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November 4, 2016

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

RE: Comments on PG&E's Capture Metrics

Dear Patty:

The Independent Review Panel (IRP) Manager is submitting formal comments regarding the Water Board October 5, 2016 Public Review and Comment Opportunity on the Proposed Capture Metrics to the revisions to Cleanup and Abatement Order (CAO) R6T-2015-0068[1].

The IRP Manager, Project Navigator Ltd. (PNL) continues to advise and provide technical outreach to the Hinkley Community on matters associated with PG&E's ongoing Cr(VI) remediation activities. PNL is requested to provide independent feedback and written comments on technical reports and cleanup and abatement orders pertaining to the Hinkley Groundwater Chromium Remediation Program to the Water Board. The comments herein are submitted consistent with this assignment, and in the spirit of the role of the IRP Manager.

As a tool used to ensure that the Cr(VI) plume does not migrate further north, the use of hydraulic control has demonstrated to be successful in containing the migration of Cr(VI) from migrating past Thompson Road. The IRP Manager agrees with technical reports[2] that conclude that hydraulic capture has been successfully implemented. CAO No.R6V-2015-0068 included capture metrics that were a component of the November 4, 2015 CAO. The IRP Manager submitted several comments letters[3] on the CAO No.R6V-2015-0068 and its various components.

Figure 1 and **Figure 2** show location of the proposed hydraulic capture containment targets compared for the shallow and deep zones of the upper aquifer. *The IRP Manager has no objections with the revised hydraulic capture metrics based on additional*

[1] Water Board. 2016. *Public Review and Comment Opportunity, Proposed Capture Metrics, Pacific Gas and Electric Company's Hinkley Compressor Station, San Bernardino County*. October 5.
[2] Hydraulic Capture Monitoring Reports.
[3] The IRP Manager submitted comments letters on March 13, June 19, and September 30.

information collected by PG&E's August 31, 2016 report on the Revised Recommendations for Alternative Capture Metrics.

The IRP Manager agrees with the current approach on using several lines of evidence to determine hydraulic capture (as the use of Cr (VI) concentrations are now discussed in current Hydraulic Capture Reports). In addition, the IRP Manager recommends supplementing the current approach with a guideline [4] used by US Environmental Protection Agency (EPA) to evaluate hydraulic capture. **Table 1** shows a table from EPA's approach using several lines of evidence such as capture metrics, potentiometric surface maps, concentrations trends and other lines of evidence. This type of table can be included in quarterly hydraulic capture reports summarizing if hydraulic capture has been achieved based on a several lines of evidence approach.

The IRP Manager thanks you for the continued opportunity to provide comments in our service to the Hinkley Community. Should you have any questions or comments, please feel free to contact either of the undersigned via email or phone as follows:

- 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: Revised Hydraulic Capture Metric for the Shallow Zone of the Upper Aquifer
Figure 2: Revised Hydraulic Capture Metric for the Deep Zone of the Upper Aquifer
Table 1: US EPA Example Table of Hydraulic Capture Evaluation

Cc:
Halil I. Kavak, Ph.D., PNL
Annie Marie Cwieka, PNL
Margaret DeAngelis, PNL

[4] EPA 600/R-08/003. 2008. *A Systematic Approach for Evaluation of Capture Zone at Pump and Treat System. Final Project Report*. January.

FIGURE 1

Hydraulic Capture at Upper Aquifer Shallow Zone

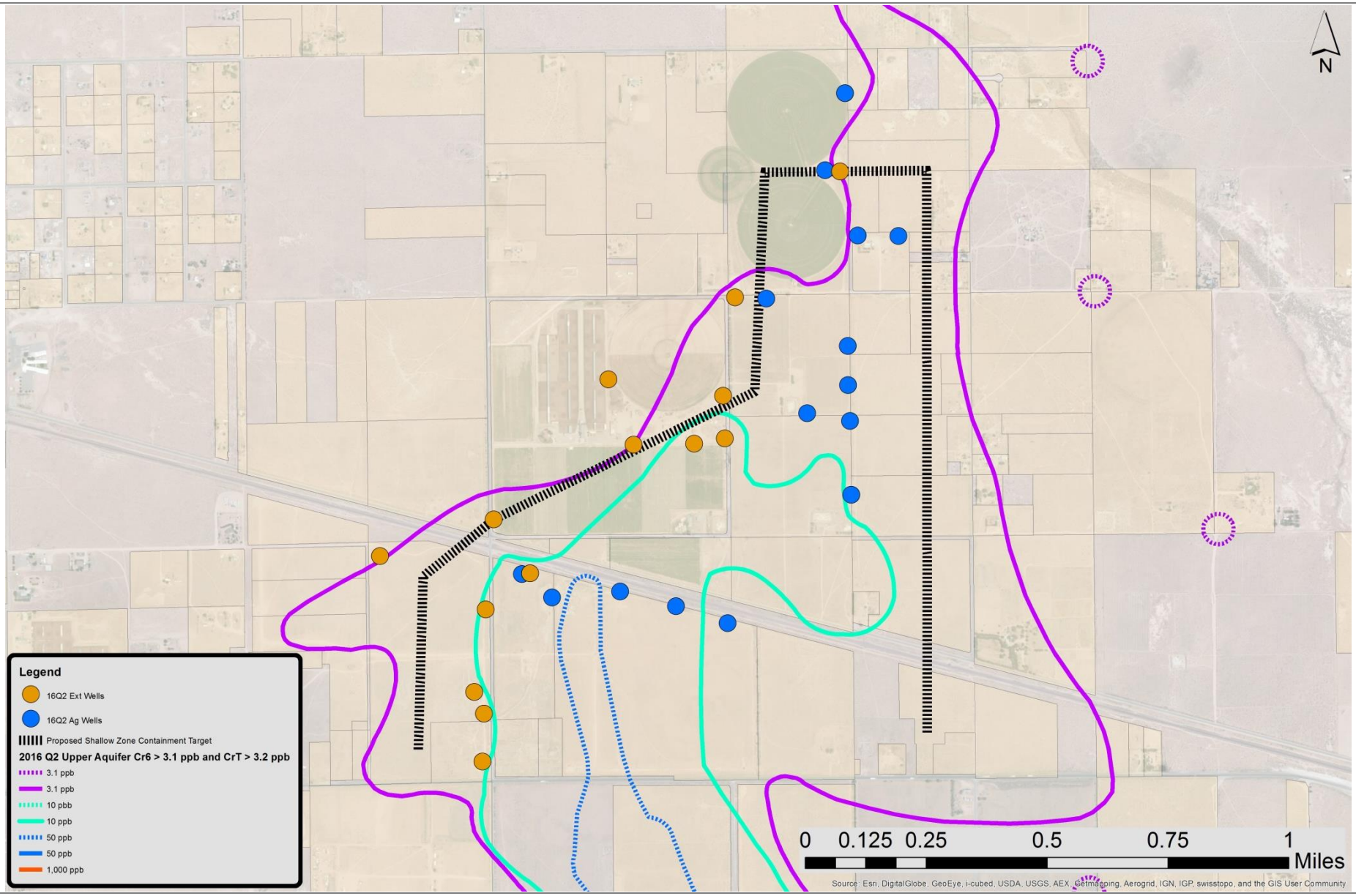

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FIGURE 2

Hydraulic Capture at Upper Aquifer Deep Zone

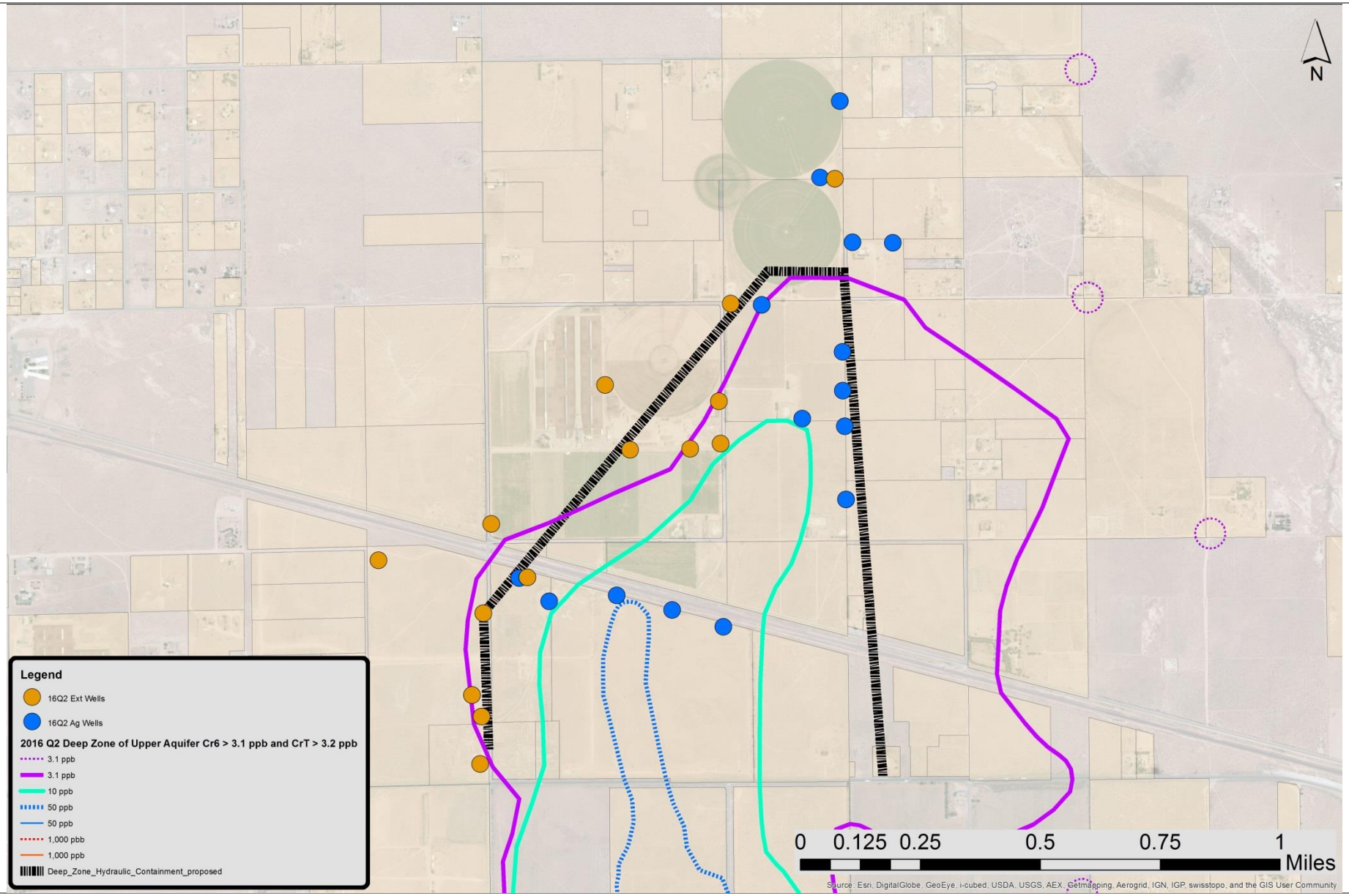

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TABLE 1

US EPA Example Table of Hydraulic Capture Evaluation

Possible Format for Presenting Results of a Capture Zone Evaluation

Line of Evidence	Is Capture Sufficient?	Comments
Water Levels • Potentiometric surface maps • Vertical head difference maps • Water level pairs		
Calculations • Estimated flow rate calculations • Capture zone width calculations • Ground-water flow modeling with particle tracking		
Concentration Trends • Sentinel wells • Downgradient performance monitoring wells		
Overall Conclusion • Is capture sufficient, based on "converging lines of evidence"? • Key uncertainties/data gaps • Recommendations to collect additional data, install new monitoring wells, change current extraction rates, change number/location of extraction wells, etc.		

Reference: EPA 600/R-08/003. 2008. *A Systematic Approach for Evaluation of Capture Zone at Pump and Treat System. Final Project Report*. Exhibit 8. January.