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Agency Secretary  
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## Department of Toxic Substances Control

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Arnold Schwarzenegger  
Governor

February 8, 2006

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

**CONDITIONAL APPROVAL OF APPROACH TO DRILLING AND WELL  
INSTALLATION AT LOCATIONS 1 THROUGH 5, WELL INSTALLATION  
WORKPLAN FOR INTERIM MEASURE PERFORMANCE MONITORING, PACIFIC  
GAS AND ELECTRIC COMPANY, TOPOCK COMPRESSOR STATION, NEEDLES,  
CALIFORNIA (EPA ID NO. CAT080011729)**

Dear Ms. Meeks:

The Department of Toxic Substances Control (DTSC) has completed a review of Technical Addendum 1 to the Well Installation Work Plan for Interim Measures Performance Monitoring (dated January 27, 2006). The Technical Addendum describes the Pacific Gas and Electric Company (PG&E) proposed approach to drilling and well installation at Locations 1 through 5 identified in the January 6, 2006 DTSC letter providing conditional approval of the November 30, 2005 Draft Well Installation Work Plan. The Technical Addendum also proposes modified well design for Sites A and B addressed in the Draft Well Installation Work Plan. The DTSC Geological Services Unit (GSU) provided technical comments on the Technical Addendum in a memorandum dated February 7, 2006. A copy of the GSU memorandum is enclosed.

DTSC's previous considered our obligations under the California Environmental Quality Act (CEQA) as described in DTSC letter dated January 6, 2006 related to the proposed work activities. DTSC has determined that the proposed activities described in Technical Addendum No. 1 do not alter or change the previous DTSC CEQA determination.

DTSC is providing conditional approval of the approach identified in the Technical Addendum No.1 as follows:

1. At Site A, PG&E shall construct a well cluster consisting of a two well nest installed in one borehole and a single well installed in a separate, adjacent borehole. Wells completed in the well nest shall include a well screened across the middle depth interval and a second well screened across the Alluvial Aquifer/bedrock interface.

2. At Location 1, PG&E shall install a nest of two monitoring wells installed in one borehole (one well with a 10-foot screen length in the middle depth interval and one well with a 10-foot screen interval in lower depth intervals of the Alluvial Aquifer) and a third hydraulic test well (screen length up to 40 feet long) installed in a separate, adjacent borehole.
3. At Location 2, PG&E shall select the well screen intervals to correspond to the most likely zones to define the plume or plume boundary. If three zones are identified as necessary for high quality monitoring (i.e., ten foot screen lengths), PG&E shall eliminate the hydraulic test well and install a third monitoring well in the second borehole. If a hydraulic test well is not installed and lower depth interval is thick, PG&E should plan to add a fourth monitoring well to create a second two-well nest. If installed, the screen interval for the hydraulic test well shall be no longer than 20 feet in length.
4. At Location 4, PG&E shall install a well with a screen length no longer than 20 feet.
5. PG&E shall minimize the total thickness of filter pack extending above each screen interval (e.g., on the order of two to three feet) so that the effective screen length of the monitoring well is not unnecessarily increased.
6. As stated in the Draft Well Installation Work Plan, PG&E shall confer with DTSC for the selection of screen interval positions for wells installed at Sites A, B, and C and at Locations 1 through 5, prior to the installation of well screens.
7. Wells installed during the 2006 IM investigation program shall be incorporated into the interim measure or site-wide monitoring program, whichever program is most appropriate for the given well location and purpose. All wells at Locations 1 through 5 shall be sampled within 30 days of installation. Prior to sampling, PG&E shall submit to DTSC the proposed sampling laboratory analysis for DTSC approval. If a well is installed at Location 5, PG&E shall also analyze samples from this well for the full suite of Title 22 metals.
8. PG&E shall obtain all necessary approvals and/or authorizations from applicable federal, state, county, and local agencies, as required. Prior to commencing any field activities associated with Locations 1 through 5, PG&E shall provide written notification to DTSC listing all applicable permits and/or approvals that have been obtained.
9. PG&E shall provide seven (7) days notice prior to commencing field activities associated with Locations 1 through 5.
10. A biological and cultural resource monitor shall be onsite prior to and during the movement and set up of drilling equipment.

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11. If the drilling and well installation activities for Locations 1 through 5 are not continuous with the activities at Sites A, B, and C, PG&E shall schedule and host an onsite pre-construction kick-off meeting prior to the start of field activities. P&GE shall provide DTSC with a minimum seven (7) days notice of the meeting date.

Additional specific details and clarification regarding some of the above-referenced technical discussions and conditions can be found in the attached GSU memorandum, If you have any questions regarding these items please contact Kate Burger at (916) 255-6537.

Sincerely,



Norman Shopay, P.G.  
Project Manager  
Geology, Permitting and Corrective Action Branch

NTS/201A

Enclosure: GSU Memorandum Dated February 7, 2006

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



## Department of Toxic Substances Control

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Agency Secretary  
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Arnold Schwarzenegger  
Governor

### MEMORANDUM

TO: Norman Shopay, P.G.  
Senior Engineering Geologist  
Geology, Permitting & Corrective Action Branch, Berkeley Office

FROM: Kate Burger, Ph.D., P.G. *Kate Burger*  
Engineering Geologist, Northern California Geological Services Unit  
Geology, Permitting & Corrective Action Branch, Sacramento Office

DATE: February 7, 2006

SUBJECT: Technical Addendum No. 1, Well Installation Work Plan for  
Interim Measures Performance Monitoring Program  
PG&E Topock Compressor Station, Needles, San Bernardino County  
Project No. 22120/540015-48/36-HWMP

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### DOCUMENT REVIEWED

Technical Memorandum, Technical Addendum No. 1: Well Installation Work Plan for Interim Measures Performance Monitoring, PG&E Topock Compressor Station, Needles, California. Prepared by CH2M Hill. Dated January 27, 2006.

### INTRODUCTION

The Northern California Geological Services Unit (GSU) of the Department of Toxic Substances Control (DTSC) has reviewed the above-referenced Addendum to the Well Installation Work Plan for Interim Measures Performance Monitoring (Workplan; CH2M Hill, 2005). The Addendum describes investigation activities associated with five additional locations specified by DTSC in its conditional approval of the Workplan (DTSC Letter; DTSC, 2006). The investigation activities defined in the Workplan and Addendum are intended to augment the interim measures (IM) performance monitoring network and to collect data that will assist with moving the project toward groundwater remedy selection.

The Addendum was provided to Consultative Workgroup (CWG) members on January 27, 2006 and no comments were received. This memorandum provides GSU comments and recommendations regarding the Addendum. If you have questions, please call me at (916) 255-6537.

## OVERALL RECOMMENDATIONS

1. For Site A, GSU recommends the well cluster design proposed in the Workplan rather than the modified design proposed in the Addendum. Hence, the Site A well cluster should consist of a two well nest installed in one borehole and a single well installed in a separate, adjacent borehole. Wells completed as the well nest should include the well screening middle depth interval and the well screening across the Alluvial Aquifer/bedrock interface.
2. For Location 1, GSU recommends that the drilling and well installation consist of a nest of two monitoring wells installed in one borehole (10-foot screens in the middle and lower depth intervals of the Alluvial Aquifer) and a hydraulic test well (screen length up to 40 feet long) installed in a separate, adjacent borehole.
3. For Location 2, GSU recommends that the screen intervals for the three wells be selected to correspond to the most likely zones to define the plume or plume boundary. The screen interval for the hydraulic test well should be no longer than 20 feet in length. If three zones are identified as necessary for high quality monitoring (i.e., ten foot screen lengths), eliminate the hydraulic test well and install a third monitoring well in the second borehole. If a hydraulic test well is not installed and lower depth interval is thick, consider adding a fourth monitoring well to create a second two-well nest. Pacific Gas and Electric Company (PG&E) should maximize the vertical separation between screened intervals for wells installed as a two-well nest.
4. For Location 4, GSU recommends a well with a screen length no longer than 20 feet to allow for both water quality characterization and hydraulic testing.
5. The total thickness of filter pack above each screen interval should be minimized (e.g., on the order of two to three feet) so that the effective screen length of the monitoring well is not unnecessarily increased.
6. PG&E should provide the product name for the bentonite slurry to be used as the annular sealant.
7. Wells installed during the 2006 IM investigation program should be incorporated into the IM or site-wide monitoring program, whichever program is most appropriate for the given well location. All wells should be sampled within 30 days of installation. If a well is installed at Location 5, samples from this well should be analyzed for the full suite of Title 22 metals.

## COMMENTS AND RECOMMENDATIONS

1. The Addendum proposes to modify the design of the Site A well cluster from the design proposed in the Workplan. PG&E now proposes to install the three wells as a **nested well cluster** in a **single borehole**. The original design proposed to install a two-well nest in one borehole and to install the third well in a separate, adjacent

borehole. This well cluster will consist of a monitoring well that screens across the base of the Alluvial Aquifer, a second well screened in the lower depth interval of the Alluvial Aquifer, and a third well screened in the middle depth interval of the Alluvial Aquifer. Given the estimated depth to bedrock (120 feet below ground surface (bgs)), the distance between the two screen intervals for the lower depth interval of the Alluvial Aquifer could range from 10 to 25 feet. The actual screen interval for the wells will be selected based on data gathered during drilling.

The Site A well cluster will provide an important measurement point to assess the hydraulic gradients induced by the new IM pumping regime. It will likely be part of the northern gradient well pair used to assess the gradients induced by extraction well PE-1. In addition, the Site A well cluster may be a key measurement point for defining the northern boundary of the chromium plume in this area of the floodplain.

After careful consideration of the significance of this well cluster for the assessment of IM performance, GSU has concerns with the proposed three-well nest design. First, the potential for close spacing of the two lower screen intervals will make it difficult to construct a nest that maintains hydraulic separation between the lower screen intervals. If this occurs, the water level and concentration data measured in these wells would be compromised. Second, if the three-well nest design were to fail, the well cluster could not be replaced until the fourth quarter of 2006 when access to the floodplain is restored. This could result in the loss of more than six months of data needed to assess the plume position and the hydraulic gradients induced by the IM. Finally, if PG&E mobilizes with the intent to install a three-well nest, this may dictate the screen interval selected for the second well installed in the lower depth interval. The screen interval selection might focus on allowing a minimum 10-foot separation between the lowest screen interval and the next screen interval rather than selecting a scientifically-based interval using data collected during drilling.

2. The Addendum proposes to modify the design of the Site B well to include two separate casings, screened in the same depth interval. One casing will be used for groundwater monitoring. The other casing will be used for water-level measurements. GSU has no comments on this proposed modification.
3. At Location 1, the DTSC Letter requires PG&E to create a monitoring well cluster by installing wells screened in the middle and lower depth intervals of the Alluvial Aquifer at a location adjacent to existing well MW-19. The DTSC Letter also instructs PG&E to design the well cluster to allow aquifer testing in this area. The DTSC Letter envisioned that both new wells would be used as plume and geochemical characterization monitoring points and that one well would also be used to evaluate aquifer characteristics in this area. In response, the Addendum proposes to install a monitoring well and hydraulic test well in separate boreholes with screen lengths of ten feet and up to 40 feet, respectively. From discussions with CH2M Hill, GSU understands that a longer screen interval is desirable for the hydraulic test well in order to be able to conduct an effective aquifer test (e.g., to see a drawdown response in nearby wells, such as Location 2 and the MW-31 cluster).

GSU is concerned that a long screen interval for one of the two monitoring wells will compromise water quality characterization by averaging the concentrations across the screen interval. Based on the rationale for this location (see Enclosure 2 of the DTSC Letter), GSU considers the groundwater characterization objective to be of higher priority than the hydraulic testing objective. However, the hydraulic characterization objective is also important for moving the project toward a groundwater remedy selection.

Two alternative designs seem feasible for this well cluster in order to meet the dual objectives for this location.

Design Alternative 1: Install a nest of two monitoring wells (each with ten-foot screen length) in one borehole. Install a hydraulic test well with screen length up to 40 feet long in a separate, adjacent borehole.

Design Alternative 2: Install a monitoring well in one borehole as proposed in the Addendum. Install the hydraulic test well in an adjacent borehole with a screen length of no more than 20 feet long.

The design proposed in the Addendum, as well as these two alternatives, will require drilling and well installation in two separate boreholes.

4. At Location 2, the DTSC Letter requires PG&E to create a monitoring well cluster by installing wells screened in the upper, middle, and lower depth intervals of the Alluvial Aquifer. The DTSC Letter also instructs PG&E to design the well cluster to allow aquifer testing in this area. The DTSC Letter envisioned that the new wells would be used as water quality monitoring points and that one well would also be used to evaluate aquifer properties. The Addendum proposes to install a nest of two monitoring wells and hydraulic test well in separate boreholes. The monitoring wells would have screen lengths of ten feet and the hydraulic test well would have a screen length of up to 40 feet.

As with Location 1, GSU is concerned that a long screen length (to allow for hydraulic testing) will compromise the ability of the well to act as an effective water quality monitoring point. The plume characterization objective has the highest priority for this location because this well cluster may be used to define the northern edge of the chromium plume. Plume delineation is most appropriately conducted using short screen length wells.

Two alternative designs seem feasible for this well cluster in order to meet the dual objectives for this location.

Design Alternative 1: As proposed in the Addendum, install a nest of two monitoring wells (each with ten-foot screen length) and the hydraulic test well (screen length up to 20 feet long) in separate boreholes.

Design Alternative 2: If three zones are identified as necessary for high quality monitoring, eliminate the hydraulic test well and install a third monitoring well in the second borehole. Depending on the depth to bedrock, it may be appropriate to install a fourth monitoring well at this location.

For both alternatives, select the screen positions such that the monitored intervals correspond with the most likely zones to define the plume or plume boundary. These zones should be identified based on data collected during drilling, existing concentration data, and the conceptual model of chromium plume migration.

5. At Location 4, the DTSC Letter requires PG&E to evaluate whether there is sufficient saturated thickness below the interval screened by well MW-26 for installation of another monitoring well. The DTSC Letter also instructs PG&E to propose a well design that supports aquifer testing. The Addendum proposes to install a hydraulic test well with a screen length up to 40 feet long. It appears likely that a well will be installed at this location because PG&E estimates that approximately 60 feet of Alluvial Aquifer sediments are present between the base on the MW-26 screen interval and the top of bedrock.

Because this well has dual objectives (water quality and aquifer property characterization), GSU recommends a screen length of no longer than 20 feet for this well.

6. The schematic diagrams provided in the Addendum do not specify a thickness of filter pack (including transition sand) that will extend above the top of the screen interval. GSU recommends that PG&E minimize this thickness (e.g., 2 to 3 feet) so as not to unnecessarily increase the effective screen length of the monitoring wells.
7. PG&E should provide the product name for the bentonite slurry to be used as the annular sealant.

## REFERENCES

- CH2M Hill. 2005. Draft Well Installation Work Plan for Interim Measures Performance Monitoring Program, PG&E Topock Compressor Station, Needles, California. November 30, 2005.
- DTSC. 2006. Conditional Approval of Draft Well Installation Work Plan for Interim Measures Performance Monitoring Program, PG&E Topock Compressor Station, Needles, California. January 6, 2006.

Peer Reviewed By: Alfredo Zanoria, C.H.G., C.E.G.