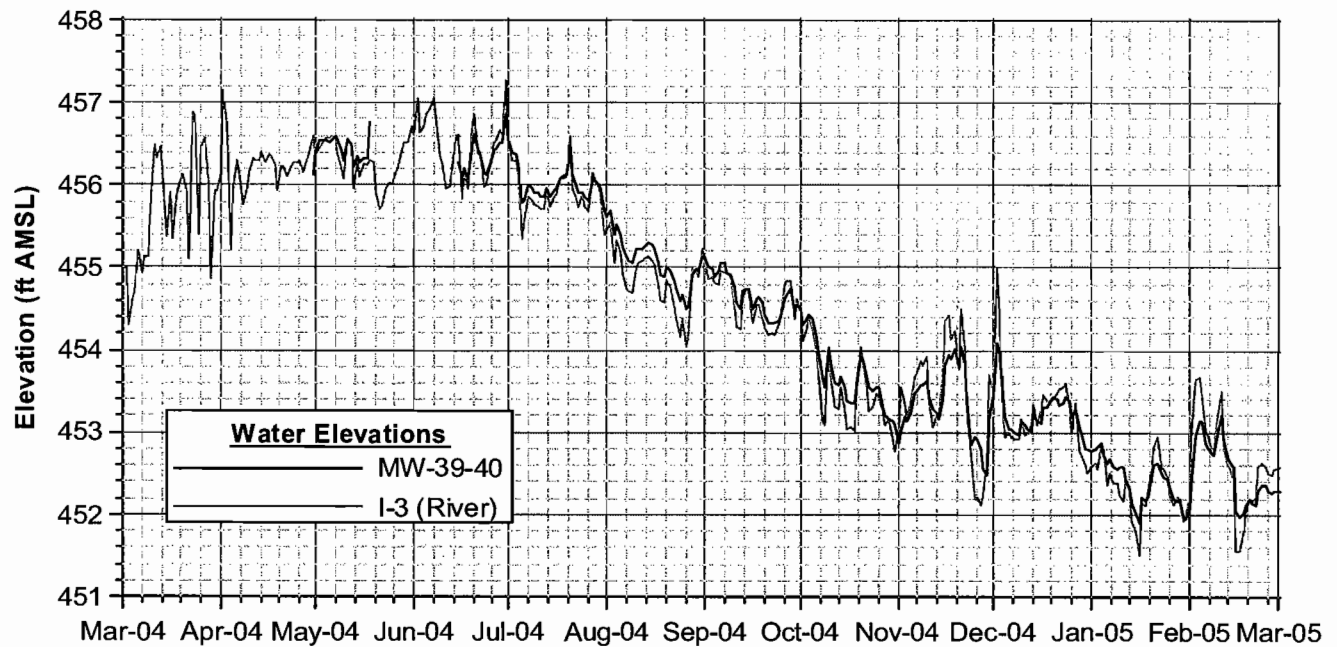
#### Notes

- Beginning March 2004, groundwater samples from floodplain wells in the groundwater monitoring program are collected using the well-volume sampling method. Prior to the Feb. 17-20, 2004 sampling method comparison test, all samples from floodplain wells were collected using low-flow purging method.
- Data subject to review.
- Review of the sample and field duplicate data for wells MW-36-100 and MW-39-100 collected on 1-12-05 indicate that the sampler switched the pre-printed labels for these two locations. On 1-27-05 these wells were resampled to verify chromium results for these locations. Review of the sample label information, field sampling logs, and resample results verified that the labels were switched. As such, the 1-12-05 laboratory analysis records for these wells have been corrected.

### PMR No.15 - Data Through 02/28/05 MW-36-100 HEXAVALENT CHROMIUM CONCENTRATION & HYDROGRAPH

PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

**CH2MHILL**



PMR No.15 - Data Through 02/28/05  
MW-39-40 HEXAVALENT CHROMIUM  
CONCENTRATION & HYDROGRAPH

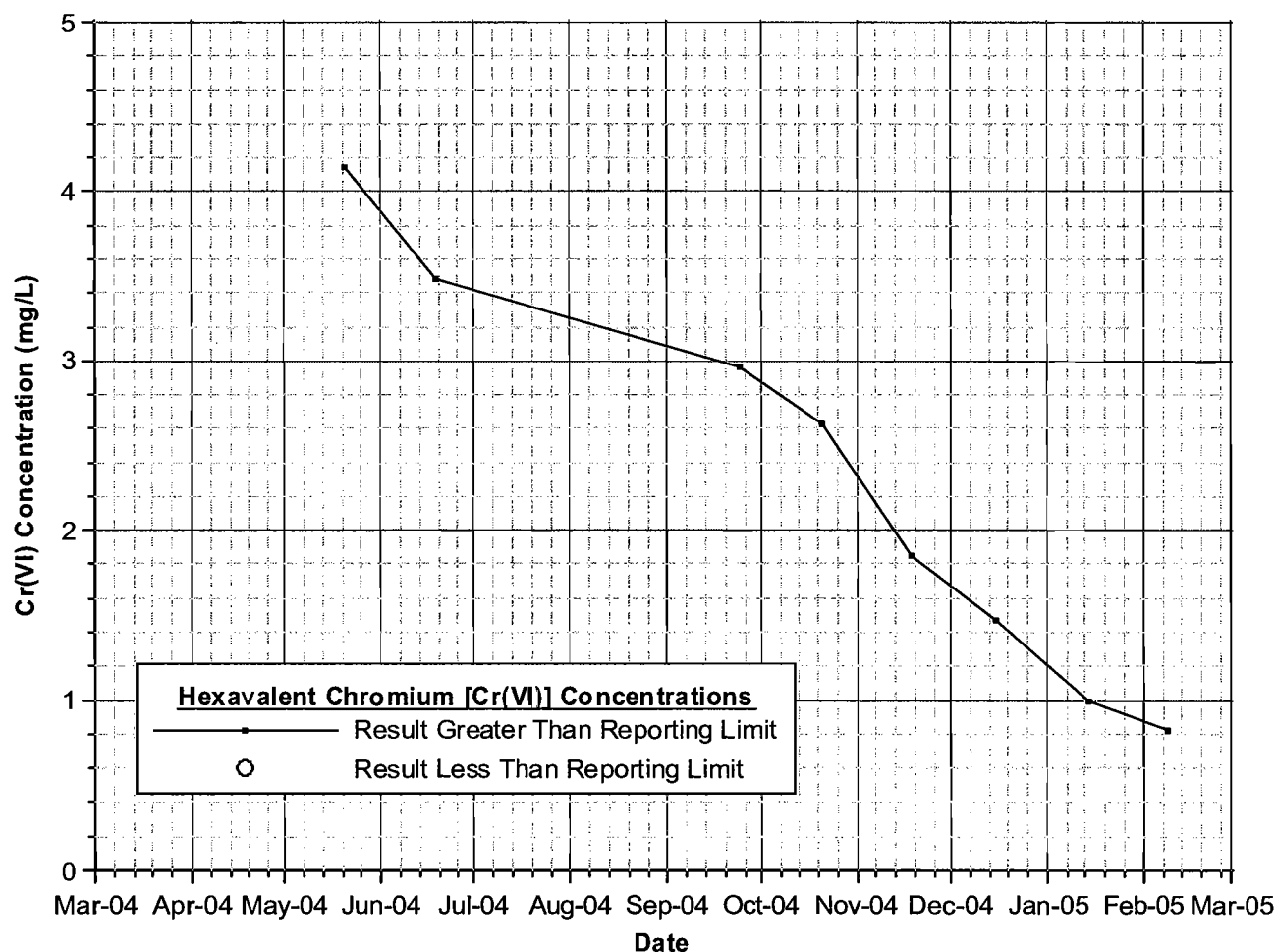
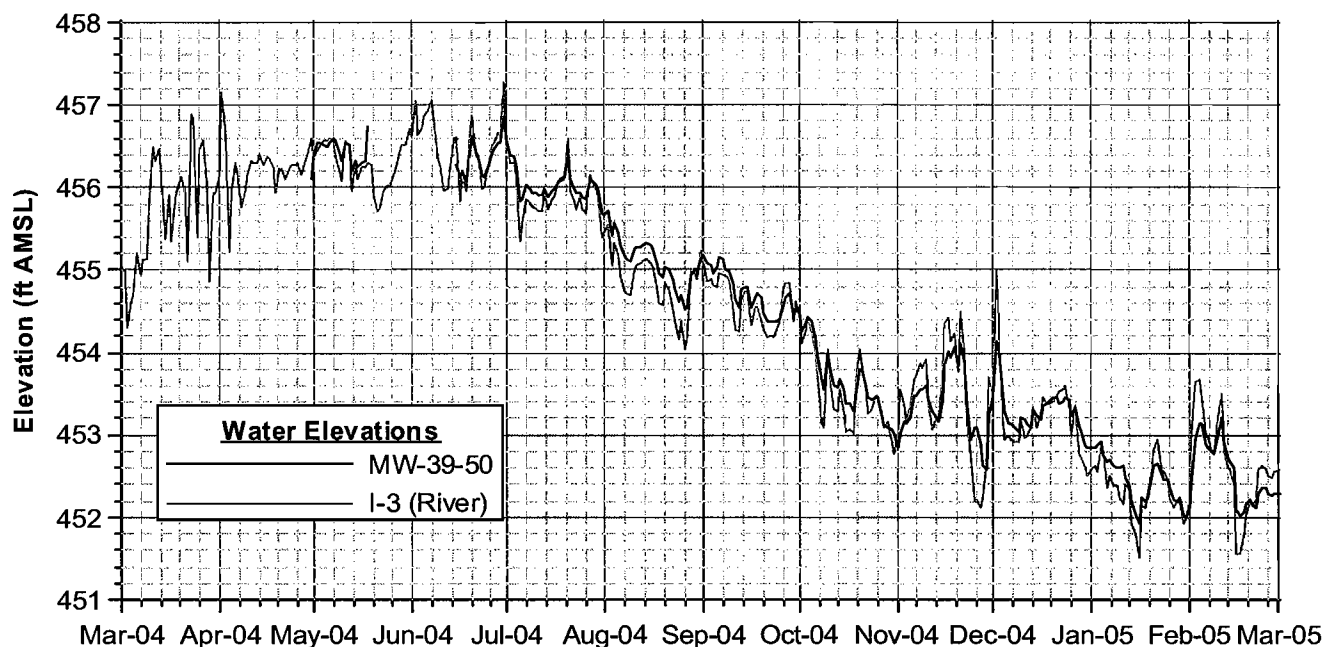
Notes

1. Beginning March 2004, groundwater samples from floodplain wells in the groundwater monitoring program are collected using the well-volume sampling method. Prior to the Feb. 17-20, 2004 sampling method comparison test, all samples from floodplain wells were collected using low-flow purging method.
2. Data subject to review.

PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

CH2MHILL





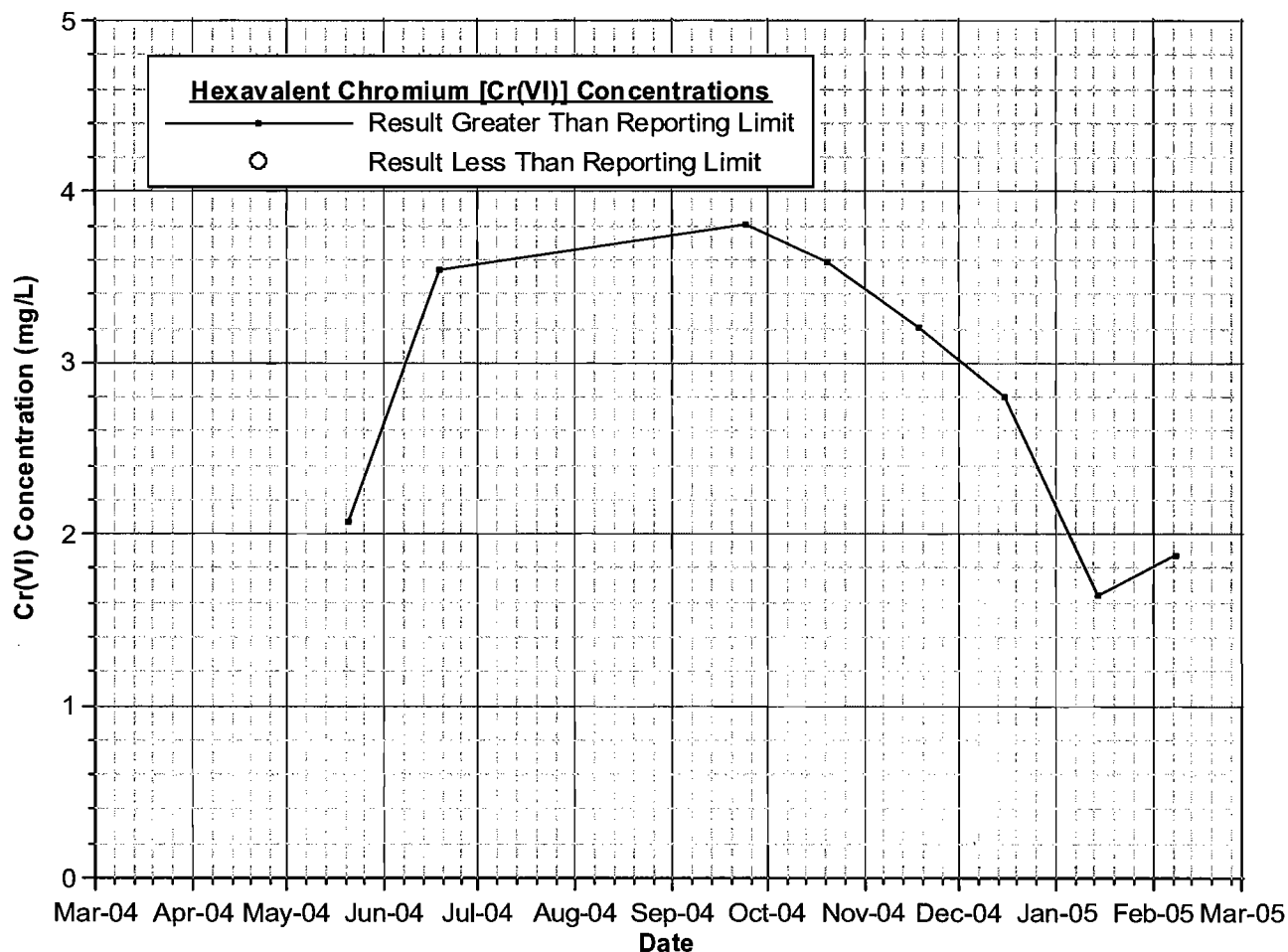
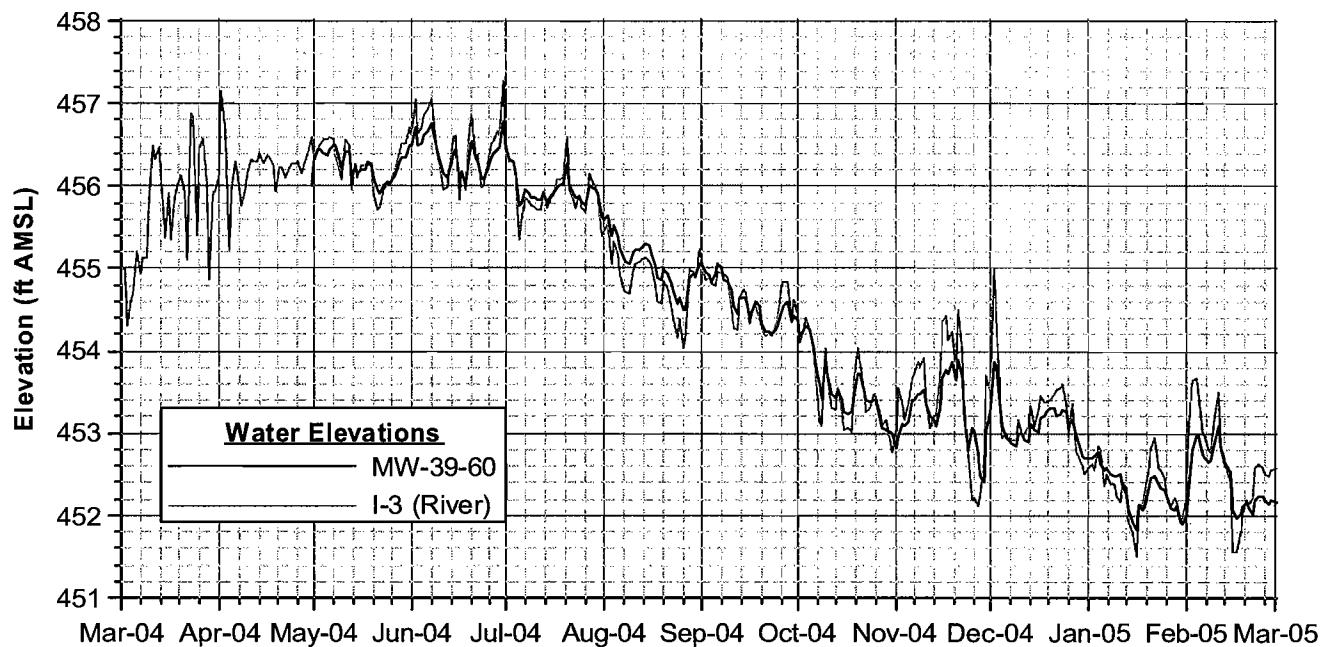
#### Notes

1. Beginning March 2004, groundwater samples from floodplain wells in the groundwater monitoring program are collected using the well-volume sampling method. Prior to the Feb. 17-20, 2004 sampling method comparison test, all samples from floodplain wells were collected using low-flow purging method.
2. Data subject to review.

PMR No.15 - Data Through 02/28/05  
MW-39-50 HEXAVALENT CHROMIUM  
CONCENTRATION & HYDROGRAPH

PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

**CH2MHILL**



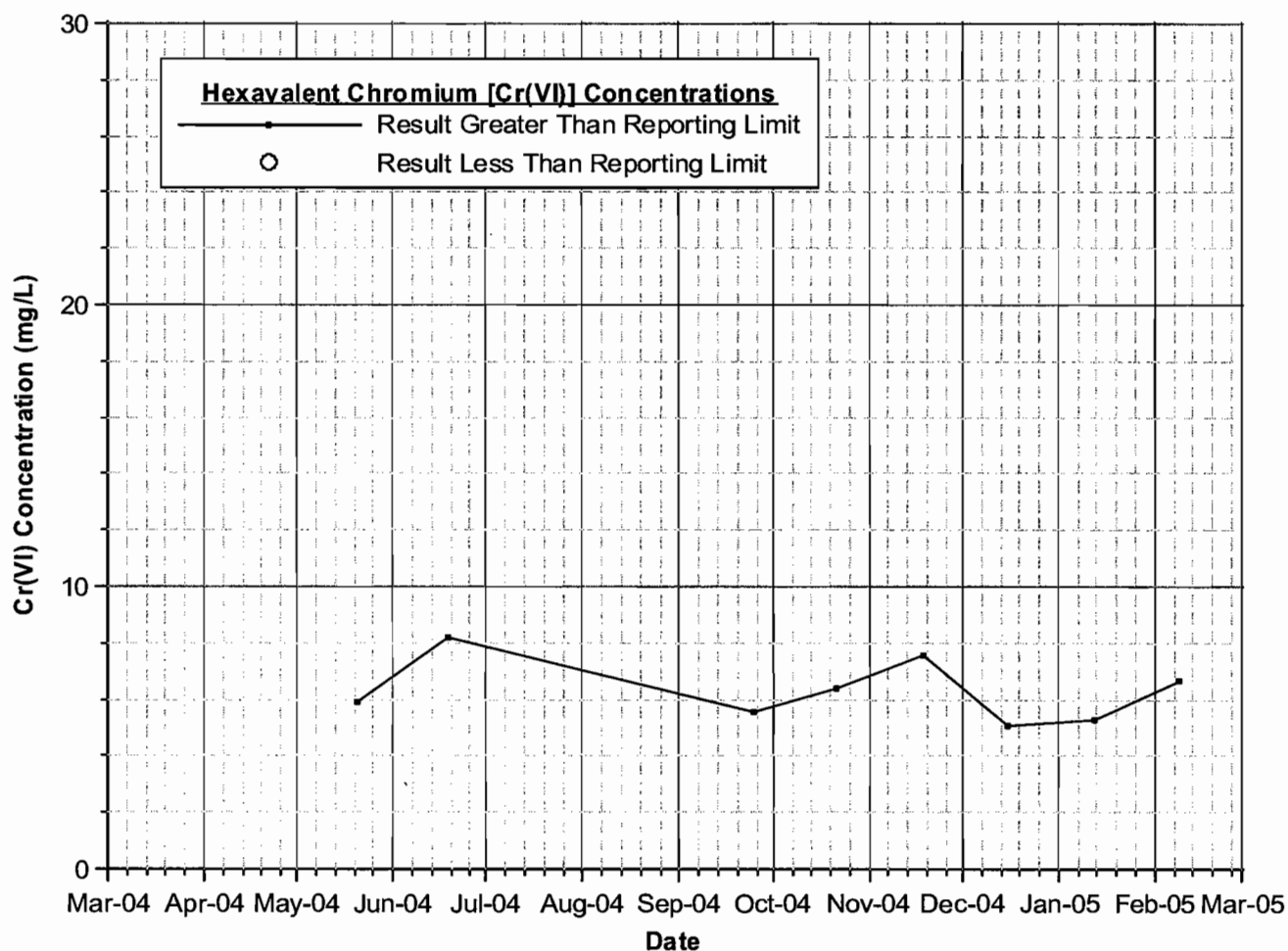
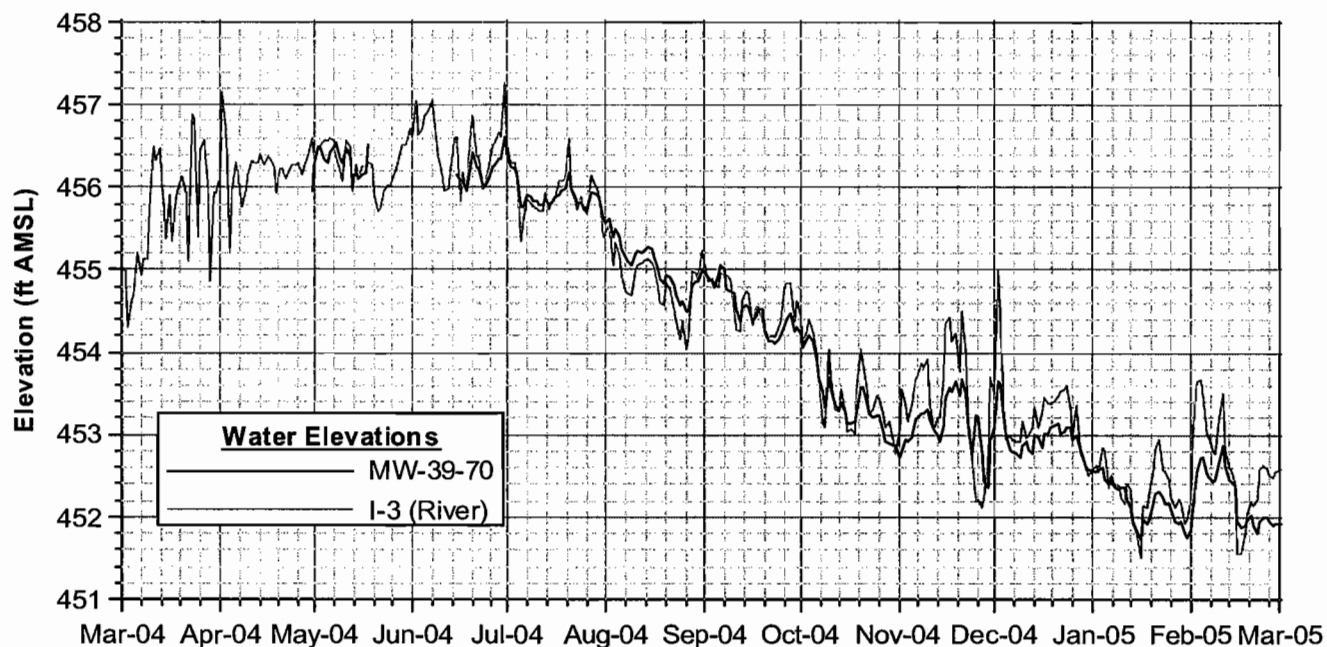
PMR No.15 - Data Through 02/28/05  
MW-39-60 HEXAVALENT CHROMIUM  
CONCENTRATION & HYDROGRAPH

Notes

1. Beginning March 2004, groundwater samples from floodplain wells in the groundwater monitoring program are collected using the well-volume sampling method. Prior to the Feb. 17-20, 2004 sampling method comparison test, all samples from floodplain wells were collected using low-flow purging method.
2. Data subject to review.

PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

**CH2MHILL**



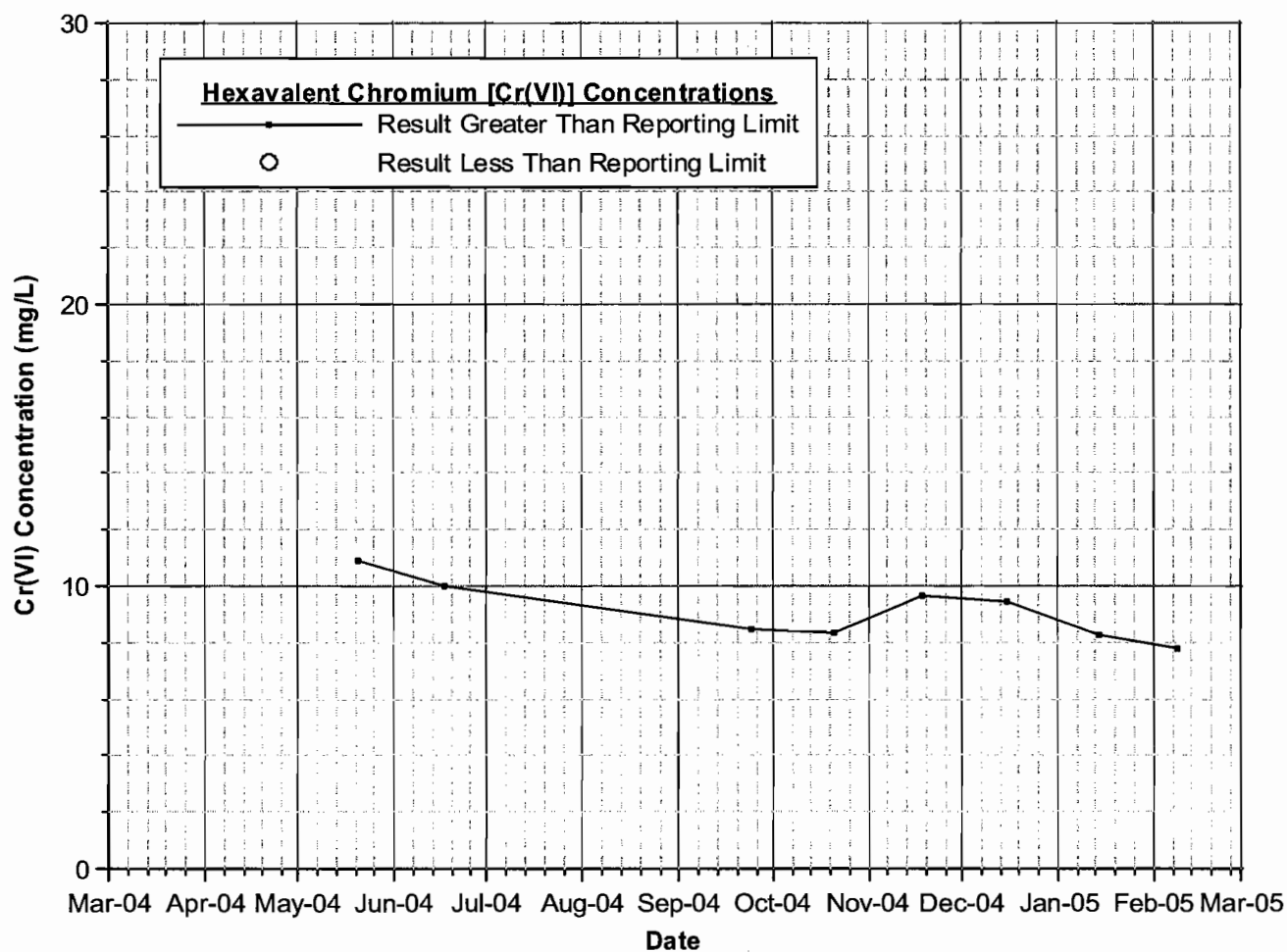
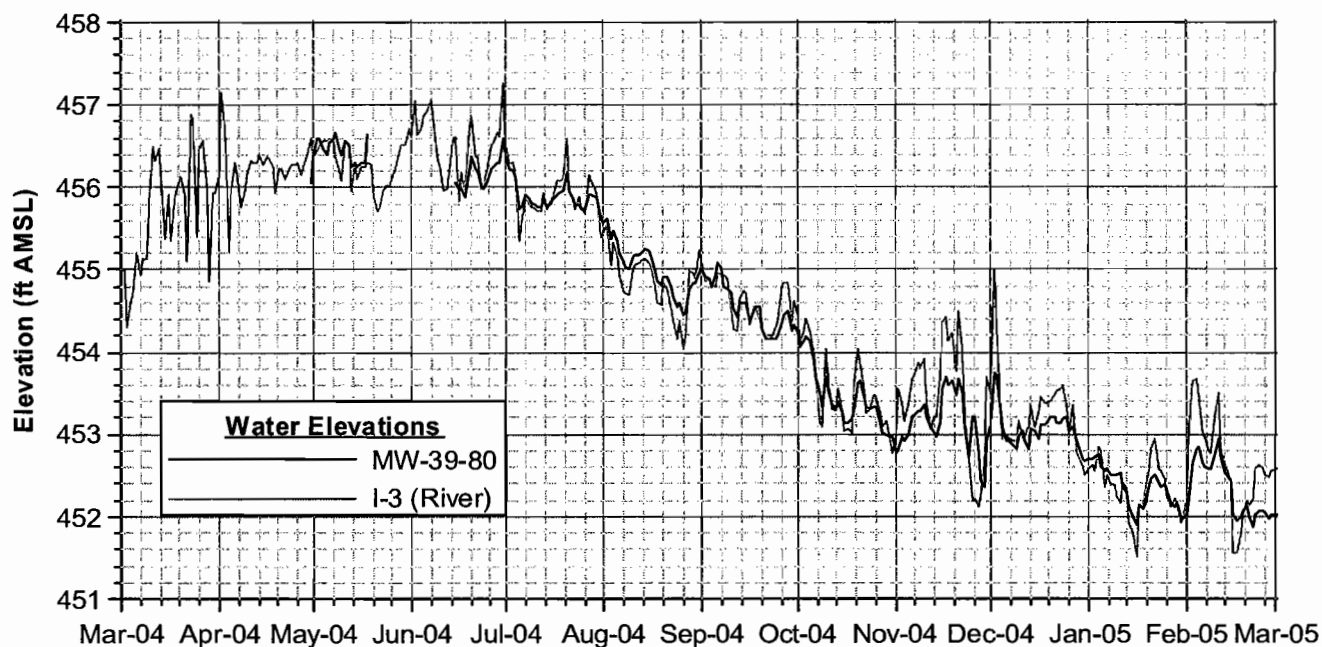
#### Notes

1. Beginning March 2004, groundwater samples from floodplain wells in the groundwater monitoring program are collected using the well-volume sampling method. Prior to the Feb. 17-20, 2004 sampling method comparison test, all samples from floodplain wells were collected using low-flow purging method.
2. Data subject to review.

PMR No.15 - Data Through 02/28/05  
MW-39-70 HEXAVALENT CHROMIUM  
CONCENTRATION & HYDROGRAPH

PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

CH2MHILL



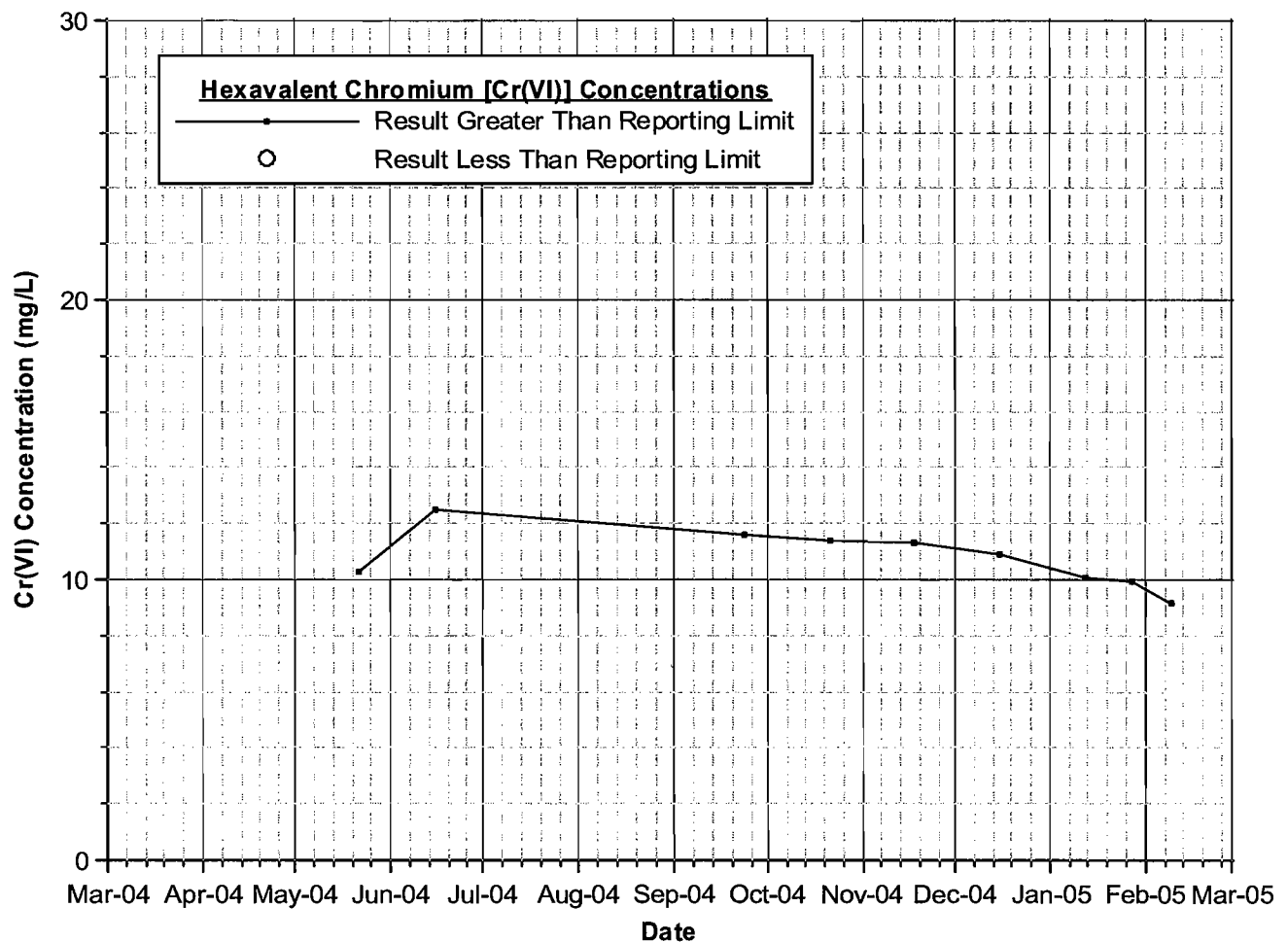
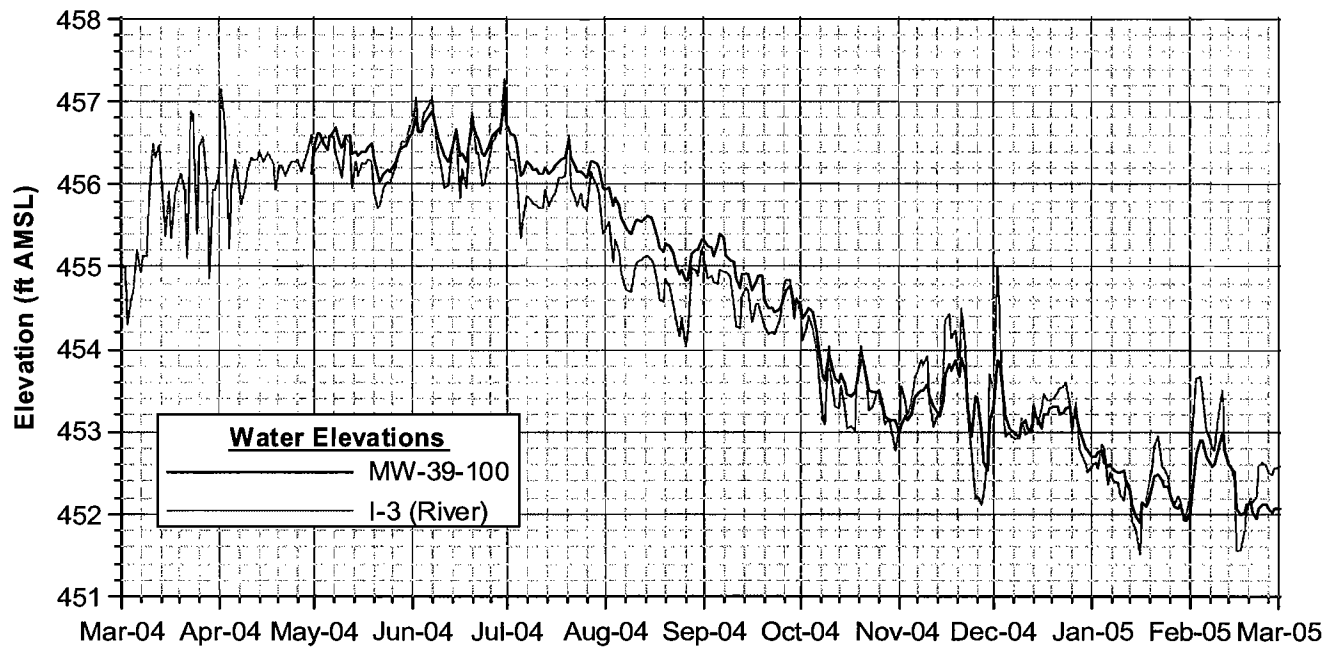
PMR No.15 - Data Through 02/28/05  
MW-39-80 HEXAVALENT CHROMIUM  
CONCENTRATION & HYDROGRAPH

PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

CH2MHILL

Notes

1. Beginning March 2004, groundwater samples from floodplain wells in the groundwater monitoring program are collected using the well-volume sampling method. Prior to the Feb. 17-20, 2004 sampling method comparison test, all samples from floodplain wells were collected using low-flow purging method.
2. Data subject to review.



#### Notes

- Beginning March 2004, groundwater samples from floodplain wells in the groundwater monitoring program are collected using the well-volume sampling method. Prior to the Feb. 17-20, 2004 sampling method comparison test, all samples from floodplain wells were collected using low-flow purging method.
- Data subject to review.
- Review of the sample and field duplicate data for wells MW-36-100 and MW-39-100 collected on 1-12-05 indicate that the sampler switched the pre-printed labels for these two locations. On 1-27-05 these wells were resampled to verify chromium results for these locations. Review of the sample label information, field sampling logs, and resample results verified that the labels were switched. As such, the 1-12-05 laboratory analysis records for these wells have been corrected.

## PMR No.15 - Data Through 02/28/05 MW-39-100 HEXAVALENT CHROMIUM CONCENTRATION & HYDROGRAPH

PG&E TOPOCK COMPRESSOR STATION  
NEEDLES, CALIFORNIA

**CH2MHILL**