



**Pacific Gas and  
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October 3, 2014

Lauri Kemper, P.E.  
Lisa Dernbach, P.G., C.E.G., C.H.G.  
California Regional Water Quality Control Board, Lahontan Region  
2501 Lake Tahoe Boulevard  
South Lake Tahoe, California 96150

**Subject: Work Plan to Conduct Hydraulic Testing and Capture Analysis, Winter 2014-2015,**  
Pacific Gas and Electric Company's Hinkley Compressor Station, Hinkley,  
California

Dear Ms. Kemper:

Pacific Gas and Electric Company (PG&E) is submitting the attached Work Plan to Conduct Hydraulic Testing and Capture Analysis at the PG&E Hinkley Groundwater Remediation Project, Hinkley, California (WDID No. 6B369107001). As discussed during a recent meeting with the Regional Water Quality Control Board (RWQCB) staff, the objective for conducting the work proposed in the attached Work Plan is to assess hydraulic influence that results from extraction of groundwater from extraction wells located primarily to the south of the Desert View Dairy (DVD), where hexavalent chromium (Cr[VI]) is detected at concentrations in excess of 40 to 50 parts per billion. PG&E will use the data collected from this study to evaluate potential changes to the current groundwater extraction system to more effectively capture Cr(VI)-impacted groundwater and minimize areas that may be subject to corresponding drawdown of the water table.

Amended Cleanup and Abatement Order No. R6V-2008-0002A3, dated March 14, 2012 (the Order) requires PG&E to operate the existing groundwater extraction system to meet specific hydraulic metrics within targeted areas on a year-round basis (Requirement A.3). Additionally, Requirement A.3 of the Order requires PG&E to collect groundwater elevation data from select monitoring well and piezometers and to provide monthly evaluations of that data. Compliance with the Order's hydraulic metrics is demonstrated by inward hydraulic gradients as measured from well pairs and triplets ("capture metrics") described in the Order.

As presented in the "Semiannual Remediation Status and Final Cleanup Effectiveness Report (January through June 2014) for the Pacific Gas and Electric Company Groundwater Remediation Program, Hinkley, California", based on recent concentration trends and hydraulic data, it may be appropriate at this time to modify the current groundwater extraction program to optimize drawdown for capture of elevated concentration of Cr(VI). An expected outcome of the data collection and analysis described in the Work Plan is the submittal of a recommendation from PG&E to update the compliance metric program through a revised extraction program.

During implementation of the hydraulic testing proposed in attached Work Plan (Winter 2014-2015) some of the metrics described in the Order may not be met in the short term. With this letter, PG&E is requesting both approval of the Work Plan and temporary relief from compliance with the metrics as specified in Paragraph A.3 of the Order from the period beginning November 1, 2014 and ending April 30, 2015. If approved,

Ms. Kemper  
Ms. Dernbach  
October 3, 2014

PG&E will continue to collect groundwater elevation data from select monitoring well and piezometers and submit monthly reports of that data, and will work closely with RWQCB staff in evaluating hydraulic data. If the Work Plan is approved and can be implemented within the proposed time frame, PG&E anticipates that any revised capture program would be proposed in April 2015, with a goal of establishing a revised capture metric compliance and reporting program by May 1, 2015.

Please feel free to call me at (925) 818-9069 if you have any questions regarding the information presented in this letter.

Sincerely,

A handwritten signature in black ink, appearing to read 'Kevin M. Sullivan', is written over a horizontal line.

Iain Baker on behalf of  
Kevin M. Sullivan

Enclosure: Work Plan to Conduct Hydraulic Testing and Capture Analysis, Winter 2014-2015



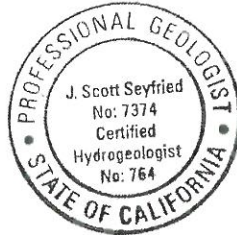
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**MEMO**

To:  
Lauri Kemper, P.E.  
Lisa Dernbach, P.G., C.E.G., C.H.G.  
California Regional Water Quality Control  
Lahontan Region (RWQCB)

Copies:  
Anne Holden, RWQCB  
Iain Baker, PG&E

From:  
Scott Seyfried, P.G. 



Date:  
October 3, 2014

ARCADIS Project No.:  
RC000699.0117

Subject:  
Work Plan to Conduct Hydraulic Testing and Capture Analysis, Winter 2014-2015  
PG&E Hinkley Compressor Station, Hinkley, California

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**1.0 Introduction**

This memorandum presents proposed methodology to conduct hydraulic testing and evaluation of groundwater extraction within the northern capture zone of the Pacific Gas and Electric Company (PG&E) Hinkley Compressor Station Site in Hinkley, California (the Site). The objective of this hydraulic testing is to collect data to assess hydraulic influence resulting from a modified groundwater extraction configuration that targets the southern portion of the capture zone. The hydraulic influence data collected from this testing will be used to develop modifications to the existing groundwater extraction configuration and the capture metric program designed to improve the effectiveness and efficiency of that program.

**2.0 Background**

As discussed in the Second Quarter 2014 Semiannual Remediation Status Report, increased groundwater extraction rates associated with the agricultural treatment units (ATUs), over time have resulted in expanded hydraulic depressions within the chromium plume areas in both the shallow (A1) and deep (A2) zones of the upper aquifer. The system's effectiveness was significantly enhanced through the addition of several new extraction wells and four ATUs starting in 2011 (Cottrell, Ranch, Gorman North, and Gorman South). This expanded cone of depression, particularly in the deep zone of the upper aquifer (A2), but also expressed in the A1, has resulted from increased extraction from wells in this area including EX-35, C-01, G5-R, and EX-25 (see Attachment 1).

This cone of depression is centered to the north of where the elevated concentrations of hexavalent chromium (Cr(VI)) (i.e., greater than approximately 10 micrograms per liter [ $\mu\text{g/L}$ ]) are present, which is generally limited to south of Alcurdia road. As a result, the northern cone of depression resulting from the current pumping configuration is acting to interfere with the efforts to extract the higher concentration Cr(VI) mass located to the south. Based on the current distribution of Cr(VI) in the deep zone of the upper aquifer, a more optimal location to target the cone of depression would be further to the south, centered closer to the southern end of the Desert View Dairy (DVD) or Ranch ATU.

### 3.0 Objectives and Approach

The primary objective of the work described in this memorandum is to assess the hydraulic influence in the A1 and A2 zones that is expected to result from groundwater extraction that is centered south of the DVD in the vicinity of wells IW-01, IW-02, EX-29, and EX-30 (Figure 1). The upper (A1) and deep (A2) portions of the upper aquifer are in combined into a single unit in this area (i.e., the brown clay is not present) and the upper aquifer has substantial hydraulic yield. This area is the northernmost extent of the chromium plume where concentrations approach 50  $\mu\text{g/L}$ .

In addition, hydraulic capture data will be collected in the shallow portion of the Upper Aquifer (the "A1" interval) to the north of the DVD in the vicinity of well EX-35 (Figure 1). These data will be used to assess what hydraulic influence may be achieved in the A1 zone by extraction exclusively from the A1 aquifer in this portion of the site.

These objectives will be met by conducting groundwater extraction from a select set of extraction wells over an anticipated three month period of time (December 2014 through February 2015), and measuring the resulting groundwater levels in surrounding wells to assess the resulting hydraulic influence. These winter months were selected for this testing to take advantage of the seasonal lower crop water demands, such that the existing ATUs can be maintained with reduced extraction rates.

Groundwater elevations will be measured on a nearly continuous basis in select wells using pressure transducers, and on a periodic (bi-weekly or monthly) basis using manual water level measurements from other wells. Locations to be outfitted with pressure transducers are highlighted in yellow on Figure 1. Pending the timing of RWQCB approval of this work plan, PG&E may elect to initiate the hydraulic testing in November, to allow for a longer time period of evaluation.

Groundwater extraction wells targeted for extraction in the southern portion of the Site include IW-01, IW-02, EX-29, and EX-30. Groundwater extraction wells targeted for extraction within the A1 aquifer in the northern portion of the Site include Y-1, Y-3, C-2, EX-31, EX-33, EX-35, and G2-R. Figure 1 shows these extraction wells and monitoring wells to be used during the test. It is anticipated that these wells will be operated at a combined flow rate of approximately 540 gallons per minute during the targeted pumping test period.

It is important to note that other extraction wells may be operated during the three month test period. Operation of other extraction wells during the pump test period may be conducted to assess for the influence of operation of select wells on drawdown, and/or to provide additional water to maintain existing ATU fields and crops.

Data collected from pressure transducers and manual measurements will be compiled to produce groundwater elevation maps periodically during the targeted pumping. These groundwater elevation maps along with hydrographs generated from wells with pressure transducers, will be used to assess for hydraulic influence associated with the targeted pumping.

The hydraulic data collected from this study will be used to help develop recommendations for a revised capture metric that focusses capture in areas that are most efficient and effective in limiting migration of Cr(VI)-impacted groundwater.

**4.0 Anticipated Schedule and Reporting**

The anticipated schedule to implement the work described above is shown on the attached schedule chart, below.

Task/Milestone	Date													
	Nov 2014		Dec 2014		Jan 2015		Feb 2015		Mar 2015		Apr 2015		May 2015	
RWQCB Approval of Hydraulic Testing Program	-----													
Conduct Hydraulic Testing Program		-----	-----											
Collect Groundwater Elevation Data*	-----													
		p		p		p		p		p		p		p
Compile Groundwater Elevation and Drawdown Data		★		★		★		★		★		★		★
Submit Proposed Revised Capture Metric Program												★		
RWQCB Review of Revised Capture Metric Program											-----			
Implement Revised Metric Monitoring and Reporting Program													★	

\* (p – download data from pressure transducers)

**Figures**

- 1 Site Plan Showing Primary Pumping Wells and Monitoring Wells During Pumping Test

**Attachment 1**

Figures 4-1 and 4-2 from: Second Quarter 2014 Agricultural Treatment Units Monitoring Report, Pacific Gas and Electric Company, Hinkley Compressor Station, Hinkley, California.



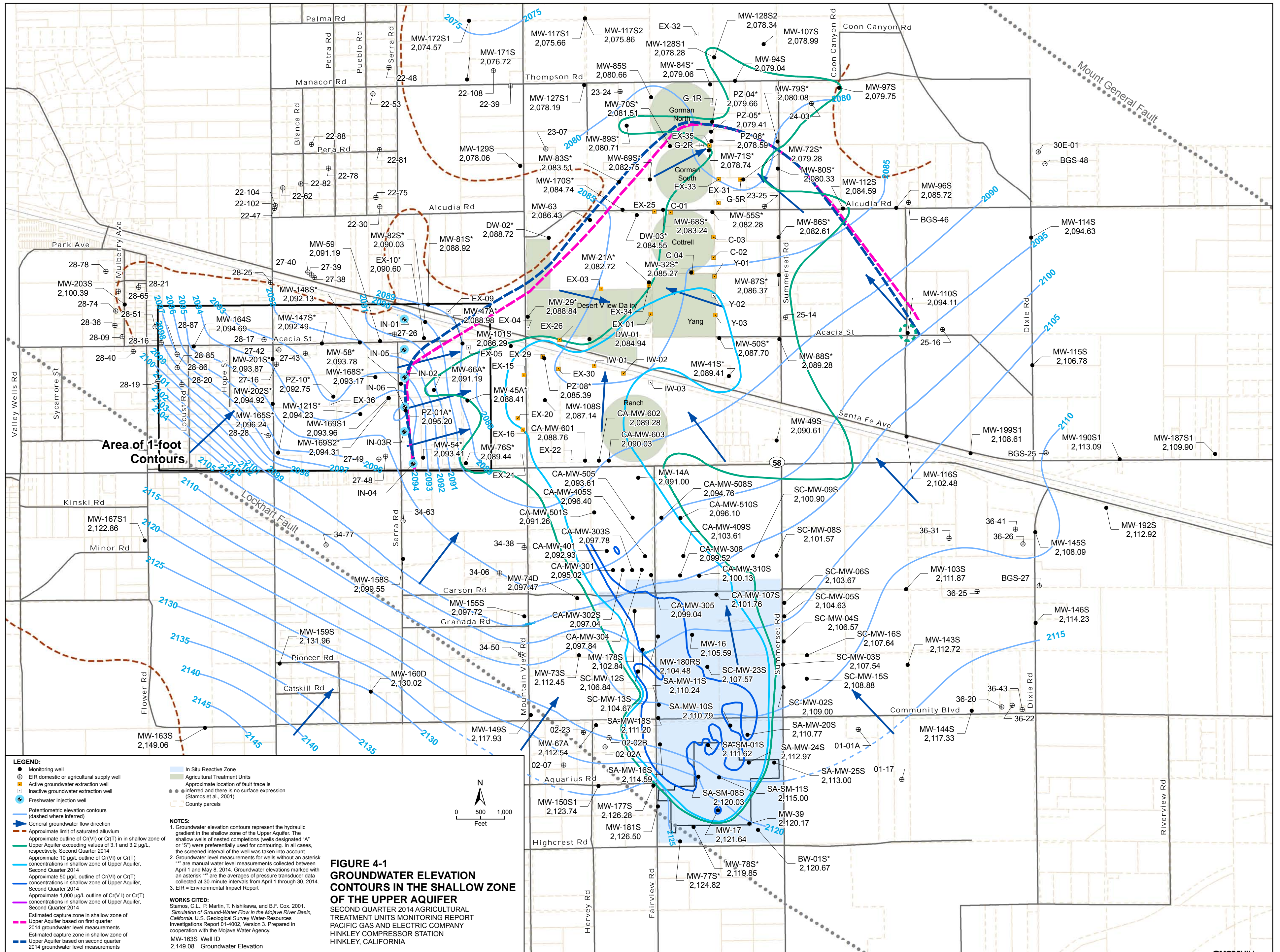
**Figures**







**Attachment 1**



**FIGURE 4-1  
GROUNDWATER ELEVATION  
CONTOURS IN THE SHALLOW ZONE  
OF THE UPPER AQUIFER**  
SECOND QUARTER 2014 AGRICULTURAL  
TREATMENT UNITS MONITORING REPORT  
PACIFIC GAS AND ELECTRIC COMPANY  
HINKLEY COMPRESSOR STATION  
HINKLEY, CALIFORNIA

**LEGEND:**

- Monitoring well
- ⊕ EIR domestic or agricultural supply well
- ⊕ Active groundwater extraction well
- ⊕ Inactive groundwater extraction well
- ⊕ Freshwater injection well
- Potentiometric elevation contours (dashed where inferred)
- General groundwater flow direction
- - - Approximate limit of saturated alluvium
- Approximate outline of Cr(VI) or Cr(T) in shallow zone of Upper Aquifer exceeding values of 3.1 and 3.2 µg/L, respectively, Second Quarter 2014
- Approximate 10 µg/L outline of Cr(VI) or Cr(T) concentrations in shallow zone of Upper Aquifer, Second Quarter 2014
- Approximate 50 µg/L outline of Cr(VI) or Cr(T) concentrations in shallow zone of Upper Aquifer, Second Quarter 2014
- Approximate 1,000 µg/L outline of Cr(VI) or Cr(T) concentrations in shallow zone of Upper Aquifer, Second Quarter 2014
- Estimated capture zone in shallow zone of Upper Aquifer based on first quarter 2014 groundwater level measurements
- Estimated capture zone in shallow zone of Upper Aquifer based on second quarter 2014 groundwater level measurements
- In Situ Reactive Zone
- Agricultural Treatment Units
- Approximate location of fault trace is inferred and there is no surface expression (Stamos et al., 2001)
- County parcels

**NOTES:**

1. Groundwater elevation contours represent the hydraulic gradient in the shallow zone of the Upper Aquifer. The shallow wells of nested completions (wells designated "A" or "S") were preferentially used for contouring. In all cases, the screened interval of the well was taken into account.
2. Groundwater level measurements for wells without an asterisk "\*" are manual water level measurements collected between April 1 and May 8, 2014. Groundwater elevations marked with an asterisk "\*" are the averages of pressure transducer data collected at 30-minute intervals from April 1 through 30, 2014.
3. EIR = Environmental Impact Report

**WORKS CITED:**

Stamos, C.L., P. Martin, T. Nishikawa, and B.F. Cox. 2001. *Simulation of Ground-Water Flow in the Mojave River Basin, California*. U.S. Geological Survey Water-Resources Investigations Report 01-4002, Version 3. Prepared in cooperation with the Mojave Water Agency.

MW-163S Well ID  
2,149.08 Groundwater Elevation

