

June 19, 2015

Patty Z. Kouyoumdjian
Executive Officer
California Regional Water Quality Control Board, Lahontan Region
2501 Lake Tahoe Boulevard
South Lake Tahoe, California 96150

RE: IRP Manager's Formal Comments and Suggestions Regarding the Six Key Topics from the California Regional Water Quality Control Board Lahontan Region Workshop on May 28.

Dear Patty:

The Hinkley Community Chromium-6 Groundwater Remediation Project's "Independent Review Panel (IRP) Manager" appreciates the opportunity to provide feedback to the California Regional Water Quality Control Board Lahontan Region (Water Board) regarding the six key policy issues that were discussed at the Water Board May 28 Workshop¹.

The purpose of the much discussed six key policy issues was to obtain feedback and help stakeholders (Hinkley Community, Water Board, PG&E and the IRP Manager) reach consensus on the Proposed Cleanup and Abatement Order² that will establish the remediation-path-forward on how the Hinkley Groundwater Remediation Program will be managed in the next several years. The workshop generated productive discussions between stakeholders and opinions were formulated on possible modifications and improvements that could still be incorporated into the Proposed CAO.

Equally importantly, the IRP Manager would like to acknowledge the Water Board's efforts in organizing the Workshop. The Workshop was a resounding success. It allowed for insightful discussions regarding concerns, and helped identify areas of agreement between stakeholders.

¹ Lahontan Regional Water Quality Control Board, Public Workshop, *Facilitated discussion on six main policy issues to help parties reach consensus on a draft order requiring Pacific Gas & Electric to cleanup and abatement its discharges of chromium to groundwater in the Hinkley area*, May 28, 201, Hampton Inn & Suites, Barstow, CA.

² California Regional Water Quality Control Board Lahontan Region. 2015. *Cleanup and Abatement Order [Proposed] No.R6V-2015-Prop, WDID No.6B369107001*. January 21.

In follow up, this summary letter presents the IRP Manager's final comments and suggestions regarding the six (6) key topics that were discussed at the Water Board's May 28, 2015 Workshop.

1. Prescriptive versus Performance Based Requirements

Should the CAO be prescriptive in setting our requirements, rely on performance based requirements; combine both types of requirements, or transition from one to the other?

The IRP Manager suggests that the Proposed CAO **should include a combination** of both prescriptive and performance based requirements, and trend towards favoring performance based requirements in the long term. Performance based requirements should recognize, and where possible, **embrace an Adaptive Management philosophy** to ensure that the Final Remedy is protective of human health and the environment.

For example, prescriptive items could include:

- Requirements of how the Cr-6 plume is contoured (e.g. minimum distance to connect monitoring wells above specific target numbers).
- Defining how hydraulic control is measured south of Thompson Road could also be part of the prescriptive program by identifying monitoring wells or piezometers that would be used to measure hydraulic control.
- Defining the hydraulic control capture metrics and identified well pairs and well triplets to ensure hydraulic control continues south of Thompson Road.
- The whole house water replacement program should also be a prescriptive component of the CAO. For example, defining the eligible area for the replacement water recipients, criteria to become eligible to receive a treatment system, and what type of treatment system could be offered to eligible recipients.

Performance based requirements of the CAO could include:

- The Monitoring and Reporting Program (MRP). Monitoring wells that show statistical increases above background levels should be monitoring more frequently than monitoring wells that show decreasing trends below background levels.
- The MRP could be based on monitoring data results to ensure human health and the environment is protected. Further details are provided in Key Policy Issue 5.

- Remediation cleanup goals, and time targets, should also be performance based to ensure that the cleanup goals are practically achievable. At present the goals and time targets are based on a computer model which estimates the time required to remediate Cr6 at specific field conditions. This topic is further discussed in Key Policy Issue 3. **Figure 1** summarizes our suggestions for Key Policy Issue 1.

2. Northern and Western Areas and The USGS Background Study

What should the CAO require of PG&E in the interim period while the USGS background study is being completed?

Figure 2 provides the IRP Manager's suggestions to Key Policy Item #2. As the Background Study (BGS) progresses and generates more data in the Western and Northern Areas, more information will become available to make better decisions.

The IRP Manager suggests that any relevant, and applicable, interim results from the BGS should be incorporated into the MRP that guides the monitoring requirements for these two regions. Using Adaptive Management Principles with data generated from the BGS will ensure that there is sufficient flexibility for the MRP, in the Northern and Western Areas, to define the Cr-6 plume and, overall, protect human health and the environment.

We suggest that until any relevant data is generated in these two areas that the Northern and Western Areas are monitored in accordance with the MRP (that will be approved as part of the CAO).

We also suggest adopting a Monitored Natural Attenuation (MNA) philosophy for data review until the BGS is completed, or there is enough data generated from the BGS to make decisions. However, if any major anomalies occur in these two areas, they should be discussed, and the action items addressed within the Technical Working Group (TWG).

3. Specific Deadlines versus Remediation Goals with Adaptive Management

Should the CAO establish remediation goals that allow for an adaptive management strategy or specific remediation deadlines? Or should deadlines be set, but used mainly to confirm the performance of the adaptive management?

As we suggested in Key Policy Issue 1, the IRP Manager recommends the use of remediation goals with adaptive management over specific deadlines. The use of remediation goals with an adaptive management approach is the optimum solution, in our opinion, to strive to reach remediation goals with changing field conditions. Our recommendations for remediation goals with

an adaptive management approach were submitted to the Water Board on March 13, 2015³, and are presented in **Figure 3**.

PG&E submitted a remedial timeframe assessment report to the Water Board on June 30, 2014⁴. The objective of this report was to estimate realistic ranges of remedial timeframes, and to present information on the certainty of timeframe estimates, so as to guide cleanup goals.

Adaptive Management principles should be used to obtain realistic remediation timeframes by running the PG&E computer model when major field changes occur. This will help ensure that the timeframes are representative of actual field conditions.

PG&E's computer model used in the remedial timeframe assessment is based on many assumptions, and uses current field conditions or boundary conditions. Boundary conditions are input conditions that a computer model requires to estimate future field conditions and cleanup times.

Boundary conditions consist, for example, of the pumping information, the amount of ethanol used at the *In-Situ* Reactive Zones (IRZs), the location of wells, Agricultural Treatment Units (ATUs) acreage, areas of interest, and porosity and hydraulic conductivity. If any field conditions change in the future, such as adding or removing ATUs, modifications to the IRZ and modifications to groundwater pumping program, then the remedial timeframes will not be representative of future conditions and should be only very carefully used for decision-making purposes, realizing these limitations.

For this reason the IRP Manager recommends using remediation goals with adaptive management to ensure remedial goals are feasible and achievable.

4. Replacement Water Requirements

Within the Cr6 MCL set, should the historical one-mile buffer zone be retained, modified, deleted, or replaced with a transition plan to move from the historical one-mile buffer to something else?

The replacement water program has always been a key issue to the Hinkley Community. PG&E has provided replacement water to the Community until the replacement water program was discontinued in October, 2014. The IRP Manager understands that the Water Board can only require PG&E to supply replacement water to residents that are at, or above, the Cr6 MCL as

³ IRP Manager. 2015. *IRP Manager (and Selected CAC Comments) Regarding the California Regional Water Quality Control Board Lahontan Region Cleanup and Abatement Order (CAO) No.R6V-2015-Prop, Issued on January 21, 2015*. March 13.

⁴ Arcadis. 2014. *Remedial Timeframe Assessment, PG&E Hinkley Compressor Station, Hinkley, Ca*. June 30.

discussed in the Olin Order⁵. The IRP Manager would suggest receiving further input from the "Community" regarding the one mile buffer zone. Some Community members we have talked to, prefer to keep the one mile buffer while others prefer to remove it, thereby removing the stigma that Hinkley is not a safe place to live. Some Community members also would like to remove the words "affected area" from the language of the Proposed CAO since it paints Hinkley in a negative light.

Figure 4 provides our suggestions to Key Policy 4.

5. Monitoring and Reporting Program

Should the monitoring and report program be prescriptive, performance-based, a hybrid of prescription/performance, or transition to a different approach?

The IRP Manager is in favor of a MRP that is a hybrid of prescription/performance, but in the long-term transitions more towards a performance based MRP.

Figure 5 provides the IRP Manager's input on Key Policy Issue 5. Further detail on the IRP Manager's recommendations are outlined in the March 13, 2015 letter regarding the Proposed CAO.

Initially, the MRP should have a prescriptive component, such as the sampling frequency at each multi-level monitoring well. It should be based on the performance of historical Cr6 concentrations at specific monitoring wells.

Monitoring wells in a cluster which show the highest Cr6 concentrations should be monitored more frequently than monitoring wells with the lowest Cr6 concentrations. Criteria should be established and agreed upon with key stakeholders on a decision-tree approach to right size the monitoring program on an annual or biannual basis. The MRP should be evaluated every one or two years to determine if increasing or decreasing the sampling frequency at a monitoring well is required.

Statistical analysis of Cr6 at monitoring wells should be performed to determine the sampling frequency for specific wells if the sampling frequency is required to be increased or decreased. Monitoring wells that show an increasing trend, and are above the background number, should be sampled more frequently than monitoring wells that are exhibiting a decreasing trend and are below the background number.

6. Community Involvement

⁵State Water Board Quality Order 2005-2007 states that the discharger is required to provide replacement water only when state or federal standards are exceeded.

What is the best structure to engage with and involve the community members in the CAO implementation? What are the community's biggest concerns with the implementation of the CAO, and how best do we address those concerns?

The IRP Manager submitted comments to the Water Board in a formal letter dated on May 21, 2015 regarding Key Policy Issue 6. **Figure 6** provides details on some of the tools the IRP Manager plans to use to increase the Community involvement and manage improved engagement on technical matters. One of the key components, moving forward, is the IRP Manager's staff becoming more involved in "above ground topics" to ensure that interested Community members have a voice and place to turn to when they have questions.

Appendix A provides a redline version of the IRP Manager's suggestions regarding the IRP Manager's Scope of Work (SOW) from the Proposed CAO No.R6-2015-Prop.

"Above ground issues" have always been important to the Hinkley Community and the IRP Manager is addressing those concerns with these suggested changes to the IRP Manager SOW. For example, Caltrans is working on the realignment of Hwy-58. How this might impact the current remediation program is a topic Community members are interested in. The IRP Manager's SOW should reflect these key changes to ensure Community members are up to date with this key technical information.

Once again, the IRP Manager appreciates the lengths the Water Board has gone to, providing many forums to learn about the Proposed CAO and the remediation blue print it delivers to the Hinkley Community for possibly decades in the future. Should you have any questions or comments, please feel free to contact either of the undersigned via email or phone:

Dr. Raudel Sanchez: rsanchez@projectnavigator.com, 714-388-1821.

Dr. Ian A. Webster: iwebster@projectnavigator.com, 714-863-0483.

Sincerely yours,



Raudel Sanchez, Ph.D.
Project Manager



Ian A. Webster, Sc.D.
Hinkley IRP Manager

Attachments

Figure 1: Key Policy Issue 1: Prescriptive vs. Performance Based Requirements

Figure 2: Key Policy Issue 2: Northern and Western Areas, and USGS Background Study

Figure 3: Key Policy Issue 3: Specific Deadlines versus Remediation Goals with Adaptive Management

Figure 4: Key Policy Issue 4: Replacement Water Requirements

Figure 5: Key Policy Issue 5: Monitoring and Reporting Program

Figure 6: Key Policy Issue 6: Community Involvement

Appendix A: IRP Manager's Redline Version of the Scope of Work from the Proposed CAO No.R6V-2015-Prop

Figure 1

Key Policy Issue 1: Prescriptive vs. Performance Based Requirements

Should the CAO be prescriptive in setting out requirements, rely on performance based requirements, combine both types of requirements, or transition from one to the other?

- **Prescriptive components** should include how the 'affected area' for the whole house replacement water program is defined, requirements for replacement water recipients, reporting frequency, plume contouring requirements and metrics for hydraulic control south of Thompson Road
- **Performance based requirements** should include the sampling program for domestic and monitoring wells and remediation cleanup goals. Wells that showed decreasing trends below background levels should be sampled less frequently while wells with increasing trends above background levels should be sampled more frequently
- **The CAO should be a combination of both prescriptive and performance based requirements but favoring performance based in the long run**
- Performance based requirements should recognize, and where possible, embrace an Adaptive Management approach



Prescriptive

Performance
Based



Figure 2

Key Policy Issue 2: Northern and Western Areas, and USGS Background Study

What should the CAO require of PG&E in the interim period while the USGS background study is being completed?

- The IRP Manager suggests that the monitoring program in the Northern and Western areas be in accordance with the MRP discussed in Key Policy Issue 5
- Any relevant interim results from the BGS should be incorporated into the MRP if applicable
- Adopt a Monitored Natural Attenuation (MNA) philosophy for data review until the BGS is completed
- Appropriate monitoring West of the Lockhart Fault

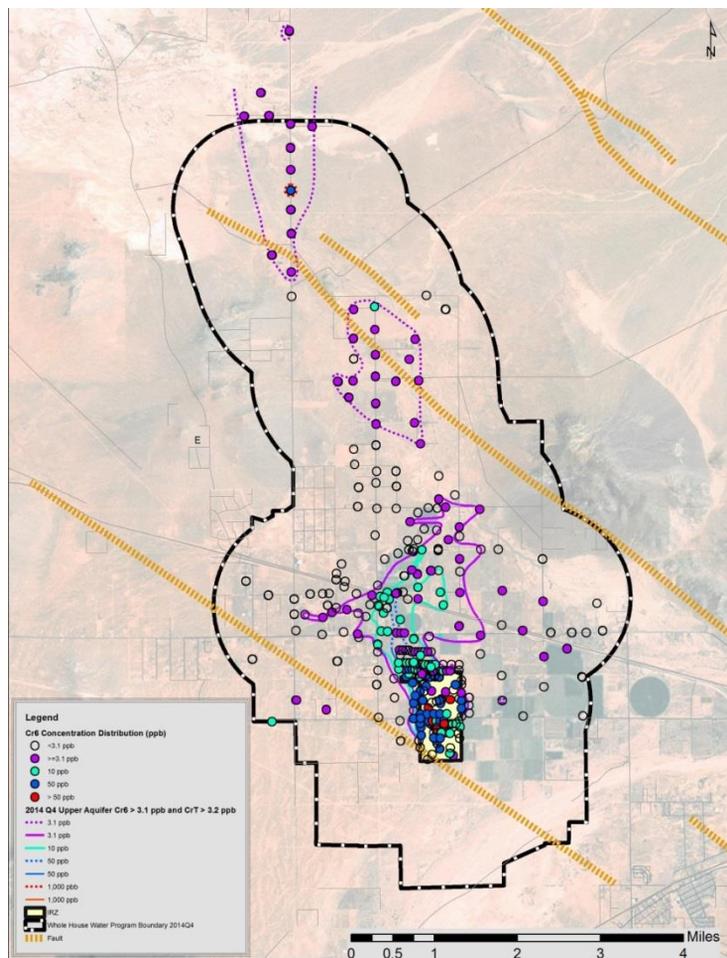


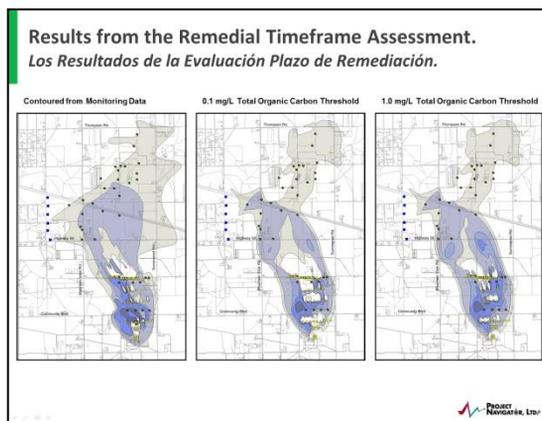
Figure 3

Key Issue 3: Specific Deadlines versus Remediation Goals with Adaptive Management

Should the CAO establish remediation goals that allow for an adaptive management strategy or specific remediation deadlines?

Or should deadlines be set, but used mainly to confirm the performance of the adaptive management?

- **The IRP Manager is in favor of Remediation Goals with Adaptive Management**
- *The use of an Adaptive Management approach is the best solution to striving to reach Remediation Goals with changing conditions which could affect performance, and with a massive influx of data which can guide the project.*
- The IRP Manager submitted comments to the WB regarding Remediation Goals on March 13, 2015 and, for example, included the following observations:
 - Computer models provide estimates on remedial cleanup times based on several boundary conditions and current conditions. If these boundary conditions are not applicable for future conditions then remedial timeframes will not be representative of future conditions (e.g. changes in extraction rates and construction/modifications to ATUs or IRZs), and should not be used
 - **Adaptive Management principals and processes should be used to obtain realistic remediation forecasts** by running computer models when major field changes occur



Specific
Deadlines



PNL

Adaptive
Management



Figure 4

Key Issue 4: Replacement Water Requirements

With the Cr6 MCL set, should the historical one-mile buffer zone be retained, modified, deleted...or replaced with a transition plan to move from the historical one-mile buffer to something else?

- *The Water Board can only require PG&E to supply replacement water to residents that are at, or above, the Cr6 MCL of 10 ppb...* This is the Law.
- Anything under the umbrella of “something else” should be based on project history, professional judgment and “softer” project considerations
 - (e.g. modifying the historical one-mile buffer to reflect the 10 ppb contour line for Cr6)
- Collect community input if they prefer to keep or modify the 1 mile buffer

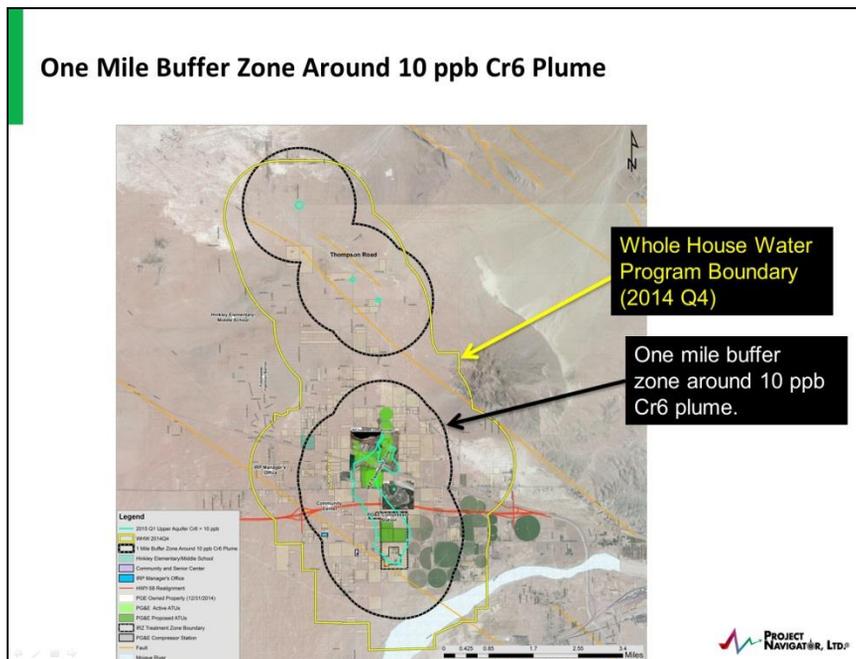
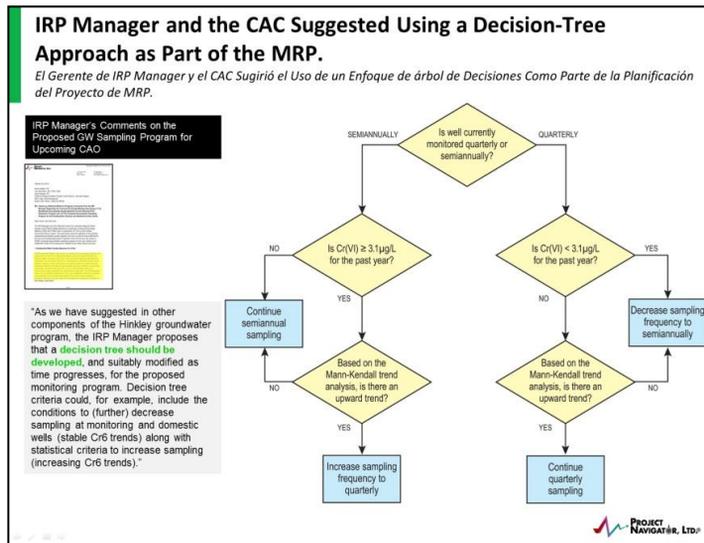


Figure 5

Key Issue 5: Monitoring and Reporting Program

Should the monitoring and reporting program be prescriptive, performance-based, a hybrid of prescription/performance, or transition to a different approach?

- The IRP Manager is in favor of a Monitoring and Reporting Program (MRP) that is a hybrid of prescription/performance based
- The IRP Manager submitted comments to the WB regarding PG&E's and the Water Board's MRPs on March 13, 2015 and included the following elements:
 - **Set the sampling frequency at each multi-level monitoring well dependent on the prior Cr6 concentration history** (i.e. the highest Cr6 detection at the a specific multi-level well should be sampled more frequently and the well with the lowest Cr6 value should be sampled less often)
 - Use an agreed upon **"Decision-Tree"** to optimize and "right-size" the sampling frequency at monitoring wells
 - **Use statistical analysis of Cr6 #'s** to increase or decrease the sampling frequency at monitoring wells based on increasing or decreasing trends



Prescriptive

Performance Based



Figure 6

Key Issue 6: Community Involvement

- (1) What is the best structure to engage with and involve the community members in the CAO implementation?
(2) What are the community's biggest concerns with the implementation of the CAO, and how best do we address those concerns?

1. The IRP Manager submitted comments to the WB regarding Community engagement, concerns and how to implement “a Plan” in a letter to the Water Board’s Executive Officer on May 21, 2015. Recommendations included the following components:
 - IRP Manager’s “Independent” Perspective Emphasized
 - Focus on both **above & below ground issues** (vs just below)
 - **Participate in BGS**
 - Meetings
 - **“One-on-Ones” with community members**
 - In-office education via an expanded “visuals room”
 - Workshop Format
 - **Outreach to individual Community groups (e.g. see map)**
 - Issue-specific technical discussions on a less frequent basis
 - Techniques
 - Table top models for workshops
 - Videos of similar work/technical approaches elsewhere
 - Less frequent, but well publicized, **Hinkley office hours**
 - **Newsletters**
 - Sponsor a **bi-monthly breakfast**
 - Work with planning resources such as Cal Poly Pomona
 - www.hinkleygroundwater.com
 - Poster-of-the-month at the Community Center
 - **Informal yellow post-it surveys (1st one delivered good info)**
2. Biggest community concerns are **trust and long term accountability**
 - Above and below ground issues



VI. Independent Consultant

A. PG&E shall continue to fund an independent consultant(s) that can provide technical information, education, and advice to community members on matters subject to regulation by the Water Board related to the chromium groundwater pollution in Hinkley. The independent consultant(s) shall not be involved in any aspect of this site (consulting for PG&E or involved in any litigation, and be willing to sign such a document stating such) and be accepted by PG&E and the Water Board or the Executive Officer.

B. Annually, on February 1 starting in 2016, PG&E must submit a report to the Water Board including the scope of work and budget for the previous year and the next twelve month period. This report must provide evidence that adequate funds were made available in the past twelve months and are being made available for the next twelve months to complete the following at a minimum (or submit an alternative plan of equivalent effort and effectiveness in meeting the community's needs):

1. An annual report and presentation to the Water Board on the independent consultant's efforts within the Hinkley community.
2. A minimum of six community newsletters each year to disseminate information to Hinkley residents.
3. A minimum of four public meetings or workshops held in the Hinkley community.
4. Availability for one on one communications with individual or groups of Hinkley residents at the IRP Manager Office or community members home (at least 100 hours of availability).
5. Production of technical reviews, written comments and presentations to respond to Water Board orders, PG&E reports, USGS reports and other technical materials related to the chromium remediation (e.g. new cleanup technology).
6. Outside expert on matter(s) of greatest concern to the community.
7. Participate and provide feedback on the USGS Cr Background Study (BGS) as a member of the Technical Working Group (TWG). Attend BGS Technical Exchange Meetings (TEMs) with the TWG, review of BGS technical information, and provide Hinkley community with BGS updates.
8. Provide technical information and work with community members regarding above ground issues.

9. Perform community outreach to groups interested in providing positive impacts to the Hinkley community.

10. Provide assistance in possible grant writing efforts which could be available to the Hinkley Community to facilitate Community future planning and rebuilding, especially with respect to the reuse of formerly impacted groundwater.

C. The annual workplan is subject to Water Board Executive Officer approval.