

Yvonne J. Meeks Site Remediation - Portfolio Manager San Luis Obispo, CA 93405 Environmental Affairs

6588 Ontario Road

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

805.546.5243 Internal: 664.5243 Fax: 805.546.5232 Internet: YJM1@pge.com

November 15, 2004

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

Subject: Performance Monitoring Report No. 11 Interim Measure No. 2 PG&E Topock Compressor Station, Needles, California

Dear Mr. Shopay:

Enclosed is the eleventh performance monitoring report for Interim Measure No. 2 for the Topock project. This report was prepared in conformance with Final Interim Measures Work Plan No. 2 and DTSC's Requirement for Future Monitoring Reports (letter dated July 21, 2004). This report describes the activities performed and monitoring data collected during the period October 1 through 31, 2004.

Please contact me at (805) 546-5243 if you have any questions or if you need additional information.

Sincerely,

Teni Herson for Growne Meeks

Enclosure

cc: CWG Members

# Performance Monitoring Report No. 11, PG&E Topock Compressor Station, Interim Measures No. 2, October 1 through 31, 2004

Prepared for

**Pacific Gas and Electric Company** 

November 15, 2004

### Performance Monitoring Report No. 11 PG&E Topock Compressor Station, Interim Measures No. 2 October 1 through 31, 2004

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

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Brian Schroth, Registered Geologist No. 7423 Senior Hydrogeologist

# Performance Monitoring Report No. 11, PG&E Topock Compressor Station, Interim Measures No. 2 October 1 through 31, 2004

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 October 1 and October 31, 2004.

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 December 15<sup>th</sup>.

### **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.

The following sections summarize the IM No. 2 operations and activities during this reporting period. Pumping volumes, analytical test results and hydraulic evaluations are also included.

#### **System Operations**

Table 1 summarizes the pumping data for the reporting period. The pumping rate from TW-2D was increased from 50 to approximately 70 gallons per minute (gpm) on October 6, 2004, upon DTSC approval of a request by PG&E to increase the pumping rate in order maintain a

landward gradient away from the Colorado River. A total of 2,846,231 gallons of groundwater were extracted and batch treated during this reporting period. The batch treated water was transported to United States Filter Corporation in Los Angeles, California for treatment and disposal. All treated water was manifested as a RCRA non-hazardous waste during this reporting period.

Treated water will continue to be transported to United States Filter Corporation for disposal in the interim until other disposal options are approved by regulatory agencies and implemented by PG&E. Solids accumulated in the clarifier are disposed as a RCRA hazardous waste at the Waste Management, Kettleman Hills Facility.

#### TABLE 1

Pump Data from TW-2S and TW-2D (October 1 through October 31, 2004) Performance Monitoring Report No. 11, Topock Compressor Station, Interim Measure No. 2

	Reporting	Project To Date			
Extraction Well	Average Pumping Rate <sup>2</sup> (gpm)	Volume Pumped (gal)	Cumulative Volume Pumped (gal)		
TW-2S <sup>1</sup>	0	0	486,358		
TW-2D	63.6	2,846,231	7,665,140		
Total	63.6	2,846,231	8,151,498		
	Volume Pumped	1,224,325			
	Total	9,375,823			
	Total V	24.3			

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>The "Average Pumping Rate" is the overall average during the reporting period (31.1 days), including system downtime. Actual pump rates from TW-2D were increased from 50 gpm to approximately 70 gpm during the reporting period.

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 October 20, 21, and 27, 2004, as well as trace precipitation on October 29, 2004. Total October rainfall measured for the area was approximately 1.3 inches.

#### **Extracted Water Analytical Results**

Weekly grab samples were collected from TW-2D during this reporting period. Table 2 summarizes analytical results from TW-2S and TW-2D since May 19, 2004.

#### **Batch Plant Modifications**

A new dry powder-type polymer replaced the wet emulsion polymer used in the polymer system on October 20, 2004. This dry polymer will further enhance the settling of solids in the clarifier and will create higher quality treated water.

Three additional treated water holding tanks were added to the batch plant, located north of the current compound along the MW-20 bench. The holding tanks will be brought into service in November 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 October reporting period (October 1 to 31, 2004). 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 indicate landward hydraulic gradients along the floodplain. The upper zone gradient is relatively flat in the portion of the floodplain near the river. Further west, the gradient in the Upper UA is eastward, consistent with regional hydraulic gradients outside of the river area.

Figure 4 shows the location of a hydrogeologic section B1 that runs east-west through monitoring points between TW-2 and the river. It is used to present the vertical as well as lateral groundwater gradients in a key area of the site. The average elevations, plotted and contoured on Figure 5, indicate average upward hydraulic gradients across most of the profile and converging hydraulic gradients near the pumping well TW-2D. The area around well clusters MW-30 and MW-36 is transitional between the naturally upward gradient and the pull of the deep zone pumping well to the west. 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.

Longer term groundwater elevation contours for each zone are included in figures provided as Attachment 2. These contour maps use averaged groundwater elevation data from June 15 through October 31, 2004. Groundwater gradients in the lower and middle zones of the aquifer are landward based on these averaged data. Groundwater gradients in the uppermost zone of the aquifer are mixed; gradients are generally flat to westward nearest the river and eastward outside of the floodplain.

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.

The estimated and actual dam discharges and river elevations since April 2004 are summarized in Table 3. The actual Davis Dam October 2004 discharge (monthly average) was significantly less (1,062 cubic feet per second [cfs]) than the USBR projected discharge for the October reporting period. Despite this discrepancy, the actual Colorado River elevation at I-3 (monthly average) was slightly greater (0.3 feet) than the predicted elevation for the October reporting period. Ongoing evaluation of the batch treatment system during late September suggested that the system was operationally capable of treating additional extracted groundwater to concentrations acceptable to the offsite disposal facility. Therefore, at the end of September PG&E requested approval from the DTSC and BLM for another increase to the pumping rate from extraction well TW-2D from 50 gpm to 70 gpm. As stated above, this increase was implemented on October 6th. PG&E will continue to monitor the operational capacity of the system and may request additional increases to the extraction rate until the maximum capacity of the system is reached.

#### 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 concentrations trends for November 2003 through October 2004 are presented in tandem with hydrographs for each monitoring well in the vicinity of the MW-20 bench. These figures are provided 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 December 15th, 2004 and will cover activities from November 1 to November 30, 2004.

Full-time pumping from TW-2D will continue in November 2004. The USBR projects that Davis Dam releases in November 2004 will be increased relative to October rates. Calculations based on this projected dam release increase indicate a corresponding rise in river level on the order of about one half foot. Future adjustments in extraction rates will be proposed based on expected river levels, observed groundwater gradients, system treatment performance at 70 gpm, potential system modifications, and other relevant factors.

### Tables

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

	TW-2S			TW-2D			TW-2 Combined					
Sample Time Relative to TW-2 Pumping Start	Sample Date	Total Dissolved Chromium	Hexavalent Chromium	Total Dissolved Solids	Sample Date	Total Dissolved Chromium	Hexavalent Chromium	Total Dissolved Solids	Sample Date	Total Dissolved Chromium	Hexavalent Chromium	Total Dissolved Solids
		mg/L	mg/L	mg/L		mg/L	mg/L	mg/L		mg/L	mg/L	mg/L
6 days	19-May-04	6 61	7 36	2 620	19-May-04	7.06	7 77	7 740	19-May-04	6 68	7 58	5 230
13 days	26-May-04	6.68	7.00	2,020	26-May-04	7 15	7 47	7 620	26-May-04	7 29	7.00	5 520
20 days	02-Jun-04	7 93	7 19	2,690	02lun-04	7.02	7.33	7 540	02-Jun-04	6.93	7.33	5,350
27 days	09-Jun-04	6.82	7.19	2,000	09-Jun-04	6.98	7.41	7,540	09-Jun-04	6.81	7.50	5.300
34 days	NS			_,	16-Jun-04	7.55	7.11	7.400	NS			-,
41 days	NS				23-Jun-04	7.11	6.75	7.200	NS			
48 days	NS				30-Jun-04	6.37	6.64	7,060	NS			
56 days	NS				08-Jul-04	7.29	6.29	7,150	NS			
62 days	NS				14-Jul-04	5.92	6.15	7,020	NS			
69 days	NS				21-Jul-04	5.74	6.20	6,830	NS			
76 days	NS				28-Jul-04	5.66	6.01	6,760	NS			
83 days	NS				04-Aug-04	5.95	6.06	7,140	NS			
98 days	NS				19-Aug-04	7.61	6.20	6,700	NS			
105 days	NS				26-Aug-04	5.31	6.03	6,620	NS			
111 days	NS				01-Sep-04	6.26	6.03	6,730	NS			
118 days	NS				08-Sep-04	6.20	6.33	6,960	NS			
119 days	NS				09-Sep-04	6.47	6.17	6,520	NS			
125 days	NS				15-Sep-04	6.31	6.30	6,430	NS			
132 days	NS				22-Sep-04	6.37	6.39	6,650	NS			
147 days	NS				07-Oct-04	5.88	6.72	6,770	NS			
153 days	NS				13-Oct-04	7.02	6.77	6,430	NS			
160 days	NS				20-Oct-04	6.47	6.66	6,270	NS			

Notes:

1. NS = Not Sampled

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.

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

	Dav	vis Dam Rele	ase	Colorado River Elevation at I-3			
		(cfs)		(ft AMSL or ft)			
Month	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	

#### 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



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PG&E Topock Compressor Station	I-3 453.54 452.93 / 454.14
Notes: Groundwater elevations shown represent those from the Middle Unconsolidated Aquifer (UA) wells only. Groundwater elevations are averages of water levels from October 1-31, 2004 measured with transducers	
at 30 minute intervals. Groundwater elevations are salinity and temperature adjusted. River elevations at R- river stations are interpolated from the average river elevations at I-3 and RRB with a resulting river gradient of 7.5 E-5 ft/ft. River elevations are shown, but not used in contouring ground water elevations for the Middle IIA River elevations are shown, but not used in contouring ground water elevations for the Middle IIA River elevations are shown, but not used in contouring ground water elevations for the Middle IIA River elevations are shown, but not used in contouring ground water elevations for the Middle IIA	UNDWATER (MIDDLE UA) AND IONS. OCTOBER 1-31, 2004
 Inferred gradients and flow directions are based upon available data; new well, additional data, and further calibration may change interpretations.	IELD PROGRAM RESSOR STATION

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Attachment 1 Hydrographs



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## Attachment 2 Long-term Groundwater Gradients



456.22 PG&E Topock Compressor Station	I-3 454.93
Notes:	
Groundwater elevations shown represent those from the Upper Unconsolidated Aquifer (UA) wells only.	Figure 2-1
transducers at 30 minute intervals. Groundwater elevations are salinity and temperature adjusted.	Average Groundwater (Upper UA) and
River elevations at RRB and R- river stations are interpolated from the average river elevations at I-3 and RRB from May, June and August 2004; the resulting river gradient is 6.6E-5 ft/ft. Inferred gradients and flow directions are based upon available data; new well, additional data, and further calibration may change interpretations.	<b>River Elevations, June - October, 2004</b> INTERIM MEASURES FIELD PROGRAM PG&E TOPOCK COMPRESSOR STATION NEEDLES, CALIFORNIA
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## Attachment 3

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## Attachment 4

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