Sheryl Bilbrey
Director
Chromium Remediation

77 Beale Street, MC B28P
San Francisco, CA 95104

Phone: (415) 973-8843
Mobile: (925) 551-1182
Fax: (415) 973-9052
S4BD@pge.com

August 9, 2012

Ms. Lauri Kemper
California Regional Water Quality Control Board, Lahontan Region
2501 Lake Tahoe Blvd
South Lake Tahoe, CA 96150

Subject: Pacific Gas and Electric Company comments on the July 25, 2012 Draft Cleanup and Abatement Order

Dear Ms. Kemper,

Thank you for the opportunity to comment on the July 25, 2012 Draft Cleanup and Abatement Order (CAO). As described below, PG&E believes the draft CAO has significant technical challenges and will not produce scientifically valid data. We urge the Regional Board to reconsider the draft CAO in favor of finalizing the remedial action plan and conducting a peer-review of PG&E's updated background study work plan.

In May of last year, PG&E committed to doing a better job working with and listening to the Hinkley community. Since then, we have been working with the Community Advisory Committee, the Independent Review Panel (IRP) Manager and listening carefully to Hinkley residents' concerns regarding chromium 6 in well water. We value the feedback we've received and have taken it to heart. Earlier this year, we responded with a comprehensive and voluntary whole house replacement water program that offers every resident who lives within one mile of the plume and has *any* detection of chromium 6 in their well a choice to either receive replacement water or have their property purchased. This program includes properties upgradient and cross-gradient of the plume and far exceeds what was contemplated in the CAO issued last October.

In addition to the replacement water program, PG&E continues to actively and aggressively remediate the groundwater plume. For example, PG&E is rapidly expanding in-situ groundwater remediation in the source area and central plume area. So far this year, over 20 remediation wells were added for treatment of the plume core as we expand the In-situ Remediation Zone (IRZ) treatment systems. These and other ongoing efforts have reduced hexavalent chromium concentrations across 54 acres of the plume core from over 1,000 ppb (parts per billion) to less than 3.1 ppb. Meanwhile, 27,000 gallons of groundwater are treated each day as it flows through the Central Area IRZ.

To the north, where concentrations are much lower, PG&E is focused on enhanced plume containment and extraction through farming of multiple agricultural fields. For example, in 2010, PG&E began to expand agricultural operations, increasing extraction capacity from 167 million gallons per year in June 2009 to 531 million gallons per year in June 2012. Aggressive

containment continues, with more than 162 million gallons of groundwater extracted and treated during the most recent quarter. This targeted containment pumping has resulted in plume capture at Thompson Road as documented in the recent report submittals to the Regional Board (CH2M Hill and ARCADIS 2012a-e1).

PG&E continues to focus on plume definition and already has committed to installing additional monitoring wells as outlined in the July 9, 2012 work plan submitted to the Regional Board. In response to peer-review comments on PG&E's 2007 background study, PG&E also submitted a revised background study work plan in February 2012. We understand that this work plan is being reviewed by Regional Board staff and outside technical experts. We look forward to future direction by the Regional Board to implement a peer reviewed work plan to develop a revised background determination.

As these actions demonstrate, PG&E is committed to the best science, engineering and remedial design for the Hinkley Groundwater Remediation Program. We have welcomed and incorporated Regional Board and third-party review and recommendations into our programs and practices. We understand that the Regional Board will be issuing a CAO sometime early in 2013 that will include the final cleanup standards for chromium 6 and remediation timeframes based on the alternatives analyzed in the EIR. As outlined in our attached comments, PG&E does not believe the July 25, 2012 draft CAO will result in any scientifically valid data that could either inform the final remedial design or be used to better understand the levels of naturally occurring chromium 6 in Hinkley. Given that PG&E's replacement water program has eliminated any potential health concerns while the clean-up is in progress, PG&E urges the Regional Board reconsider the draft CAO and remain focused on the final remedy and updated background study.

We welcome the opportunity to discuss this with you further. If you have any questions regarding these comments, please contact me at (925) 551-1182.

Sincerely,

Sheryl Bilbrey
Director, Chromium Remediation

Attachment

Cc: Ian Webster, IPR Manager

---

[1] CH2M Hill and ARCADIS 2012a. *March 2012 Hydraulic Capture Monitoring Report, Hinkley, California.* April 13.
CH2M Hill and ARCADIS 2012b. *April 2012 Hydraulic Capture Monitoring Report, Hinkley, California.* May 15.
CH2M Hill and ARCADIS 2012c. *Response to Investigative Order No. R6V-2012-0035, Hinkley California.* June 7.
CH2M Hill and ARCADIS 2012d. *May 2012 Hydraulic Capture Monitoring Report, Hinkley, California.* June 15.
CH2M Hill and ARCADIS 2012e. *June 2012 Hydraulic Capture Monitoring Report, Hinkley, California.* July 12.

Attachment 1
August 9, 2012
PG&E's Specific Comments on the July 25, 2012 Draft CAO

The Draft CAO is Unsupported, Impracticable and Would Not Produce Scientifically Valid Data

1. **There is no Scientific Basis for the Proposed 2 ppb Chromium (Both Hexavalent and Total) Threshold in the Draft CAO**

The proposed 2 ppb chromium threshold for requiring monitoring wells is unsupported by the record. The draft CAO would require monitoring wells in areas unimpacted by PG&E's plume and with concentrations of chromium below background. There is no evidence linking PG&E's discharge to chromium at concentrations of 2.0 ppb. The Regional Board has adopted maximum background concentrations for total and hexavalent chromium as 3.2 and 3.1 ppb, respectively. (Draft CAO, Finding 5.)[1] There are 135 domestic wells in Hinkley that contain either hexavalent chromium or total chromium levels at or above 2.0 ppb. The draft CAO states: "It is anticipated that the Discharger will use monitoring well pairs and triplets and associated infrastructure to sample and monitor for the existence of chromium in groundwater. (Draft CAO, Finding 9.) Well "pairs" require the installation of two wells and well "triplets" require the installation of three wells.[2] As a result, the draft CAO would require installation of 270 to 405 new monitoring wells in areas not linked to PG&E's discharge.[3]

Finding 10 in the draft CAO asserts that "domestic wells containing chromium concentrations at 2.0 ppb or greater, . . . may be indicative of diluted plume concentrations at greater levels." There is no scientific or technical evidence in the record to support this statement.

This provision of the draft CAO also is contrary to the record concerning chromium levels in Hinkley that are unrelated to PG&E activities. For example, the Regional Board staff has concurred with PG&E's conclusion that the hexavalent chromium concentrations detected in well 34-65, which are above the adopted maximum background of 3.1 ppb, are not the result of PG&E's historical discharge. (Regional Board Handout at Community Advisory Committee meeting, September 27, 2011.) Nor does the draft Order account for site-specific and regional data demonstrating that chromium unrelated to PG&E activities is present in the Hinkley and other areas in the Mohave Desert at concentrations higher than even the adopted background

[1] As noted in the cover letter, PG&E has submitted an updated background study work plan in response to the Regional Board's peer review of the 2007 Background Report. PG&E looks forward to implementing its new background study work plan once it is approved by the Regional Board, to determine an accurate background level for the Hinkley Valley using a methodology that is supported by all peer reviewers. In the interim, Regional Board staff has agreed that the established background numbers should be utilized. (See, June 2012 Regional Board Staff Report: "Statistical Analysis of Background Chromium Groundwater Subset Data from Pacific Gas & Electric Company's 2007 Groundwater Chromium Background Study.")

[2] The draft CAO language anticipating the use of well pairs or triplets also ignores the fact that the aquifer does not have sufficient thickness at every location to accommodate well pairs or triplets.

[3] These new wells would have their own impacts: environmental, aesthetic, or otherwise.

levels of 3.1 ppb of hexavalent chromium and 3.2 ppb of total chromium.[4] All of these factors contradict the Finding 10 in the draft CAO and all of these factors will be considered in the updated background study.

2. The Draft CAO Requirement to Replicate Domestic Well Chromium Concentrations Using Monitoring Wells Is Impracticable and Unsupported by the Record

The draft CAO requires that all monitoring wells "replicate chromium concentrations in nearby domestic wells to greater than detected values or no more than 0.5 ppb less than detected values." (Draft CAO Order, Section I.) As described more fully below, there is no scientific basis to compare sampling results from domestic wells and monitoring wells.

First, monitoring wells and domestic wells utilize very different well screen lengths. The Regional Board staff requires PG&E to install monitoring wells using 10-15 foot well screens. (Sept. 22, 2010 Regional Board E-mail to PG&E.) The 10-15 foot well screens are intended to measure hexavalent chromium concentrations in a very specific depth of the aquifer. However, domestic wells in Hinkley are designed to pull as much water as possible and typically utilize well screens across the entire water bearing zone which is always greater than 10-15 feet and commonly up to one hundred feet of well screen or more. Thus, the wells pull water from different parts of the aquifer which means that the type of data derived from each is necessarily different.

Second, the domestic wells in Hinkley are constructed of different materials than monitoring wells. Domestic wells in Hinkley, some of which are more than 50 years old, were commonly constructed with steel casings with 100-foot or more well slots that were made in the field and sometimes without a filter pack between the casing and borehole wall. Monitoring wells at PG&E's Hinkley site are constructed using PVC casings with factory milled 10-15 foot screens and a filter pack that was chosen to correspond to the geology surrounding the well. Thus the data from each is necessarily different.

Third, domestic wells often utilize pumps and other materials containing stainless steel which contains hexavalent chromium and can contribute to hexavalent chromium levels in water pumped by the well. In addition, the well installation details and history for domestic wells are often unavailable.

[4] Research by the USGS since the original background study (Izbicki, 2008) has identified other sources of man-made "background" chromium in the Mohave Desert environment. The mechanism described by Izbicki relates to infiltration from agricultural operations, and results in elevated levels of hexavalent chromium (over 10 ug/L) in the upper layers of the aquifer, with lower and often non-detectable levels deeper in the groundwater aquifer. This pattern is seen in many parts of the Hinkley site which have had historical agricultural operations unrelated to PG&E. If this mechanism is at work in the Hinkley Valley, it is critical to understand the mechanism and its influence.

These significant differences in purpose and construction make comparison of the results inappropriate and not technically sound. In essence, the draft CAO requires an "apples to oranges" comparison that would not yield meaningful, scientifically valid data. Even if a monitoring well with a 10-15 foot well screen could replicate a domestic well with one hundred feet of well screen constructed of different materials, the results would not be informative.

Finally, the non-PG&E hexavalent chromium concentrations in Hinkley make clear that the requirement to replicate domestic well results with "nearby" monitoring wells is not supported. Naturally occurring hexavalent chromium levels can vary considerably within a short distance and can vary across different depths within the same monitoring well. Even if the two wells were of the same screen length and construction materials, it would make little sense to attempt to replicate hexavalent chromium concentrations that can naturally vary.

3. The Draft CAO's Directive to Delineate the Plume using Domestic Well Data Would Result in An Artificially Expanded Plume Without A Scientific or Factual Basis

The draft CAO would require PG&E to draw the chromium plume boundary around domestic wells that are above 3.1 ppb of hexavalent chromium or 3.2 ppb of total chromium, if PG&E is unable to access nearby property to install monitoring wells within six months or if PG&E's monitoring wells are unable to replicate the chromium concentrations in the domestic well. (Draft CAO Order, Section I.2.d.i.&ii.)

First, there is no scientific or factual basis to define the plume boundary based on domestic well results. The Regional Board has correctly required PG&E to utilize monitoring wells as the basis for plume boundaries based on their careful design and installation. The proposed requirement to use data from domestic wells ignores the significant differences between domestic wells and monitoring wells and the less reliable domestic well testing results. Moreover, this requirement would result in a plume map based on two different types of wells—domestic and monitoring—without consideration of their differences. It is technically inappropriate to draw plume contours that ignore differences in well construction. In some cases, such depictions could be contrary to the groundwater flow direction, resulting in serious errors in the understanding of site conditions.

In addition, the draft CAO's directive to depict the plume in areas where property is inaccessible[5] or monitoring data cannot replicate chromium concentrations in nearby domestic wells would result in an artificial expansion of the plume boundary. For example, while PG&E is diligently seeking federal and state permits to install monitoring wells within endangered species habitat, we are legally prohibited from installing wells until the permits are received. Similarly, there is no basis for ordering PG&E to assume the plume has expanded to areas where residents have refused to grant access to install a monitoring well.

[5] For example, as a result of endangered species act issues or inability to secure owner approval.

Basing the plume boundary on these arbitrary and artificial requirements also ignores important factors such as technical judgment, site-specific conditions, and groundwater flow. Plume delineation using such a method would be technically unsound.[6]

Finally, the requirement to draw the plume around domestic wells with chromium concentrations above 3.1 ppb would drastically expand the apparent size of the plume by including multiple areas where monitoring and domestic wells are either non-detect for chromium or contain chromium levels below background levels. There is no scientific or legal basis for this requirement.

4. The Draft CAO Would Improperly Require the Installation of Monitoring Wells Upgradient of the Plume

The draft CAO specifically requires the installation of new monitoring wells southeast of the plume boundary in the upgradient direction. (Draft CAO Order, Section 1.A.) It also requires monitoring wells at the location of all domestic wells that contain chromium at or above 2.0 ppb. There are at least 25 domestic wells upgradient of the plume that contain chromium levels at or above 2.0 ppb. There is no justification for these requirements. By definition, wells upgradient of the plume are not impacted by the plume and there is no evidence that PG&E bears any responsibility for any hexavalent chromium detected in those wells.

One example of this problem is upgradient well 34-65. Regional Board staff has concurred with PG&E's conclusion that the chromium detected in this well did not result from PG&E's historic operations. (Regional Board Handout at Community Advisory Committee meeting, September 27, 2011.) Nevertheless, the draft CAO would require PG&E to install monitoring wells near well 34-65. There is no justification for such a requirement.

5. The Draft CAO Imposes Impracticable Deadlines

The draft CAO requires submission of documents and data on an impracticable timeline. It requires PG&E to submit a work plan within 21 days of the date a final order is issued by the Regional Board. In addition, this required work plan must include an assurance that there is a reasonable probability of success in gaining access and a likelihood of well installation at each location. Yet if the Order was issued as drafted, PG&E would be required to install up to 405 monitoring wells at 135 locations. While PG&E could draft a work plan to include installation of

[6] The same problem arises with the draft CAO's requirement that PG&E draw the plume boundary to connect "any monitoring well located within 2,000 ft of any other monitoring well having chromium concentrations of 3.1 ppb Cr(VI) or 3.2 ppb Cr(T) or greater." (Draft CAO Order, Section 2.d.) Before using well data to define the plume boundary, staff should consider the location, data, and information specific to that well, rather than assume that every well containing hexavalent chromium is part of the same plume and drawing the plume boundaries accordingly. The requirement to draw the plume to connect monitoring wells that are 2,000 feet apart lacks technical support. Arbitrarily following this requirement would will likely lead to misunderstandings of the actual distribution of chromium in groundwater.

this number of wells, the accelerated timeframe would not allow PG&E time to engage property owners and verify viability of monitoring well locations within 21 days, as required.

Even more difficult is the requirement that PG&E submit a report "discussing the investigation results to define the plume" by September 30, 2012. Again, installation, development, sampling, and reporting for up to 405 wells—and no later than September 30, 2012—is impracticable to meet given field and analytical time frames. If the CAO were issued on August 10, 2012 (the date comments are due), PG&E's work plan would be due Aug. 31, 2012. PG&E would then have 30 days to install, sample and report on up to 405 wells, an impossible task.

6. The Draft CAO Recites Incorrect and Obsolete Regulatory History

Finding 3 of the draft CAO describes the provisions of paragraph 3 in the August 6, 2008 CAO pertaining to plume containment. However, the provisions of paragraph 3 from the 2008 CAO were removed and replaced with new containment requirements in the 2012 amendment to the 2008 CAO. (Amended CAO R6V-2008-0002A3.) This does not acknowledge significant changes made to the 2008 CAO and does not provide an accurate description of the regulatory history. The correct regulatory history demonstrates that PG&E has been responsive to regulatory requirements for plume containment and definition.

The Draft CAO Exceeds the Regional Board's Legal Authority

In addition to the technical challenges described above, the draft CAO exceeds the Regional Board's legal authority and would be an abuse of discretion per Code of Civ. Proc., § 1094.5, subd. (b); Wat. Code, §§ 13320, subd. (a) & 13330. "Abuse of discretion is established if the respondent has not proceeded in the manner required by law, the order or decision is not supported by the findings, or the findings are not supported by the evidence." (Code of Civ. Proc., § 1094.5, subd. (b).) Thus, a regional board's actions must fall within its legal authority, have strong support in the evidence, and be further supported by findings which bridge the logical gap between the evidence and action. For the reasons described in the comments above, the draft CAO does not meet these requirements:

- The draft CAO exceeds the Regional Board's authority by ordering PG&E to investigate areas that are not linked to PG&E's discharge. State Water Resources Control Board Resolution No. 92-49 authorizes regional boards to require investigation and cleanup and abatement for any location "affected by the discharge or threatened discharge." (Resolution No. 92-49, section II.A.3.) This presupposes that the investigation and cleanup and abatement are linked to that discharger's activities. Yet, the draft amended CAO does not link the required monitoring activities to PG&E's discharge. This lack of nexus between the Cr6 levels and any activity by PG&E undermines the amended CAO. An administrative agency's findings must be sufficient to allow parties to determine the basis for the agency's action. (*Topanga Assn. for a Scenic Community v. County of Los Angeles* (1974) 11 Cal.3d 506, 514.) The findings must form an analytic bridge between the evidence and the agency's conclusion. (*Id*. at p. 515.) Yet, at this time, the Regional

Board's draft CAO lacks any findings to justify the expansive monitoring and other requirements.

- The draft CAO exceeds the Regional Board's authority by ordering PG&E to investigate areas where chromium levels are below natural background conditions. Water Code section 13304 requires cleanup of all waste discharged and restoration of affected water to background conditions. (Resolution No. 92-49, finding 4.) "[U]nder no circumstances shall these provisions be interpreted to require cleanup and abatement which achieves water quality conditions that are better than background conditions[.]" (Resolution No. 92-49, section III.F.1.) Regional boards shall "ensure that dischargers are required to clean up and abate the effects of discharges in a manner that promotes attainment of either background water quality, or the best water quality which is reasonable if background levels of water quality cannot be restored[.]" (Resolution No. 92-49, section III.G.) Yet, the draft CAO would require that PG&E investigate areas that contain chromium levels below background.

- The draft CAO exceeds the Regional Board's authority by setting very specific means to achieve plume definition. The Regional Board exceeds its statutory authority by specifying the means for PG&E to comply with any need for further plume definition. (See Wat. Code, § 13360.)

> No waste discharge requirement or other order of a regional board . . . shall specify the design, location, type of construction, or particular manner in which compliance may be had with that requirement, order, or decree, and the person so ordered shall be permitted to comply with the order in any lawful manner.

(Wat. Code, § 13360, subd. (a).) "That is to say, the Water Board may identify the disease and command that it be cured but not dictate the cure." (*Tahoe-Sierra Pres. Council v. State Water Res. Control Bd.* (1989) 210 Cal.App.3d 1421, 1438.) The draft CAO does exactly what Water Code section 13360 forbids: specify the design, location, and manner of monitoring through which PG&E "must achieve" plume definition. (See Draft CAO Order, Section I; see also Wat. Code, § 13360, subd. (a).)

As set forth above, the draft CAO contains errors that render it unsupportable, both legally and technically. If despite the comments, the Regional Board chooses to issue the draft CAO, the key provisions that are beyond the Regional Board's authority must be modified or eliminated altogether.[7] Despite this, PG&E offers the following changes that need to be made at a minimum should the Regional Board choose to move forward with the draft CAO:

[7] Pursuant to administrative mandamus, the applicable standard for judicial review of the Regional Board's action, such as the issuance of the proposed CAO, is "arbitrary and capricious." For the reasons set forth above, the issuance of the draft CAO would not meet this standard and therefore should not be issued as drafted.

- Delete the requirement to install monitoring wells at each domestic well containing concentrations of 2 ppb or above.
- Delete the requirement to replicate domestic well concentrations in monitoring wells.
- Delete the requirement to use domestic well data for plume definition.
- Delete the requirement to install upgradient monitoring wells.
- Modify the deadlines.
- Add an accurate recitation of regulatory history.

Conclusion

PG&E has demonstrated a commitment to install additional monitoring wells as expeditiously as possible to determine the extent of contamination in the Hinkley Valley. PG&E also has pledged to implement its voluntary whole house water program, which offers replacement water to anyone within one mile of the current plume who has even the slightest detectable levels of chromium in their domestic wells. Given these actions and the scientific, technical and legal challenges associated with the draft CAO, PG&E urges the Regional Board to reconsider issuance and remain focused on finalizing the remedial action plan and moving forward with the updated background study.