

Lahontan Regional Water Quality Control Board

## MEMORANDUM

**TO:** Harold J. Singer, Executive Officer  
Lahontan Regional Water Quality Control Board

*Lisa Dembar*  
**FROM:** Lauri Kemper, Assistant Executive Officer  
**LAHONTAN REGIONAL WATER QUALITY CONTROL BOARD**

**DATE:** April 19, 2012

**SUBJECT: PROSECUTION TEAM RESPONSE TO WHOLE HOUSE WATER  
FEASIBILITY STUDY AND PILOT TEST RESULTS REPORT, PG&E  
COMPRESSOR STATION CHROMIUM CONTAMINATION, HINKLEY—  
CLEANUP AND ABATEMENT ORDER NO. R6V-2011-0005A1**

The Lahontan Water Board Prosecution Team staff has reviewed the Pacific Gas and Electric Company's (PG&E) Replacement Water Supply Feasibility Study, Pilot Test Results Report, and cover letter, dated April 9, 2012 (Feasibility Study). The Feasibility Study and Results Report were both prepared by Arcadis and were submitted in response to the requirements of Item 2.c. of Amended Cleanup and Abatement Order (Amended CAO) R6V-2011-0005A1.

The Prosecution Team recognizes that Item 2.e. of the Amended CAO requires acceptance of the Replacement Water Feasibility Study by the Water Board. We believe the Executive Officer, through his delegated authority, will ultimately be responsible for reviewing the Feasibility Study and determining compliance with the Amended CAO.

During the April 11, 2012 Community Advisory Committee (CAC) Subcommittee meeting, Water Board Staff was asked by the CAC Independent Review Project Manager to provide their assessment on the Feasibility Study and the extent to which PG&E has complied with the Amended CAO. **We conclude that the Feasibility Study is inadequate and incomplete.** We submit the detailed comments below in support of this conclusion for the Executive Officer's consideration.

Based on the public input received by the Prosecution Team, we also want to convey to the Executive Officer the importance of PG&E taking rapid steps to engage the public, including through use of the independent review panel expert, to develop a revised, complete and sufficient replacement water plan that addresses the deficiencies identified below. We recommend that the public outreach by PG&E be completed by June 15, at the latest, so that treatment systems can be in place by September 13. It may be advisable to engage in a separate approach for those households with concentrations above 3.1 ppb so that, for at least these households, treatment can be operational by September 13, 2012.

### **Analysis of Replacement Water for Domestic Wells Above Maximum Background Levels Is Incomplete**

The Feasibility Study evaluated multiple alternatives for providing whole-house replacement water supply for residences with domestic wells having detections of hexavalent or total chromium at levels greater than maximum background values. "Domestic wells exceeding maximum background levels" are defined in the Feasibility Study as those domestic wells within one mile down-gradient or cross-gradient of the fourth quarter 2011 plume boundary containing chromium exceeding 3.1 parts per billion (ppb) hexavalent chromium or 3.2 ppb total chromium. The Feasibility Study did not address replacement water for other impacted wells in the affected area, as required by Item 3 of the Amended CAO.

The Prosecution Team notes that all the replacement water alternatives evaluated by PG&E were capable of providing water with hexavalent chromium levels below 0.06 ppb. Based upon various criteria, PG&E is recommending that two alternatives be offered to residents with affected domestic wells: installation of a deeper well or installation of a point of entry whole household treatment system consisting of an ion exchange with under sink reverse osmosis systems.

The Prosecution Team has determined that the Feasibility Study and Results Report are incomplete. An attachment to this letter contains the Prosecution Team's technical comments on the Feasibility Study. We believe that the missing and incomplete information outlined in the attachment need to be addressed before the document can be considered complete. We recommend that the Executive Officer extend a new deadline to PG&E for submittal of a revised Feasibility Study and Pilot Test Report that includes the missing and incomplete information identified by the Prosecution Team.

Once revised documents are received and determined to be complete, Water Board staff will gladly assist Hinkley residents with domestic wells exceeding maximum background levels in making informed decisions about their options for whole-house replacement water under the Feasibility Study within the following 60 days. Water Board staff also offers assistance to all Hinkley residents impacted by PG&E's waste chromium in making informed decisions regarding replacement water.

### **Voluntary Replacement Water Program for Domestic Wells Below Maximum Background Levels Is Insufficient**

PG&E has repeatedly stated that it does not believe a statistical method exists for determining if the PG&E chromium release has affected domestic wells having detections of hexavalent or total chromium with levels at or less than maximum background values. PG&E believes there is no technically sound statistical method that will allow it to comply with Item 3.a. of the Amended CAO. Instead, it has offered to develop a voluntary program to supply whole-house replacement water to other households in the affected area. The voluntary program will extend the replacement water program to those houses within one mile of the fourth quarter 2011 chromium plume boundary that have detections in their domestic wells below the maximum background values for hexavalent chromium and total chromium, but above non-detectable concentrations (or 0.06 ppb hexavalent chromium).

As the Prosecution Team's April 12, 2012 letter demonstrated, statistical methods do exist for evaluating and determining whether PG&E's discharge is affecting Hinkley domestic wells. The Prosecution Team documented how PG&E's chromium release can be scientifically proven to exist in Hinkley domestic wells in levels at or below the current maximum background values. Our April 12, 2012 letter provides two examples of statistical methods that PG&E can use to make such calculations. It therefore appears to the Prosecution Team that PG&E's voluntary program for whole-house replacement water is meant to replace the requirements of Order 3.a. in the Amended CAO.

PG&E's offer to implement voluntary whole-house replacement water program is intended to substitute for compliance with the Amended CAO. In a letter to the Executive Officer dated April 16, 2012, PG&E states "[we] believe that our voluntary program significantly expands and fully meets the intent of Paragraph 3 of the 2011 Order, making this provision moot."

Prosecution Team disagrees with this assessment of PG&E's compliance with the Amended CAO. An offer to enter in to a voluntary program does not alleviate PG&E's legal requirements to comply with the CAO as drafted. The voluntary program will provide replacement water to "domestic wells that, more likely than not, partially or completely, were impacted by PG&E's waste" and are therefore cleanup measures instituted pursuant to the Amended CAO. The Prosecution Team urges the Executive Officer to reject PG&E's assessment and make an independent determination about PG&E's compliance with the Amended CAO and its legal requirements to provide replacement water to impacted wells in the affected area.

### **Geographic Limits of Replacement Water Program Are Arbitrarily Constrained**

In its April 16, 2012 letter, PG&E clarifies that, "In order to be eligible for the Whole House Replacement Water Program or property purchase option, the residence must [be]...a residence with an active domestic well located within one mile of the Fourth

Quarter 2011 chromium 6 plume, and [have] a domestic well that has been tested by PG&E within the last six months for chromium 6 levels greater than non-detect.”

Prosecution Team staff believes some houses outside of the 1 mile boundary may also be impacted by PG&E's waste. These houses would not be eligible for the Whole House Replacement Water Program under the Feasibility Study as of today. Yet, Finding 30 of the Amended CAO states that “The affected area may change based on new data collected and evaluated each quarter.” Since the Amended CAO requires new evaluation and determination of the affected area and potentially impacted wells following each quarterly plume mapping, there is the potential for domestic wells outside the affected area today that could be in the affected in the future. But since PG&E's proposal would exclude such residences because they were originally outside the Fourth Quarter 2011 chromium 6 plume, the Program does not meet conditions of the Amended CAO. Therefore, the Prosecution Team recommends the Executive Officer reject PG&E's Whole House Replacement Water Program unless it is revised to match the requirements of Amended Order.

#### **Limited Duration of Replacement Water Program for both Domestic Wells above Current Maximum Background Levels and Voluntary Program Does Not Fully Compensate Residents of Hinkley**

The Prosecution Team has additional concerns about the duration of the replacement water program for Hinkley residents. PG&E states in the cover letter it is committed to providing whole house water for up to 5 years or until a maximum contaminant level (MCL) for Cr6 is adopted. The limitations in duration apply to both households receiving replacement water because they are above the maximum background levels, and households receiving water under the voluntary program. The April 16, 2012 letter to the Executive Officer clarifies that, “PG&E's Whole House Replacement Water Program will be offered until the State of California has adopted a drinking water standard specifically for chromium 6 or for up to 5 years at which time the program will be evaluated...”

PG&E's Whole House Replacement Water Program provides an incomplete remedy to homeowners impacted by PG&E's waste. There is nothing in the Amended CAO stating that PG&E can cease providing whole-house replacement water when an MCL is set. Finding 2.c. of the Amended CAO says that replacement water must meet Cr6 at 0.02 (or <0.06 ppb) or the final MCL once adopted. PG&E's Whole House Replacement Water Program contains no guarantees for cost absorption after 5 years or after establishment of the hexavalent chromium Maximum Contaminant Level (MCL). Homeowners that choose ion exchange wellhead treatment may have to bear their own maintenance and monitoring costs if the PG&E program is discontinued. Lastly, the program offers no guarantees about water quality if other anthropogenic pollutants created from PG&E's remedial actions (e.g., arsenic, manganese) are detected in domestic wells in the future. We recommend that PG&E be required to answer and address all the unclear matters of the proposed program prior to the Executive Officer making a decision on the sufficiency of the proposal.

### **The Voluntary Program Eliminates Critical Regulatory Oversight**

To conclude, the Prosecution Team does not believe a voluntary replacement water program is a sufficient substitute for the legal requirements of the Amended CAO. PG&E's Whole House Replacement Water Program is an illusory, unenforceable "promise" to deliver replacement water to homeowners impacted by PG&E's waste. PG&E is legally obligated to provide most, if not all of these same homeowners with replacement water under the Amended CAO. PG&E can withdraw its offers to the people of Hinkley at any time under the voluntary program, but the Amended CAO is an Order of the Water Board subject to regulatory oversight and enforcement. PG&E claims that, "a voluntary program is the best solution to expeditiously address community concerns that exist regarding domestic well water supplies..." The Prosecution Team disagrees. The PG&E's Whole House Replacement Water Program does not offer more immediate relief than that required by the deadlines expressed in the Amended CAO, and is not a sufficient substitution to an enforceable Order. Where would the residents of Hinkley be now if PGE had been left to voluntarily resolve the problems it has caused there from the beginning?

We appreciate the opportunity to provide these comments for your consideration. Please let us know if you have any questions concerning issues in this memorandum.

Attachment: Technical Comments on Whole-House Water Feasibility Study and Pilot Test Report

Cc: Ann Holden, LRWQCB  
Ellen Howard, OE, SWRCB

## Technical Comments

Water Board Prosecution Team staff has reviewed the April 9, 2012 document and provides the following comments on the Replacement Water Supply Feasibility Study and Pilot Test Results Report.

### Feasibility Study:

1. Overall wording in FS seems to be slanted to imply that hexavalent chromium detected in domestic wells is naturally occurring. This is not true. Domestic wells having detections greater than 3.1 ppb Cr6 or 3.2 ppb CrT are above the maximum background levels for the Hinkley Valley adopted by the Water Board in 2008. The Water Board determined these wells contain waste from PG&E's past chromium release to groundwater.
2. The description of the lower aquifer on Page 5 is misleading where it states that the lower aquifer consists of weathered bedrock and ranges in thickness from a few feet to 20 feet. While weathered bedrock may be present in the lower aquifer at some locations, such as next to shallow bedrock features, other locations show the lower aquifer consisting of condensed layers of sand and finer-grained sediments. The lower aquifer has also been reported to the Water Board as being up to 60 feet in thickness beneath the Compressor Station. In general, the lower aquifer is thicker closer to the Mojave River and along the valley leading to the Hinkley Gap.
3. The description of uranium data on Page 9 as being limited is incomplete. Rather, this section should state what is *known* of uranium data in the Hinkley Valley rather than just what is unknown. For instance, PG&E has collected uranium information in the vicinity of the Ranch and Gorman field land treatment units and this report needs to share this information.
4. The statement on Page 10 that there are no community wells in the Hinkley area is misleading. The state Department of Public Health reports that the following are considered public water systems in Hinkley and subject to regulation: Hinkley Elementary School, Senior Center, and the Compressor Station.
5. Section 3.5 outlines community engagement process, by stating, "Community acceptance . . . will be evaluated . . . over the next several months." The Prosecution Team recommends:
  - a. Details and deadlines for start and conclusion of public process for input should be provided. Focus on determining acceptable whole-house water alternatives for the owners of 17 wells above 3.1 ppb by June 1, then the focus should be on the other wells with detectable chromium levels.

- b. Timeframe needs to be shorter and more details included about the community engagement process
  - c. PGE needs to articulate how individual well owner concerns will be addressed by the community engagement process.
6. The indication in the report that high levels of nitrates and TDS in Hinkley groundwater are omnipresent is misleading. PG&E's past reporting of nitrate and TDS data to the Water Board shows that only limited areas are subject to nitrate and TDS pollution. For example, areas downgradient (i.e., north) of the Ranch Land Treatment Unit and Desert View Dairy to Salinas Road are reported to have high levels of nitrate and TDS in groundwater. Also groundwater downgradient of the Heifer Ranch shows high levels of nitrate and TDS.
7. For Table 4, it needs to be clarified why bicarbonate is shown as poor water quality at 100 ppm CaCO<sub>3</sub>, but average has 260 ppm and good has 70 ppm. Are the poor and average numbers switched?
8. Disagree with the assumptions shown in Table 4 on Page 49 for the "Poor" water designation. The designation of "Poor" water quality should be based on exceedances of drinking water standards and not statistics of constituent numbers for Hinkley wells. For instance, "Poor" water should be defined as being >10 ppm nitrate as nitrogen and >1,000 ppm for TDS.
9. Disagree with the assumptions shown in Table 4 on Page 49 for "Average" designation. The designation of "Average" water quality should be based either on the drinking water standards or the majority of wells in Hinkley. For instance, since a majority of domestic wells have TDS levels of less than 1,000 ppm, "Average" water should be defined as being <1,000 ppm for TDS instead of >1,000 ppm.
10. Table 5 on Page 50 is not clear in meaning of the numbers listed in the column for Alternative 4c. The table shows that 272 gallons per day (gpd) of brine would be generated. Is this number based upon the 9 gallons passing through the under sink RO each day or another number? Also, the column for Alternative 4c is missing the number "2" as a footnote.
11. Table 5 and the follow up discussions do not emphasize that the RO brine generated from Alternative 4c represents *one* under sink RO system. Since it was stated earlier in the report that residents will have the option of having RO systems in each bathroom as well as in the kitchen, this would increase the amount brine generated and sent to septic systems. For example, if a resident elected to have RO systems added to two bathrooms, the amount of brine generated would be three times 272 gpd, for a total amount of 831 gpd. We recommend that the amount of brine generated be shown in a table for one and more RO under sink systems.

12. The disposal of RO brine and IX process water generated from Alternatives 4a and 4c does not describe the potential effects to water quality in groundwater beneath or adjacent to disposal locations at residences initially and over time. Such information is necessary to assess the potential long-term impacts to water quality from such disposal and the potential for domestic wells to pull in groundwater containing brine and process water in the future.
13. While the report states that pilot test water from Gorman well GR-1 reflects the worse-case scenario for detected constituents, other conclusions in the report do not make the same statement when it should. For instance, on Page 55, the report discusses and provides numbers for brine generation and removal from the various alternatives but does not state that they reflect the worse-case scenario and apply to only a limited number of domestic wells. Current data shows that only about 5 domestic wells would qualify as having high levels of nitrate and TDS, or about one-fifth of the total 25 wells assumed in the report. This leads to an exaggeration of the numbers of truck trips of 2,000 per month created to remove brine produced from Alternative 4b when it may be more like 400.
14. The deeper well alternative states on Page 56 that well construction will need to adhere to standards established by the State Water Resources Control Board...” Actually, the California Well Standards are regulated by the Department of Water Resources as Title 22, California Code of Regulations.
15. The wording in Table 6 on Page 73 should be changed for realistic conditions. For instance, since the information in the row “Quality of water” incorrectly states that “Primary and secondary drinking water standards do not apply.” Rather the standards do apply as per directive 2.c. in the Amended CAO which states, “Permanent replacement water must meet all California primary and secondary drinking water standards...”
16. The wording in Table 6 on Page 73 should be changed for realistic conditions. For example, since the information in the row “By-products and waste” reflects the worse-case scenario, the word “would” in the sentence “Would create a large brine stream...” should be changed to “could.”
17. Cost estimates in Table 6 are misleading for Alternative 4b. The table shows a cost estimate of \$19.4 million for 5 years and \$106.6 million for 30 years based on the worse-case scenario of water quality for all 25 replacement wells. Yet, as previously discussed, this scenario does not exist in reality. Only about one-fifth of the total residential domestic wells or 5 have water that would be considered to be “poor” quality. Thus, the estimated costs to treat, store, transport, and dispose of brine waste water would be far less than assumed in this table.

18. The report states that under sink RO treated water is not conveyed through household plumbing and thus has a minimal risk for corrosion. It should be clarified that treated RO water goes through plumbing and taps at the sink, so some corrosion could occur.
19. Besides Alternative 4c (ion exchange [IX] treatment with under sink reverse osmosis treatment [RO]) and Alternative 5 (deeper well), Board staff believes that PG&E needs to also offer Alternative 4a (IX treatment) as an option to those residents with affected domestic wells having low levels of nitrate and TDS and not wanting under sink RO systems.
20. Board staff believes that Alternative 4b (whole-house RO with off-site disposal) also needs to be offered as an option to those few residences with affected domestic wells having high levels of nitrate and TDS and not wanting under sink RO systems with discharges of brine water to septic systems. Offering Alternative 4b is reasonable considering that most areas in Hinkley having high levels of nitrate and TDS are downgradient of properties owned by PG&E, including the former Ranch Land Treatment Unit and the Desert View Dairy. It is also reasonable to offer this alternative to those residents not willing to have IX treatment flushes containing formaldehyde, acetaldehyde, cyclohexanone, and other constituents disposed to septic systems, as may occur with Alternative 4c.
21. For the same reason that PG&E has listed domestic wells 33-11 and 34-16 on Hinkley Road to receive replacement water, well 34-65 on Community Boulevard needs to be added since monitoring report shows hexavalent or total chromium levels as being greater than background concentrations for three continuous quarters.
22. Appropriate disinfection alternatives, instead of just chlorine, should be offered in each alternative for residents to select their preferred disinfection option or none at all.

Pilot Test Report (Appendix B):

1. Please explain what product water and feed water are.
2. What is RO permeate?
3. Table A in Appendix A incorrectly lists the drinking water standard for uranium as being 10 pCi/L when it is 20 pCi/L.
4. Table 17 (Overview of Technologies) on Page 81 is missing from the Pilot Test Report in Appendix A.