



Linda S. Adams  
Secretary for  
Environmental Protection



## Department of Toxic Substances Control

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Maureen F. Gorsen, Director  
5796 Corporate Avenue  
Cypress, California 90630



Arnold Schwarzenegger  
Governor

Sent Via Email

April 5, 2007

Ms. Yvonne Meeks  
Portfolio Manager – Site Remediation  
Pacific Gas and Electric Company  
4325 South Higuera Street  
San Luis Obispo, CA 93401

**REQUIREMENT FOR PHASE II CHROMIUM ISOTOPE STUDY WORKPLAN,  
PACIFIC GAS AND ELECTRIC COMPANY (PG&E), TOPOCK COMPRESSOR  
STATION, NEEDLES, CALIFORNIA (EPA ID NO. CAT080011729)**

Dear Ms. Meeks,

As a result of the Phase I Chromium Isotope Study review and consideration of recommendations from the January 22, 2007 Technical Workgroup meeting, the Department of Toxic Substances Control (DTSC) is requiring Pacific Gas and Electric Company (PG&E) to prepare and submit a Phase II Chromium Isotope Study Workplan. One of the objective of the Phase II study is to further evaluate the ability to use chromium isotopes to distinguish between naturally-occurring chromium in groundwater and historic chromium releases associated with the PG&E Topock Compressor Station at the plume margin. DTSC notes that general consensus has been reached by the Technical Workgroup on the specific reference and plume margin groundwater wells which should be included in the phase II study. Therefore, the Workplan should include those well identified in the January 22, 2007 Meeting Notes (enclosed).

Please note that the United States Geological Survey (USGS) is currently preparing a scope of work (SOW) for soil evaluation involving chromium isotopes. If such an approach is deemed valuable, DTSC may require PG&E to prepare a separate supplemental workplan. DTSC will confer with PG&E to assess the merits of such a study soon after the USGS completes its SOW.

Ms. Yvonne Meeks  
April 5, 2007  
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If you have any questions or comments regarding this Workplan call-in letter, please contact me at (714) 484-5439.

Sincerely,



Aaron Yue  
Project Manager  
Geology, Permitting and Corrective Action Branch

Enclosures

aky:040703A

cc: PG&E Topock Consultative Workgroup Members – Via e-mail  
Tribal Representatives in PG&E Contact List – Via e-mail

## USGS-CH2M HILL Meeting Notes

**San Diego, CA January 22, 2007**

This was a meeting to discuss wells to be sampled in Phase II of the Chromium Isotope Study (CIS). Attendees are listed at the end of this document. The main objectives were as follows:

- Gain consensus between attendees on which wells are most appropriate to be sampled
- Anticipate the range of results from the chosen wells and have reasonable confidence that the selection of wells will be sufficient to either:
  - Reject the use of chromium isotopes as an effective tool for plume definition, or
  - Prove usefulness and have sufficient data to better define the extent of plume-affected groundwater
- Discuss logistics of sampling and analysis

It was agreed during the meeting that understanding the degree of isotopic fractionation (i.e. increase in value of  $\delta^{53}\text{Cr}$ ) of downgradient plume samples is a key goal of Phase II sampling. Phase I data suggest that plume margin wells have larger  $\delta^{53}\text{Cr}$  values than reference wells. Three possible explanations for this were discussed during the meeting:

1. There really is no significant difference between the groups; there were simply not enough data to verify this in Phase I, or
2. These samples represent downgradient fractionation of local reference wells and therefore would be classified as natural Cr(VI) concentrations, or
3. The margin wells represent plume water that has undergone  $^{53}\text{Cr}$  fractionation at the plume edge, leading to higher  $\delta^{53}\text{Cr}$  values than natural groundwater.

It was agreed that the list of proposed Phase II wells will have a good chance of addressing this question .

The attached table represents the list to be presented and discussed at the next TWG meeting to be held February 21<sup>st</sup>. A preliminary table was provided to USGS by CH2M HILL prior to the meeting, and had recommended 23 wells for Phase II. During meeting discussions, the following wells were suggested to be added to the proposed list:

- GSWC-2 in Golden Shores (average 5.0  $\mu\text{g/L}$ ) in order to increase the range in Cr(VI) for AZ wells
- MW-15 on Topock Site to add a shallow alluvial well close to mountain recharge area. Although MW-15 was not included in the Background Study, participants agreed that historical data for this well are consistent with other reference wells in the area. Chromium isotopic data is anticipated to verify this assumption.
- Recent concentrations of Cr(VI) at MW-47-55 have exceeded 50  $\mu\text{g/L}$ , making this well potentially valuable as a downgradient plume sample for Phase II. It is anticipated that samples such as this one and MW-40S have the best chance of displaying reductive fractionation of  $^{53}\text{Cr}$  in the groundwater plume, as described in alternative (3) above, as they appear to represent plume edge concentrations.

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- MW-35-135 was sampled in Phase I, but has increased from 21 to 35 µg/L between May and October 2006. If the increase continues in the next sample (scheduled for March 2007), this well should be added to the Phase II list to check for changes in isotope values with changing Cr(VI) concentrations.

In addition, anticipated field activities were also discussed. Attendees agreed that because no preservative or exchange resin would be required in Phase II sampling, CH2M HILL field personnel could collect the samples without the need for a USGS representative. Samples would be shipped to the USGS lab in Menlo Park, CA where speciation and chromium isotope analyses would be run. In a separate conversation with Tom Bullen, it was agreed that the samples could be shipped “blind” (i.e. with sample identifications that do not divulge the name of the sampled well).

Attendees

Thomas Bullen, USGS

John Izbicki, USGS

Peter Martin, USGS

Brian Schroth, CH2M HILL

**TABLE 1**

Reference Wells Available for Sampling in Phase II of Chromium Isotope Study

Well Name	Site Aquifer Depth Zone <sup>1</sup>	Geologic Material at Screen	State	Location	Average Cr(VI), µg/L	Recommended for Phase II?	Comments
ADOT New Well	NA	Alluvial	AZ	3.4 miles east of Topock Site	7.4	No	Redundant with EPNG-2
CW-01D	Deep	Alluvial	CA	South of IW-2 off old Hwy 66	0.5	No	CW-1M sampled in Phase I
CW-02D	Deep	Alluvial	CA	East of IW-2	1.1	No	CW-2M sampled in Phase I
CW-03D	Deep	Alluvial	CA	Northeast of IW-2	1.0	No	Redundant with CW-03M
CW-03M	Deep	Alluvial	CA	Northeast of IW-2	8.5	Yes	
CW-04D	Deep	Alluvial	CA	Northwest of IW-2	0.5	No	Redundant with CW-04M
CW-04M	Medium-Deep	Alluvial	CA	Northwest of IW-2	13.5	Yes	
EPNG-2	NA	Alluvial	AZ	3.2 miles east of Topock Site	8.7	Yes	
GSRV-2	NA	Alluvial	AZ	1.9 miles northeast of Topock Site	27.1	Yes	
GSWC-1	NA	Alluvial	AZ	3.9 miles northeast of Topock Site	12.7	No	Redundant with Langmaack
GSWC-2	NA	Alluvial	AZ	5.0 miles northeast of Topock Site	5.0	Yes	Close to GSWC-4, but shows low end of AZ Cr(VI) concentrations

**TABLE 1**  
Reference Wells Available for Sampling in Phase II of Chromium Isotope Study

Well Name	Site Aquifer Depth Zone <sup>1</sup>	Geologic Material at Screen	State	Location	Average Cr(VI), µg/L	Recommended for Phase II?	Comments
GSWC-4	NA	Alluvial	AZ	4.5 miles northeast of Topock Site	10.1	Yes	
Langmaack	NA	Alluvial	AZ	3.4 miles northeast of Topock Site	20.7	Yes	
MWP-12	Shallow	Alluvial	CA	South of Old Evaporation Ponds	0.2	No	Well has been frequently dry and Cr(VI) very low
MW-15	Shallow	Alluvial	CA	North of Old Evaporation Ponds	10.9	Yes	Not in Groundwater Background Study
Needles MW-11	NA	Fluvial	CA	11 miles northwest of Topock Site	2.4	Yes	
OW-01S	Shallow	Alluvial	CA	East Mesa Injection Area	17.8	No	Redundant with OW-2S
OW-02S	Shallow	Alluvial	CA	East Mesa Injection Area	26.2	Yes	
OW-03D	Deep	Alluvial	CA	West Mesa	0.6	No	Redundant with OW-3M
OW-03M	Medium-Deep	Alluvial	CA	West Mesa	15.1	Yes	Sampled in Phase I, but had unusually low $\delta^{53}\text{Cr}$ ; recommend resampling
OW-03S	Shallow	Alluvial	CA	West Mesa	17.9	Yes	
OW-05S	Shallow	Alluvial	CA	East Mesa Injection Area	25.3	Yes	
P-2	Deep	Alluvial	CA	New Ponds Area	29.2	Yes	
PMM-Supply	NA	Alluvial	CA	Park Moabi, 1.4 miles west of	7.7	No	Drinking water well

**TABLE 1**  
Reference Wells Available for Sampling in Phase II of Chromium Isotope Study

Well Name	Site Aquifer Depth Zone <sup>1</sup>	Geologic Material at Screen	State	Location	Average Cr(VI), µg/L	Recommended for Phase II?	Comments
Sanders	NA	Fluvial	AZ	plume Across river, 0.6 miles east of MW-20	0.3	No	near site Drinking water well near site
Tayloe	NA	Alluvial	CA	7.2 miles northwest of Topock Site	0.6	Yes	
TMLP-2	NA	Alluvial	AZ	6.3 miles east of Topock Site	17.0	Yes	
Topock-2	NA	Alluvial	AZ	Across river, 0.9 miles east of MW-20	7.8	No	Drinking water well near site
Topock-3	NA	Alluvial	AZ	Across river, 0.9 miles east of MW-20	11.2	No	Drinking water well near site

Note:

<sup>1</sup>Aquifer depth zone is based on screen elevation and not hydrostratigraphy. It provides a relative comparison of screened intervals of Topock Site wells. The designation is not applicable to offsite wells, so the term "NA" is used for these wells.

**TABLE 2**  
 Plume Wells with Cr(VI) Concentration Between 50 and 1,000 ppb

Well Name	Site Aquifer Depth Zone <sup>1</sup>	Geologic Material at Screen	Location	Average Cr(VI), $\mu\text{g/L}$	Recommended for Phase II?	Comments
MW-09	Shallow	Alluvial	Bat Cave Wash near original discharge	342	Yes	Upgradient of MW-10 with much lower Cr(VI)
MW-11	Shallow	Alluvial	Bat Cave Wash near original discharge	625	Yes	Downgradient of MW-10 with lower Cr(VI)
MW-12	Shallow	Alluvial	Southeast edge of plume near PM Road	897	No	Expected to give similar $\delta^{53}\text{Cr}$ to Phase I plume samples
MW-31-135	Deep	Alluvial	North end of 20-bench	285	Yes	Near MW-50-095 but deeper screened depth with greater reduction potential
MW-34-100	Deep	Fluvial	Eastern floodplain near river	671	Yes	Sampled in Phase I, but decreasing trend in Cr(VI) may help calibrate $\delta^{53}\text{Cr}$
MW-38D	Deep	Alluvial	Bat Cave Wash near original discharge	191	Yes	Deep Bat Cave Wash well
MW-40D	Deep	Alluvial	Western edge of plume at I-40 median	51	Yes	MW-40S showed high $\delta^{53}\text{Cr}$ ; value from deeper well will provide additional data
MW-44-125	Deep	Alluvial	Eastern floodplain north of PE-1	372	Yes	Deep downgradient well
MW-45-	Deep	Fluvial	Eastern floodplain near PE-1	228	Yes	Deep fluvial well to compare to



**TABLE 2**  
 Plume Wells with Cr(VI) Concentration Between 50 and 1,000 ppb

<b>Well Name</b>	<b>Site Aquifer Depth Zone<sup>1</sup></b>	<b>Geologic Material at Screen</b>	<b>Location</b>	<b>Average Cr(VI), μg/L</b>	<b>Recommended for Phase II?</b>	<b>Comments</b>
MW-09 095	Shallow	Alluvial	Bat Cave Wash near original discharge	342	Yes	Upgradient of MW-10 with much lower Cr(VI) MW-34-100
MW-46-175	Deep	Alluvial	Eastern floodplain at north edge of plume	191	Yes	Near plume edge
MW-47-055	Shallow	Alluvial	Park Moabi Road at northern edge of plume	38.2	Yes	Two most recent samples were above 50 μg/L.
MW-50-095	Deep	Alluvial	Northwest of 20-bench off old Hwy 66	209	No	Likely redundant to MW-31-135

Note:

<sup>1</sup>Aquifer depth zone is based on screen elevation and not hydrostratigraphy. It provides a relative comparison of screened intervals of Topock Site wells.