Department of Toxic Substances Control

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

Linda S. Adams
Secretary for
Environmental Protection

Arnold Schwarzenegge
Governor

October 30, 2006

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

ADDITIONAL GROUNDWATER CHARACTERIZATION IN CALIFORNIA BY SLANT DRILLING AT PACIFIC GAS AND ELECTRIC COMPANY (PG&E), TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA (EPA ID NO. CAT080011729)

Dear Ms. Meeks,

The Department of Toxic Substances Control (DTSC) has completed the evaluation of the *Work Plan for Additional Groundwater Characterization Beneath the Colorado River by Slant Boring in California* (Work Plan). The Work Plan was submitted to DTSC in accordance with our directive in the September 29, 2006 letter. As a result of the review, DTSC is in general agreement with the proposed work and approves the Work Plan contingent on resolution of recommendations provided in the enclosed memorandum by Mr. Christopher Guerre of DTSC's Geological Services Unit. Furthermore, DTSC understands that the proposed slant drilling location is within the property owned and managed by the United States Department of the Interior and that PG&E shall comply with all permitting requirements identified by the Department of Interior prior to commencement of any proposed activities.

The purpose of the slant drilling investigation is to evaluate the extent of hexavalent chromium in groundwater within the fluvial sediments beneath the Colorado River south of the Interstate Highway 40 Bridge, and to investigate the thickness of the reductive zone immediately beneath the Colorado River at that location. DTSC's current understanding is that any hexavalent chromium originating from PG&E's historic discharge should pass through the proposed, downgradient sampling location. This is based on regional groundwater flow considerations and the nature of the bedrock structure.

Based on existing information and interpretation, DTSC believes the proposed drilling location within California will provide significant information associated with plume delineation. Therefore, DTSC does not plan to conduct additional characterization within California if the sampling results from the proposed wells do not detect

hexavalent chromium above regional background concentrations. DTSC wishes to provide this clarification to address the concern of the Department of Interior that ground disturbing activities within a sensitive ecological and cultural setting be as limited as possible.

If you have any questions or comments with regards to this letter, please contact Mr. Aaron Yue at (714) 484-5439.

Sincerely,

for Karen Baker, CEG, CHG, Chief
Geology, Permitting and Corrective Action Branch

aky:100603C

Enclosure

cc: PG&E Topock Consultative Workgroup Members – Via e-mail

Linda S. Adams
Secretary for
Environmental Protection

Department of Toxic Substances Control

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

Arnold Schwarzenegger
Governor

TO: Aaron Yue
Project Manager
Geology, Permitting & Corrective Action Branch

FROM: Chris Guerre, CHG
Senior Engineering Geologist
Geological Services Unit

DATE: October 27, 2006

SUBJECT: Workplan for Angled Multilevel Wells Beneath the Colorado River
PG&E Topock Compressor Station, Needles, California
Project No. 22120/540015-48/36-HWMP

DOCUMENT REVIEWED

Work Plan for Additional Groundwater Characterization Beneath the Colorado River by Slant Boring in California, PG&E Topock Compressor Station, Needles, California (Workplan). The Workplan is dated October 19, 2006 and was prepared by CH2M Hill.

BACKGROUND

The Geological Services Unit (GSU) of the Department of Toxic Substances Control (DTSC) has reviewed the above-referenced workplan regarding installation of two angle borings and multilevel monitoring wells beneath the Colorado River from the California shoreline. The Workplan was prepared in response to a September 29, 2006 DTSC letter requesting PG&E prepare a workplan for a slant boring. Well installation is to be completed prior to March 15, 2007, the next migratory bird nesting season.

The Workplan states that the primary objectives of the slant drilling groundwater investigation are to assess chromium concentrations and natural geochemical parameters (e.g., reducing conditions) in the fluvial sediments beneath the Colorado River downgradient of the chromium plume observed in the floodplain. Additionally, permanent multilevel groundwater monitoring points are proposed to monitor water quality and hydraulics downgradient of the floodplain.

The Workplan proposes to install two angle borings (Borings 1 and 2) from one location adjacent to the California shoreline just south of Interstate Highway I-40 on Havasu

National Wildlife Refuge property. Boring 1 and Boring 2 will be drilled at different angles estimated at approximately 30° and 40° from horizontal along 300 and 200 foot lengths respectively. Drilling is planned to occur through fluvial deposits beneath the Colorado River and terminate when Miocene bedrock is encountered. As drilling occurs, depth-discrete groundwater samples will be obtained every 20 feet using the Isoflow® sampling method and analyzed for water quality parameters as well as chromium and iron. After the borehole has been completed to total depth, three BarCad™ wells will be bundled together and installed within the borehole as a multilevel monitoring system. The exact locations for BarCad™ screen placement will be determined based on the lithologic and Isoflow® data obtained during drilling. After the wells are completed, they are planned to be developed and then sampled using sampling procedures consistent with procedures used in monitoring floodplain wells. The wells will be sampled for chromium (both hexavalent and total chromium), ferrous iron, general minerals, water quality parameters and stable isotopes of oxygen 18 and deuterium.

The GSU concurs with the investigation activities proposed within the Workplan, but does have a few concerns identified in the Specific Comments below. The GSU recommends that PG&E address these comments and that the Workplan be implemented only if these comments are appropriately addressed. If you have questions regarding the following comments, please contact me at (714) 484-5422 or by email at cguerre@dtsc.ca.gov.

SPECIFIC COMMENTS

1. The third paragraph of Section 2.5 on page 2-6 of the Workplan discusses multilevel well design and installation. The GSU concurs that custom centralizers will need to be placed around the BarCad™ bundle to prevent it from lying on the ground. This will ensure that the well is appropriately sealed according to existing standards and ensure that discrete zones are monitored. The custom centralizer should also provide a space between each one-inch PVC BarCad™ riser to allow for adequate seal placement. However, the Workplan appears to indicate that only one custom centralizer will be installed above every screen interval. The GSU recommends that centralizers be placed every 10 to 50 feet along the length of the casing. The GSU realizes that there can be a trade off between the number of centralizers used and the ability to place seals and filter packs with tremie pipes. Adequate well seals are critical to ensure the multilevel design functions appropriately. Installation of adequate well seals are also critical to eliminate potentially elaborate decommissioning procedures when it comes time to remove the well from service.

2. The GSU expects PG&E to consult with DTSC regarding alternative well designs especially if problems are discovered while refining the design or installing the proposed BarCad™ multilevel system. The GSU suggests that a couple of

contingency designs (e.g., Solinst mutlichannel tubing (CMT) system, conventional single well design) be developed to ensure an alternate design will be identified and ready to implement prior to the implementation of field activities. PG&E will need DTSC's concurrence regarding any alternative designs.

3. The GSU has some concern regarding the placement and confirmation of annular seals and filter packs. Due to the angle of the boring it may be difficult to accurately tag the top of annular materials including collapsed borehole sediments. If this problem is encountered in the field, it is recommended that additional filter pack be added around screened zones to prevent sand/bentonite from invading and potentially occluding the screened zone.

4. Depth-specific Isoflow® sampling described in Section 2.4 on page 2-5 of the Workplan indicates that sample collection will occur every 20 feet from 10-foot open boreholes. The GSU understands that a conventional open borehole doesn't exist as part of the Isoflow® sampling technique but it does utilize a temporary well screen that is exposed to the formation by retracting an outer casing.

5. The last paragraph of Section 2.6 on page 2-9 of the Workplan indicates that the new multilevel angle wells will be incorporated into the Topock monitoring program. The GSU requests that after installation, these wells be sampled once each month for six months. An alternate groundwater sampling schedule may be requested by PG&E after the six month period. A more frequent sampling schedule may be necessary based on initial results.

6. The notes on Figure 4 indicate that the 40° slant boring may be drilled if field conditions allow and additional characterization is required. The 40° slant boring should be installed unless DTSC concurs that it is not necessary or impracticable.

7. The GSU requests that PG&E notify the DTSC team at least two weeks prior to the initiation of field activities described in the Workplan.

Peer Reviewed By: Alfredo Zanoria, CHG, CEG