



**Pacific Gas and
Electric Company**

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September 8, 2003

Aaron Yue
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California Department of Toxic Substances Control, Region 4
Geology and Corrective Action Branch
5796 Corporate Avenue
Cypress, California 90630

Subject: Sampling and Analysis Plan for Groundwater Monitoring
September 2003 Quarterly Monitoring Event
PG&E Topock Compressor Station, Needles, California

Dear Mr. Yue:

Enclosed is a technical memorandum entitled *Sampling and Analysis Plan for September 2003 Quarterly Groundwater Monitoring, PG&E Topock Project (SAP)*, dated September 4, 2003. This SAP was prepared at DTSC request to describe the locations, scope of analyses, and procedures to be used for groundwater and surface water sampling to be conducted by PG&E during the September 2003 monitoring activity.

Please contact me at (925) 974-4081 if you have any questions or if you need additional information.

Sincerely,

Linda Gonsalves for

Linda Gonsalves
Senior Project Manager
Environmental Services

Enclosure

cc: Robert Romero/DTSC
Fred Zanoria/DTSC

Sampling and Analysis Plan for September 2003 Quarterly Groundwater Monitoring PG&E Topock Project

DATE: September 4, 2003

This Technical Memorandum describes the sampling and analysis plan for quarterly groundwater monitoring at Pacific Gas and Electric Company's (PG&E) Topock compressor station near Needles, California. This Technical Memorandum addresses the groundwater and surface water sampling and analysis methods and procedures to be conducted for the September (3rd Quarter) 2003 monitoring event. The groundwater monitoring program (GMP) is part of a RCRA Facility Investigation (RFI) being performed under a Corrective Action Consent Agreement (CACA) issued February 1996 for the Topock site by the California Department of Toxic Substances Control (DTSC). CH2M HILL is performing the GMP activities for PG&E.

SAMPLING PLAN OBJECTIVES

- Identify the list of wells and surface water monitoring locations and scope of analyses to be used for the Topock September 2003 quarterly monitoring event.
- Describe the field sampling procedures/methods, analytical methods, and data reporting for the quarterly monitoring activity.

SAMPLING LOCATIONS

Under the current GMP, a total of 36 groundwater monitoring wells and six river monitoring stations are sampled and/or monitored on a quarterly or annual monitoring schedule. Figure 1 shows the locations of the groundwater wells and surface water stations in the Topock GMP. The locations to be sampled and monitored during the September 2003 event include:

- 34 groundwater monitoring wells, including the seven new monitoring wells installed by PG&E in March and June 2003,
- One inactive industrial water supply well (PGE-6),
- Six surface water stations along the Colorado River (defined in the RFI),
- Four additional surface water sampling locations selected by PG&E (A-Dock, NR-1, NR-2, and Needles-1).

Table 1 lists the wells and surface water locations to be monitored and sampled during the September 2003 event.

MONITORING SCHEDULE

The 3rd Quarter 2003 Topock groundwater monitoring event is scheduled for September 8 through 12, 2003.

MONITORING ACTIVITIES AND SCOPE OF ANALYSES

Water Level Measurements. Static water levels are measured in all accessible wells and the three surveyed river gauging stations before sampling activities commence. In addition, pressure transducers are currently installed in 10 monitoring wells and one surface water station to record water level measurements (Table 1). Transducer data will be downloaded during the September monitoring event.

Groundwater Sampling and Analysis. The 34 wells on the monitoring list (Table 1) are purged and sampled for the site constituents of concern (COCs) defined in the 1996 CACA. The site COCs are hexavalent chromium [Cr(VI)], total chromium [Cr(T)], copper, nickel, zinc, electrical conductivity (EC), and pH.

Surface Water Sampling and Analysis. The six surface water stations established in the RFI, designated CON, RRB, R-28, R-27, R-22, and I-3 (Table 1 and Figure 1) are sampled for the site COCs. For the September 2003 event, PG&E has selected three additional river sampling locations (stations A-Dock, NR-1, NR-2; see Figure 1) to be sampled for Cr(VI) and Cr(T). Additionally, a water sample from the Colorado River will be collected for Cr(VI) and Cr(T) analyses at a selected location in the city of Needles (15 miles upstream of Topock site) during the September 2003 event.

Field QC Samples. Three field duplicate groundwater samples will be collected and analyzed for the site COCs during the September sampling event. Because all sampling is conducted using either dedicated sampling systems or disposable sampling equipment, rinsate blank samples are not collected.

Field Water Quality Parameter Measurements. A field water quality meter (Horiba U-22) is used to measure water parameters during well purging and groundwater and surface water sampling. The field parameters measured are temperature, pH, specific conductance, salinity, turbidity, dissolved oxygen (DO), and oxidation-reduction potential (ORP).

ANALYTICAL METHODS AND LABORATORY

The groundwater and surface water samples collected during GMP activities are submitted to Truesdail Laboratories, Inc, a state-certified analytical laboratory in Tustin, California. The laboratory is certified by California DHS to perform analyses of the site COCs, including Cr(VI) using Method SW 7199. The analytical methods and laboratory reporting limits (RL) to be used for analysis of the site COCs include:

Method SW 6010B Analyses for total dissolved chromium, copper, nickel, and zinc. The minimum RL for Cr(T) is 0.0025 milligrams per liter (mg/L) for un-diluted samples.

Method SW 7196A Analyses for Cr(VI) for samples collected from monitoring wells where prior monitoring has detected Cr(VI) concentrations above 0.010 mg/L. The minimum RL for Cr(VI) using Method 7196A is 0.010 mg/L for un-diluted samples.

Method SW 7199 Analyses for Cr(VI) for all surface water/river samples and groundwater samples collected from all monitoring wells where prior monitoring has not detected Cr(VI) concentrations above 0.010 mg/L. The method detection limit (MDL) for Cr(VI) using Method 7199 is 0.0002 mg/L for un-diluted samples. The required detection limit for purposes of reporting (DRL) using Method 7199 per the California Department of Health Services (DHS) is 0.001 mg/L (see: www.dhs.ca.gov/ps/ddwem/chemicals/DRL).

The laboratory analyzes all samples for specific conductance and pH using Methods SW 9050 and SW 9040, respectively.

SURFACE WATER SAMPLING PROCEDURES

Consistent with prior GMP sampling, the surface water grab samples collected at stations CON, R-22, R-27, R-28, NR-1, and NR-2 (Table 1) are sampled by directly filling the sample bottle from surface water accessible to the sampler at the shoreline locations. No depth-discrete or special-purpose sampling equipment is used. A disposable bailer is used to collect the water samples at Red Rock Bridge (RRB) and the gas transmission bridge station I-3.

GROUNDWATER SAMPLING PROCEDURES

All monitoring wells in the Topock GMP are purged and sampled using dedicated or disposable sampling systems. Table 1 identifies the sampling system used for the individual wells. The following sampling systems and purging methods are used:

- Dedicated constant-discharge electric submersible pumps are installed in 22 wells to be sampled during the September 2003 event. Samples are collected from dedicated discharge systems after three well casing volumes have been purged and field parameters have stabilized.
- Dedicated adjustable-rate battery-powered submersible pumps are installed in eight monitoring wells in the shoreline area. These wells are purged and sampled using low-flow/stable drawdown and field parameters sampling techniques per U.S. EPA guidelines.
- A peristaltic pump equipped with disposable tubing is used to sample the five shallow (< 30 foot) groundwater monitoring wells in the shoreline area. These wells are purged and sampled using low-flow/stable drawdown and field parameters sampling techniques per U.S. EPA guidelines.

PURGE WATER MANAGEMENT

During September 2003 sampling, the purge water from all wells will be contained and transferred to an on-Station wastewater storage tank. The purge water is managed and disposed by PG&E following the Station waste management and off-site disposal procedures.

During future sampling events, the purge water from wells with non-detect Cr(VI) will be discharged to the ground at the well site.

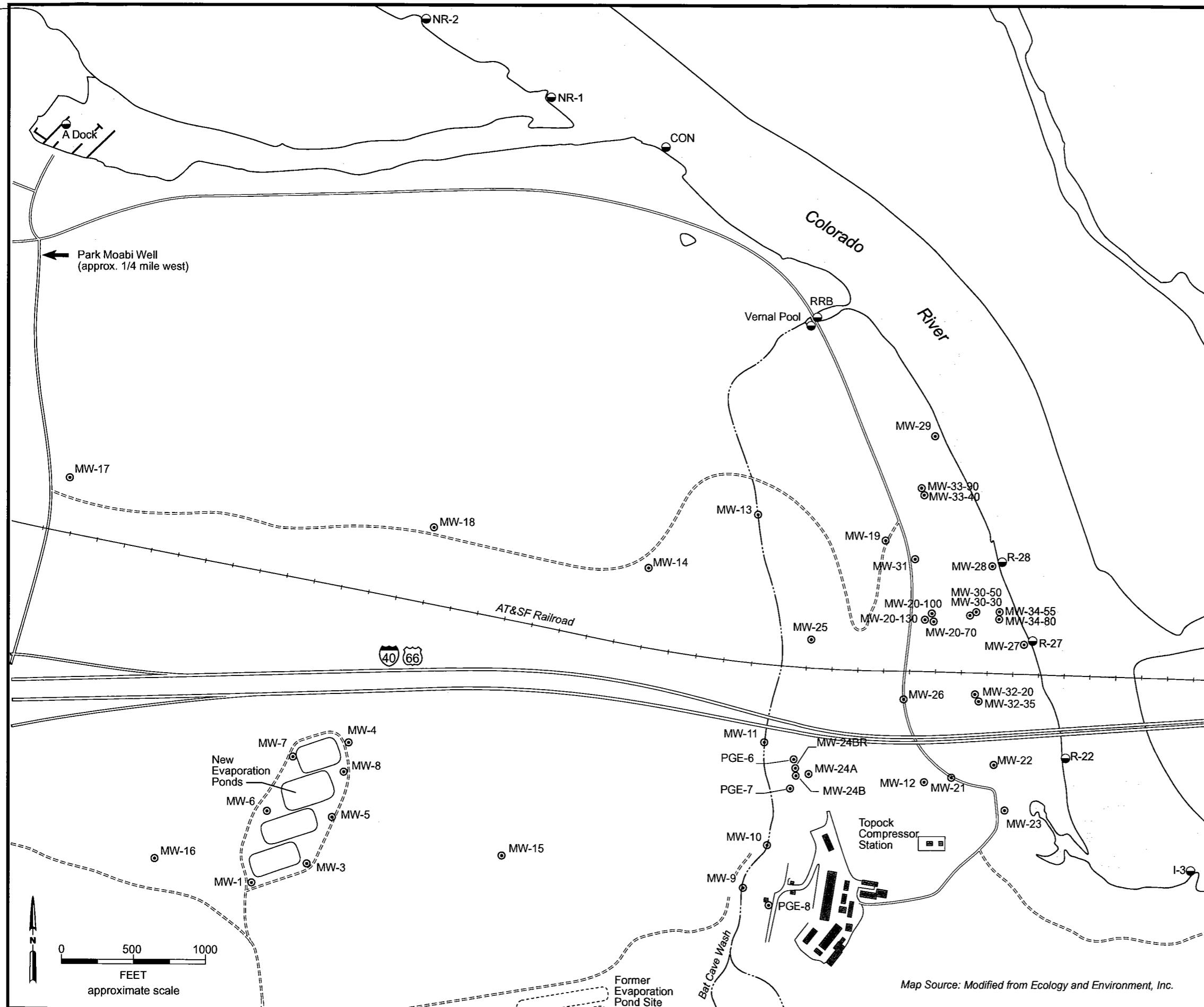
SAMPLING DOCUMENTATION

All water level measurements, well purging, and field sampling and water quality measurements are recorded on field log sheets or logbook. Sample containers, sample collection, labeling, handling, and courier shipment to the laboratory are performed in accordance with standard chain-of-custody and laboratory analytical requirements. The field crew documents any well or station that can not be sampled and the CH2M HILL project manager is notified of any sampling deviations or modifications.

DATA REPORTING

The analytical results from the September 2003 quarterly monitoring event will be summarized in a letter report consistent with prior RFI and GMP reporting. The results of the current sampling event will be presented in tabular listing with the prior quarterly sampling results. The Cr(VI) results will be posted for sampling locations on the site monitoring base map, with individual stations color-coded for the Cr(VI) result concentrations (i.e., greater than 0.050 mg/L, between the Cr(VI) analytical RL and 0.050 mg/L, and not detected).

The monitoring letter report will be issued after the complete laboratory analytical data packages has been validated by independent CH2M HILL chemist staff. The monitoring reports will be issued six calendar weeks after the sampling event is completed.



LEGEND

- Groundwater Monitoring Well
- Surface Water Monitoring Station

Station ID	Monitored Zone	Well Depth (feet bgs)	Sampling Frequency
MW-9	Upper UA	87	Q
MW-10	Upper UA	94	Q
MW-11	Upper UA	83	Q
MW-12	Upper UA	48	Q
MW-13	Upper UA	49	Q
MW-14	Upper UA	131	Q
MW-15	Upper UA	201	Q
MW-16	Upper UA	218	Q
MW-17	Upper UA	150	Annual (Q3)
MW-18	Upper UA	105	Q
MW-19	Upper UA	66	Q
MW-20-70	Upper UA	70	Q
MW-20-100	Middle UA	99	Q
MW-20-130	Lower UA	131	Q
MW-21	Upper UA	60	Q
MW-22	Shoreline sediments	11	Q
MW-23	Fanglomerate	80	Q
MW-24A	Upper UA	124	Q
MW-24B	Lower UA	214	Q
MW-24BR	Bedrock	438	Q
MW-25	Upper UA	104	Q
MW-26	Upper UA	71	Q
MW-27	Dredge / shoreline	17	Q
MW-28	Dredge / shoreline	23	Q
MW-29	Dredge / shoreline	39	Q
MW-30-30	Dredge / dunes	32	Q
MW-30-50	Middle UA	50	Q
MW-31	Upper UA	62	Q
MW-32-20	Shoreline sediments	20	Q
MW-32-35	Middle UA	35	Q
MW-33-40	Dredge / dunes	39	Q
MW-33-90	Middle UA	89	Q
MW-34-55	Middle UA	56	Q
MW-34-80	Lower UA	83	Q
PGE-6	UA	163	every 2 years (Q4)
PGE-7	Fangl / Bedrock	338	every 2 years (Q4)
PGE-8	Bedrock	575	every 2 years (Q4)
Park Moabi	UA	—	Annual (Q1)
River Stations			
A-Dock	slough		water level only
CON	upstream		Q
Vernal Pool / RRB	Bat Cave Wash		Q
R-28	dune area		Q
R-27	dune area		Q
R-22	dune area		Q
I-3	downstream		Q

Abbreviations UA = Unconsolidated Alluvial Aquifer
Q = Quarterly monitoring

Figure 1
Groundwater and Surface Water
Monitoring Locations

Bat Cave Wash Project
PG&E Topock Compressor Station

Table 1
 Sampling and Analysis Plan for September 2003
 Topock Groundwater Monitoring

Well No.	Monitored Zone	Prior Hexavalent Chromium Concentration (mg/L)	Monitoring and Sampling Parameters - September 2003 Round			
			Site COCs and Field Parameters	Cr(VI) Analysis Method Number	Sampling Method (System)	Water Level Elevation Measurements
MW-9	Upper UA	0.343	yes	SW 7196A	Ded CD pump	manual
MW-10	Upper UA	1.65	yes	SW 7196A	Ded CD pump	manual
MW-11	Upper UA	0.429	yes	SW 7196A	Ded CD pump	manual
MW-12	Upper UA	1.28	yes	SW 7196A	Ded CD pump	manual
MW-13	Upper UA	0.0159	yes	SW 7196A	Ded CD pump	manual
MW-14	Upper UA	0.0306	yes	SW 7196A	Ded CD pump	manual
MW-15	Upper UA	0.0111	yes	SW 7196A	Ded CD pump	manual
MW-16	Upper UA	0.0147	yes	SW 7196A	Ded CD pump	manual
MW-17	Upper UA	ND <0.010	yes	SW 7199	Ded CD pump	manual
MW-18	Upper UA	0.0233	yes	SW 7196A	Ded CD pump	manual
MW-19	Upper UA	0.581	yes	SW 7196A	Ded CD pump	manual
MW-20-70	Upper UA	11.90	yes	SW 7196A	Ded CD pump	manual + pressure transducer
MW-20-100	Middle UA	2.77	yes	SW 7196A	Ded CD pump	manual + pressure transducer
MW-20-130	Lower UA	6.44	yes	SW 7196A	Ded CD pump	manual + pressure transducer
MW-21	Upper UA	ND <0.010	yes	SW 7199	Ded CD pump	manual
MW-22	Upper UA: Floodplain	ND <0.010	yes	SW 7199	Peristaltic pump	manual
MW-23	Fanglomerate	ND <0.010	yes	SW 7199	Ded CD pump	manual
MW-24A	Upper UA	2.64	yes	SW 7196A	Ded CD pump	manual + pressure transducer
MW-24B	Lower UA	4.79	yes	SW 7196A	Ded CD pump	manual + pressure transducer
MW-24BR	Bedrock	ND <0.010	yes	SW 7199	Ded CD pump	manual
MW-25	Upper UA	2.48	yes	SW 7196A	Ded CD pump	manual
MW-26	Upper UA	3.68	yes	SW 7196A	Ded CD pump	manual
MW-27	Upper UA: Floodplain	ND <0.010	yes	SW 7199	Peristaltic pump	manual + pressure transducer
MW-28	Upper UA: Floodplain	ND <0.010	yes	SW 7199	Peristaltic pump	manual
MW-29	Upper UA: Floodplain	ND <0.010	yes	SW 7199	Ded purge pump	manual
MW-30-30	Upper UA: Floodplain	ND <0.010	yes	SW 7199	Peristaltic pump	manual + pressure transducer
MW-30-50	Middle UA	2.77	yes	SW 7196A	Ded purge pump	manual + pressure transducer
MW-31	Upper UA	3.57	yes	SW 7196A	Ded purge pump	manual
MW-32-20	Upper UA: Floodplain	ND <0.010	yes	SW 7199	Peristaltic pump	manual
MW-32-35	Middle UA	ND <0.010	yes	SW 7199	Ded purge pump	manual
MW-33-40	Upper UA: Floodplain	ND <0.010	yes	SW 7199	Ded purge pump	manual
MW-33-90	Middle UA	ND <0.010	yes	SW 7199	Ded purge pump	manual
MW-34-55	Middle UA	ND <0.010	yes	SW 7199	Ded purge pump	manual + pressure transducer
MW-34-80	Lower UA	ND <0.010	yes	SW 7199	Ded purge pump	manual + pressure transducer
PGE-6	Upper & Middle UA	1.00	yes	SW 7196A	Ded CD pump	manual
PGE-7	Lower UA & Bedrock	well sampled every 2 years; next sampling December 2003				manual
PGE-8	Bedrock	well sampled every 2 years; next sampling December 2003				manual

Table 1
 Sampling and Analysis Plan for September 2003
 Topock Groundwater Monitoring

Well No.	Monitored Zone	Prior Hexavalent Chromium Concentration (mg/L)	Monitoring and Sampling Parameters - September 2003 Round			
			Site COCs and Field Parameters	Cr(VI) Analysis Method Number	Sampling Method (System)	Water Level/Elevation Measurements
River Sampling Locations						
CON	upstream	ND <0.010	yes	SW 7199	bottle dip	NA
RRB	River at Bat Cave Wash	ND <0.010	yes	SW 7199	disposable bailer	manual
R-28	plume area	ND <0.010	yes	SW 7199	bottle dip	NA
R-27	plume area	ND <0.010	yes	SW 7199	bottle dip	NA
R-22	plume area	ND <0.010	yes	SW 7199	bottle dip	NA
I-3	downstream	ND <0.010	yes	SW 7199	disposable bailer	manual + pressure transducer
A-Dock	Park Moabi marina	ND <0.010	Cr(T), Cr(VI) & FP only	SW 7199	bottle dip	manual
NR-1	upstream	ND <0.010	Cr(T), Cr(VI) & FP only	SW 7199	bottle dip	NA
NR-2	upstream	ND <0.010	Cr(T), Cr(VI) & FP only	SW 7199	bottle dip	NA
Needles-1	upstream	not sampled	Cr(T), Cr(VI) & FP only	SW 7199	bottle dip	NA

NOTES:

1. Site constituents of concern (COCs) are hexavalent chromium, total chromium, copper, nickel, zinc, electrical conductivity, and pH. Analyses for dissolved total chromium, copper, nickel, zinc by Method SW 6020A. mg/L = milligrams per liter
2. Hexavalent chromium [Cr(VI)] to be analyzed by Method SW 7199 or Method 7196A (refer to Sampling Plan for explanation). The minimum reporting limit for Cr(VI) analytical methods are 0.0002 mg/L (Method SW 7199) and 0.010 mg/L (Method SW 7196A).
3. Cr(VI) sampling results from June 2003, except MW-17 (Sep-02), NR-1/NR-2 (Aug-02), PGE-6 (Sep-01), A-Dock (Feb-98)
4. Ded CD pump = dedicated constant-discharge pump, Ded purge pump = dedicated adjustable-rate low-flow sampling pump.
5. River locations NR-1 and NR-2 are added by PG&E to September 2003 monitoring event for background sampling data.
6. UA = Unconsolidated Alluvial Aquifer, FP = field water quality parameters, NA = not applicable