

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION**

**AMENDED CLEANUP AND ABATEMENT ORDER
NO. R6V-2008-0002A3**

WDID NO. 6B369107001

**REQUIRING PACIFIC GAS AND ELECTRIC COMPANY
TO CLEAN UP AND ABATE WASTE DISCHARGES OF
TOTAL AND HEXAVALENT CHROMIUM TO THE
GROUNDWATERS OF THE MOJAVE HYDROLOGIC UNIT**

_____ San Bernardino County _____

The California Regional Water Quality Control Board, Lahontan Region (Water Board), finds:

1. The Pacific Gas and Electric Company owns and operates the Hinkley Compressor Station (hereafter the "Facility"), located at 35863 Fairview Road, Hinkley in San Bernardino County. For the purposes of this Order, the Pacific Gas and Electric Company is referred to as the "Discharger."
2. The purpose of this Amendment is to address the hydraulic containment of chromium-affected groundwater south of Thompson Road in Hinkley, California, and actions to reduce plume migration in the area generally north of Thompson Road.
3. On August 6, 2008, the Water Board issued Cleanup and Abatement Order No. R6V-2008-0002 (combined with its amendments, hereafter referred to as the "CAO" or "CAO R6V-2008-0002") to the Discharger to clean up and abate the effects of waste discharges and threatened discharges containing hexavalent chromium and total chromium to waters of the State. The CAO required the Discharger to develop and implement a comprehensive cleanup strategy to clean up and abate the chromium plume to background levels and set an interim maximum background level of 4 parts per billion (ppb).
4. The CAO also required the Discharger to take immediate additional corrective actions to contain chromium migrating with groundwater and to continue to implement groundwater remediation in the source area and central plume area. The CAO also modified the monitoring and reporting program for permitted projects.
5. Order Paragraph 3 of the CAO required the Discharger to contain the hexavalent and total chromium plumes to locations where hexavalent chromium was below the interim background level of 4 ppb and the total chromium was below 50 ppb.

- a. The Discharger was required to achieve containment of the hexavalent chromium plume in the ground water by December 31, 2008, using the Discharger's *Boundary Control Monitoring Program and Updated Site-Wide Groundwater Monitoring Program* (submitted July 2, 2008 and prepared by Secor International) as described in Finding 16 in the Order.
 - b. The Discharger was required to achieve containment of the total chromium plume in the ground water by December 31, 2008, also based on the *Boundary Control Monitoring Program and Updated Site-Wide Groundwater Monitoring Program* as described in Finding 16 in the Order.
6. Amendment Order No. R6V-2008-0002A1, effective November 12, 2008, adopted average and maximum background levels for hexavalent chromium of 1.2 ppb and 3.1 ppb, respectively. The adopted average and maximum background levels in the Amendment Order for total chromium are 1.5 ppb and 3.2 ppb, respectively. These background levels were adopted for the purposes of establishing background water quality conditions, considering cleanup strategies and supporting future decisions regarding cleanup levels. For plume containment, the level remained at 4 ppb for both hexavalent chromium and total chromium.
 7. Amendment Order No. R6V-2008-0002A2, effective April 7, 2009, allowed lateral migration of the 4 ppb hexavalent chromium plume boundary east of the South Central Remediation In-situ Area from discharges to groundwater extracted and piped from cleanup actions in the northwest plume area. Lateral plume expansion of 1,000 feet was allowed as long as it could be shown that the chromium would be captured by the existing groundwater extraction system in the downgradient flow direction.
 8. In its First Quarterly 2009 Evaluation Monitoring Report, the Discharger reported that hexavalent chromium control limits were exceeded in Monitoring Well 62-A beginning in November 2008. The results were verified in February and March, 2009. The report was submitted April 29, 2009. Subsequent quarterly reports indicated that Monitoring Well 62-A continued to exceed hexavalent chromium control limits (with the exception of one quarter) through the Fourth Quarterly 2011 Groundwater Monitoring Report, submitted January 30, 2012. Data reported by the Discharger indicates that Monitoring Wells 72S and 79S have also exceeded hexavalent chromium concentrations, greater than 4 ppb. Since 2009, the migrating chromium plume in groundwater has affected domestic and agricultural wells at concentrations exceeding the maximum background concentration for hexavalent chromium of 3.1 ppb or total chromium of 3.2 ppb. Affected wells are located east of Summerset Road, and north of Thompson Road to Mount General Road.
 9. On March 14, 2012, the Water Board adopted Settlement Agreement and Stipulation for Entry of Order; Order No. R6V-2012-0013 at its public meeting after receiving comments from the public. The Settlement Agreement addresses the period of

violation of CAO R6V-2008-0002 for plume migration from January 1, 2009 to December 31, 2011. As part of Order No. R6V-2012-0013, the Water Board agreed to amend CAO R6V-2008-0002 to replace CAO Paragraph 3 with the requirements presented in this Amendment to CAO R6V-2008-0002 addressing chromium plume migration.

10. In the interim period prior to Water Board certification of an environmental impact report and adoption of waste discharge requirements to achieve comprehensive cleanup, modified corrective actions by the Discharger from those listed in CAO R6V-2008-0002 are necessary to achieve containment north of Highway 58, at the Desert View Dairy and north to Thompson Road, and north of Thompson Road to Salinas Road. The Discharger will take actions reasonably available and permissible to reduce chromium levels in the impacted areas during this interim period. Chromium impacts to groundwater may be subject to cleanup additional investigative and cleanup requirements set by the Water Board.
11. This enforcement action is being taken by this regulatory agency to enforce the provisions of the California Water Code, and as such is exempt from the provisions of the California Environmental Quality Act (Public Resources Code section 21000 et seq.) in accordance with California Code of Regulations, title 14, section 15321. The implementation of this CAO Amendment is an action to assure the restoration of the environment and is exempt from the provisions of the California Environmental Quality Act, and in accordance with the California Code of Regulations, title 14, sections 15301 and 15303. The existing monitor well pairs and triplets and infrastructure are subject to section 15301 because there is negligible or no expansion of their existing uses. The extraction well to be installed north of Thompson Road is a new, small structure subject to section 15303.

IT IS HEREBY ORDERED that, pursuant to the Water Code section 13304, the Discharger shall clean up and abate the effects of the discharge and threatened discharge of chromium to waters of the State, and shall comply with the provisions of this Order:

- A. Cleanup and Abatement Order No. R6V-2008-0002 is amended for the purposes of evaluating plume containment and complying with Requirement No. 3 of Cleanup and Abatement Order No. R6V-2008-0002 by replacing Requirement No. 3 with the following.

3. Plume Containment

Hydraulic Containment of Chromium-Affected Groundwater South of

Thompson Road: As part of its effort to prevent further migration of chromium-affected groundwater, the Discharger shall achieve and maintain hydraulic capture within the targeted areas shown on Figures 1 and 2 in Attachment A (incorporated herein by reference) by completing the following.

- 3.1 Discharger shall operate and maintain the groundwater extraction system that exists as of January 15, 2012, or its functional equivalent, such that hydraulic containment is maintained within the areas indicated on Figures 1 and 2 in Attachment A on a year-round basis. Separate Areas of Hydraulic Containment are established for the shallow zone of the Upper Aquifer and the deep zone of the Upper Aquifer. The Water Board will determine hydraulic containment compliance by comparing hydraulic gradients or groundwater flow direction vectors calculated from groundwater elevation data from select well pairs and triplets and piezometers with control limits, as outlined in Attachment B of this Order (incorporated herein).
- 3.2 Water levels shall be monitored on a monthly basis, year-round. For this evaluation, the Discharger shall collect continual pressure transducer data by the end of the month (e.g., January 31) and a data evaluation shall be submitted by the Discharger by the 15th of the subsequent month (e.g., February 15). If the evaluation demonstrates that the average monthly water level data from any of the well pair or triplet metrics provided in Attachment B is not met, the Discharger shall:
 - a. Verify the water levels manually within five days of the evaluation, and in any case no later than the 20th of the month when the data evaluation is submitted.
 - b. If the manual measurements confirm that there is no longer an inward gradient, the Discharger will adjust operations within five days in the field using existing infrastructure (i.e., adjust individual well pumping rates).
 - c. With the Water Board staff's written approval, the Discharger may demonstrate plume capture using alternative metrics (e.g., well pairs or triplets) to verify inward plume capture.
- 3.3 The Water Board may find the Discharger out of compliance with this Order if either of the following occurs:
 - a. The third consecutive month of data (e.g., January, February and March) for the same well pair or triplet indicates that the capture metrics are still not met, or
 - b. If for any 3 out of 12 months during the course of one year (e.g., July 2012 through July 2013), a specific well pair or triplet does not meet capture metrics.
- 3.4 Should either condition 3.3.a. or 3.3.b. occur, then by the 15th of the following month, the Discharger shall submit a contingency plan to re-establish capture

in addition to the existing infrastructure. The Water Board staff will review the contingency plan and either accept it or request modifications in writing.

Actions to Reduce Plume Migration in Area Generally North of Thompson Road:

The Discharger shall take reasonable and practicable corrective actions to reduce hexavalent chromium concentrations in groundwater and to reduce plume migration in areas north of Thompson Road (as illustrated by Attachment C incorporated herein by reference) by taking the following interim actions prior to the approval of the final remedy proposed by Discharger:

- 3.6 Starting the summer of 2012, the Discharger shall conduct groundwater extraction during the summer months of June 1 through September 30 in at least one location to maximize extraction and chromium removal. Failure to implement this action will constitute a violation of this Order.
- 3.7 By July 1, 2012, the Discharger shall review existing extraction and well sampling data and evaluate the need for additional extraction within the area depicted by Attachment C. If additional extraction is deemed necessary, the Discharger shall evaluate extraction methods and propose additional actions and a schedule to implement further chromium removal north of Thompson Road in the area depicted on Attachment B. The Discharger shall include the most effective actions reasonably feasible. The Discharger shall then implement these additional actions according to the schedule, subject to obtaining all required permits from regulatory agencies including approvals required by the California Environmental Quality Act and state and federal Endangered Species Acts, which approvals the Discharger shall diligently seek. In the event of any delay, the Discharger shall notify the Water Board staff in writing and seek a modification of the schedule. Failure to implement this action will constitute a violation of this Order.
- 3.8 The Discharger shall dispose of extracted groundwater containing chromium concentrations in a manner approved by Water Board staff.
- 3.9 In the event the Discharger determines that the new remedial components required by paragraphs 3.1-3.5 are interfering with the Discharger's ability to maintain inward gradients as required by paragraphs 3.1-3.5, the Discharger shall notify Water Board staff within five days of that determination and provide written evidence supporting the Discharger's determination. After notifying the Water Board, the Discharger may suspend the remedial requirements required by paragraphs 3.1-3.5 for no longer than is necessary to develop alternative pumping regimes above and/or below Thompson Road that will maintain internal hydraulic capture south of Thompson Road while maximizing chromium removal north of Thompson Road. The Discharger shall consult Water Board staff as necessary and seek written approval before taking any actions inconsistent with paragraphs 3.1-3.9 of this Order.

Any modifications to this order amending CAO No. R6V-2008-0002 are only effective upon the written approval of the Executive Officer or Assistant Executive Officer. Failure to comply with the terms or conditions of this Order will result in additional enforcement action that may include the imposition of administrative civil liability pursuant to California Water Code section 13350 or referral to the Attorney General of the State of California for such legal action as she may deem appropriate.

Any person aggrieved by this action of the Lahontan Water Board may petition the State Water Resources Control Board (State Water Board) to review the action in accordance with Water Code section 13320 and California Code of Regulations, title 23, section 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date of this Order, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at: http://www.waterboards.ca.gov/public_notices/petitions/water_quality or will be provided upon request.

I, Harold J. Singer, Executive Officer and Board Advisor, do hereby certify that the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, Lahontan Region, on March 14, 2012.

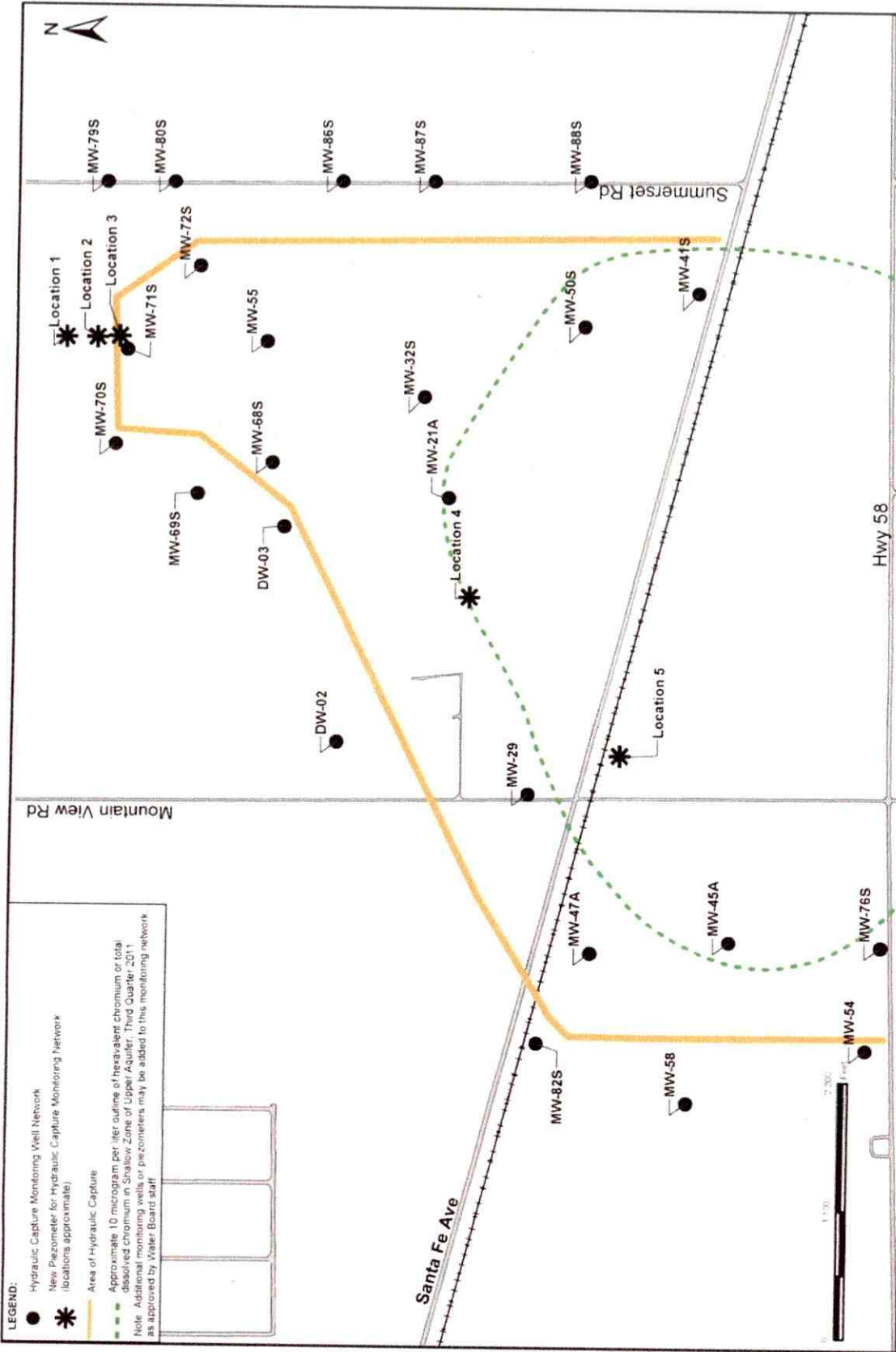


HAROLD J. SINGER
EXECUTIVE OFFICER

Attachments:

- A. Hydraulic Capture Zones, Figures 1 and 2
- B. Hydraulic Zone Capture Metrics
- C. Area for Extraction and Treatment of Hexavalent Chromium in Ground Water
North of Thompson Road

ATTACHMENT A
HYDRAULIC CAPTURE ZONES
FIGURES 1 AND 2



LEGEND:

- Hydraulic Capture Monitoring Well Network
- ★ New Piezometer for Hydraulic Capture Monitoring Network (locations approximate)
- Area of Hydraulic Capture
- Approximate 10 microgram per liter outline of hexavalent chromium or total dissolved chromium in Shallow Zone of Upper Aquifer, Third Quarter 2011
- Note: Additional monitoring wells or piezometers may be added to this monitoring network as approved by Water Board Staff

	<h2 style="margin: 0;">Hydraulic Capture Monitoring Plan, Shallow Zone of Upper Aquifer</h2> <p style="margin: 0; font-size: small;">Pacific Gas and Electric Company Hinkley, California</p>	<p>FIGURE 1</p>
<p>Project Manager: Lisa Coppe</p> <p>Project Manager: Jennifer Beatty</p> <p>Project Manager: Margaret Conable</p> <p>Technical Review: Scott Sayfred</p>	<p>100 Montgomery Street, Suite 1000 San Francisco, California 94104 Tel: 415.774.2744 www.arcadisusa.com</p>	

LEGEND:

- Hydraulic Capture Monitoring Well Network
- ★ New Piezometer for Hydraulic Capture Monitoring Network (locations approximate)
- Area of Hydraulic Capture
- Approximate 10 microgram per liter outline of hexavalent chromium or total dissolved chromium in Deep Zone of Upper Aquifer, Third Quarter, 2011

Note: Additional monitoring wells or piezometers may be added to this monitoring network as approved by Water Board staff

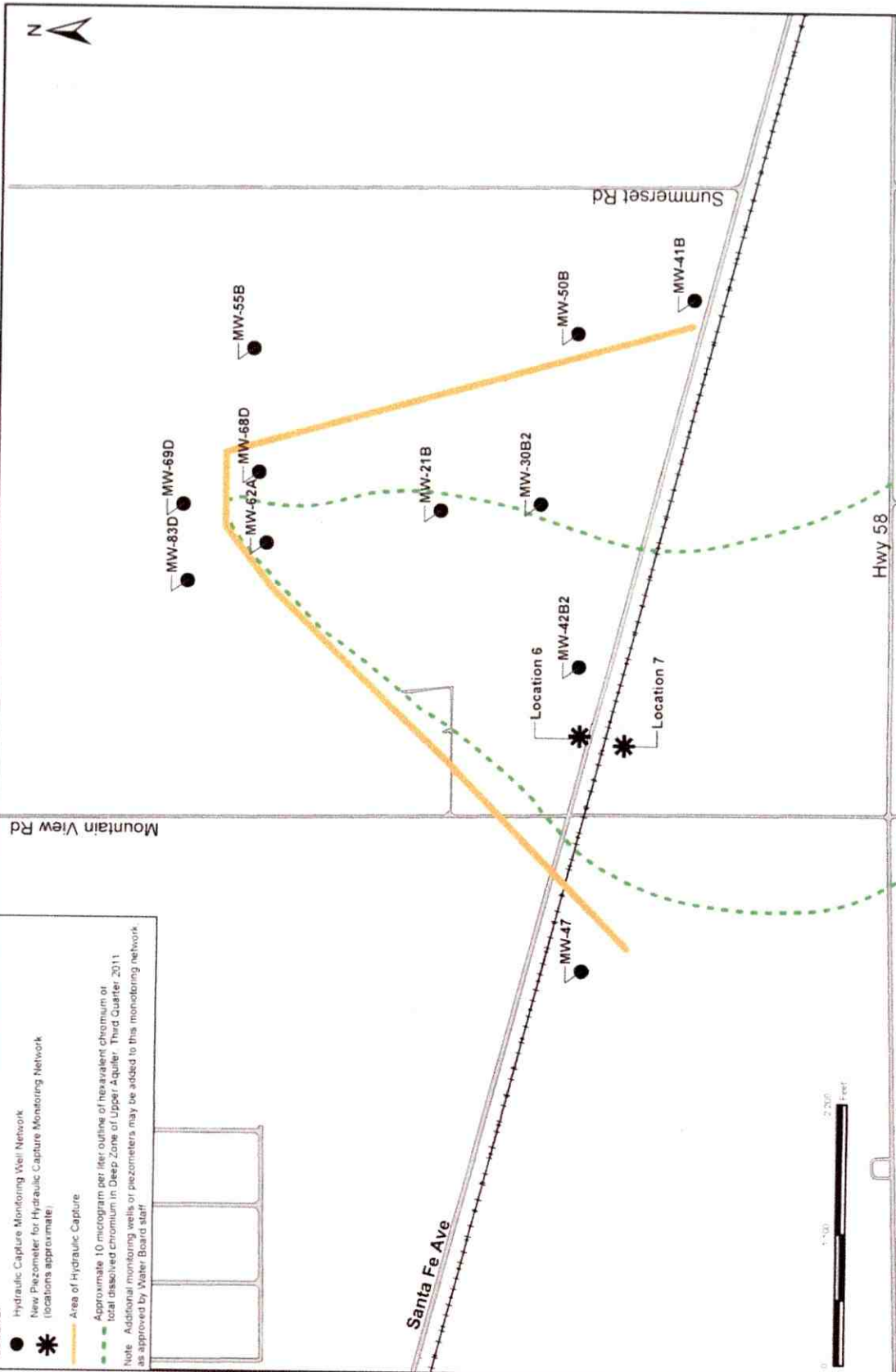


FIGURE 2

Hydraulic Capture Monitoring Plan, Deep Zone of Upper Aquifer

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ATTACHMENT B
HYDRAULIC ZONE CAPTURE METRICS

APPENDIX A

Hydraulic capture shall be demonstrated through analysis of potentiometric surfaces in the A1 and A2 layers of the upper aquifer measured at least monthly. Hydraulic capture shall be demonstrated using those monitoring wells or piezometers identified in Table A-1 or other wells as accepted by Water Board staff. For well pairs, the inner well must have a potentiometric surface lower than the outer well. For well triplets, the vector described by the potentiometric surfaces at the three wells must show a gradient directed inward of the capture boundary line shown on Figures A-1 or A-2, for the A1 and A2 depth layers, respectively.

Table A-1 Hydraulic Capture Monitoring Plan

Depth Interval	Well Pairs		Well Triplets
A1 Layer	Outer Well	Inner Well	
	MW-86S	MW-55S	
	MW-80S	MW-72S	
	DW-03	MW-68S	
	MW-79S	MW-71S	
	New wells ^{1,2}	MW-71S	
			MW-88S, -87S, -32S
			MW-70S, -69S, -71S ²
			DW-02, MW-29, -21A or new piezometer ³ near MW-31
			MW-58, -45A and -47A
	MW-82S	new piezometer ³ near EX-29/-30	
			MW-54, -76S and -45A
			MW-50S, -88S and -41S
A2 Layer	Outer Well	Inner Well	
	MW-41B	MW-30B2	
	MW-83D	MW-62A	
	MW-69D	MW-62A ²	
	MW-50B	MW-21B	
	MW-47	MW-42B2 or new piezometer ³ near EX-29/-30 or EX-26	
			MW-69D, MW55B, MW-68D ²

¹“New Wells” indicates one or more piezometers in a row north of 71S. There is technical uncertainty as to the exact location of the down gradient capture line. Therefore only one of the piezometers will need to indicate an inward gradient. This piezometer must be outboard of the containment line.”

² It is understood that seasonal groundwater extraction to the north of this well pair/triplet may temporarily expand capture to the north. As a result, it is acceptable that an inward gradient or vector at these points may not be demonstrated during extraction from the A1 interval north of G2R, and/or from the A2 interval north of Alcudia Road. Expanding capture to the north will continue to meet the minimal plume capture requirement.

³ If the new piezometer cannot be installed due to access limitations pursuant to Endangered Species Act, then PG&E will develop an alternative location.

ATTACHMENT C

AREA FOR EXTRACTION AND TREATMENT OF HEXAVALENT
CHROMIUM IN GROUND WATER NORTH OF THOMPSON ROAD

