CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

MEETING OF SEPTEMBER 16-17, 2015
BARSTOW

ITEM: **1**

SUBJECT: **PUBLIC WORKSHOP ON DRAFT ORDER REQUIRING PACIFIC GAS AND ELECTRIC COMPANY (PG&E) TO CLEANUP AND ABATE ITS DISCHARGES OF CHROMIUM TO GROUNDWATER IN THE HINKLEY AREA**

PURPOSE: The workshop purpose is to bring the various parties together, and through facilitation, to discuss key changes in the proposed Cleanup and Abatement Order (CAO). Enclosure 1 to this item contains the draft CAO and nine attachments, which are listed separately in the table below.

DISCUSSION: The Water Board Advisory Team developed this draft CAO after reviewing input received from stakeholders at the May 28, 2015, public workshop and written comments received from stakeholders. This draft CAO also includes suggested changes that the Water Board Prosecution Team and PG&E agreed upon and submitted to the Water Board Advisory Team on July 8, 2015. A key is provided at the beginning of Enclosure 1 to illustrate how the consensus text appears as compared to how the Advisory Team recommended changes appear in the draft CAO.

The draft CAO and its nine attachments were posted on September 1, 2015, for a 30-day public review and comment period. Enclosure 2 is a copy of the cover letter announcing the request for written comments. To ensure that they are considered and become part of the record, any oral comments provided at the workshop should be followed up with written comments by the September 30, 2015 deadline. Any consensus reached at the workshop will be forwarded to the Water Board for its consideration as part of the adoption of the CAO, which is tentatively scheduled for November 4-5.

PUBLIC NOTICE: The Water Board Advisory Team issued a public notice on August 14, 2015, to announce the workshop on the draft CAO. Enclosure 3 is a copy of that public notice. The announcement was emailed to

all parties and emailed individually to subscribers of the Water Board's public Lyris list for the PG&E Hinkley Chromium Cleanup case.

WORKSHOP AGENDA:

September 16, 2015
1:00pm – WELCOME followed by presentation on process
1:30pm – Facilitated discussion
3:00pm – BREAK
3:30pm – Facilitated discussion continuation
5:00pm – DINNER BREAK
7:00pm – Report Out from facilitated discussion
8:00pm – Next Steps

RECOMMMENDA-TION:

This is a public workshop item, and no formal action requested from the Water Board at this time. The Water Board may provide direction to staff as appropriate.

	ENCLOSURE	**BATES NUMBER**
1	Draft Cleanup and Abatement Order (CAO)	**1-5**
	Attachment 1: Orders Replaced by CAO No. R6V-2015-DRAFT	**1-39**
	Attachment 2:Location of Chromium Plumes (3rd quarter 2014)	**1-47**
	Attachment 3:Area of Plume Expansion	**1-51**
	Attachment 4:Active Water Board Orders and Notices Authorizing Cleanup Actions	**1-55**
	Attachment 5:Hydraulic Capture Metrics	**1-59**
	Attachment 6:Hydraulic Capture Monitoring Plan, Shallow Zone of Upper Aquifer	**1-63**
	Attachment 7: Hydraulic Capture Monitoring Plan, Deep Zone of Upper Aquifer	**1-67**
	Attachment 8: Groundwater Monitoring and Reporting Program, CAO No. R6V-2015-DRAFT	**1-71**
	Attachment 9: Summary of Performance and Submittal Requirements	**1-105**
2	Request for Comments issued September 1, 2015, on draft CAO	**1-113**
3	Public Notice issued August 14, 2015, announcing September 16, 2015, workshop on draft CAO	**1-121**

ENCLOSURE 1

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KEY

For

Reviewing Draft CAO

September 1, 2015

The enclosed draft Cleanup and Abatement Order (CAO) contains recommended changes from the Lahontan Regional Water Quality Control Board (Water Board) Advisory Team, and consensus text between the Water Board Prosecution Team and PG&E. Please note that the consensus text is shown in *black italics* and the Advisory Team recommendations are shown in red ~~strikeout~~ for deletions and underline for additions. These changes are illustrated by the following two examples:

1. Advisory Team recommendations (additions and ~~deletions~~):

   Orders in CAO No. R6V-2008-0002A4, which were issued prior to the State of California setting the Cr(VI) drinking water standard at 10 ppb, required PG&E to define the extent of chromium in the upper aquifer ~~to~~ using the interim maximum background levels.

2. Consensus text from Prosecution Team and PG&E (*additions* and ~~*deletions*~~):

   Therefore, this Order requires PG&E to: continue southern plume containment, continue and enhance corrective actions in both aquifers; conduct corrective actions in the northern plumes area, *when applicable*, and define the extent of chromium in the upper aquifer. To ensure progress toward restoration of beneficial uses of the groundwater, this Order sets deadlines for PG&E to reach and maintain specific concentrations of chromium in groundwater, including interim targets such as 50 ppb; 10 ppb; ~~*background values of 3.1 ppb Cr(VI) and 3.2 ppb Cr(T) in the upper aquifer;*~~ and non-detectable levels of chromium in the lower aquifer near the Desert View Dairy.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

CLEANUP AND ABATEMENT ORDER [~~PROPOSED~~DRAFT]
NO. R6V-2015-~~PROP~~DRAFT

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:

Discharger

1. The Pacific Gas and Electric Company (PG&E) 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 the Discharger.

2. This is a new order issued to PG&E to clean up and abate the effects of the discharge of chromium waste or threatened pollution or nuisance. For the purposes of this Order, references to "chromium" include both total (Cr(T)) and hexavalent (Cr(VI)) forms, unless otherwise specified. This Order combines outstanding requirements in previous orders, adds new requirements and deadlines for future cleanup and abatement actions, and replaces previous orders with requirements now incorporated into this Order. Previous orders replaced by this Order are listed in Attachment 1, "CAO and Investigative Orders Replaced by CAO No. R6V-2015-PROP."

Source of Groundwater Contamination

3. The Facility began operating in 1952 and discharged untreated cooling tower wastewater containing hexavalent chromium, used as a corrosion inhibitor, to unlined ponds until 1964. Wastewater percolated through soil to the water table, approximately 80 feet below, creating chromium contamination in groundwater. The area beneath the former unlined ponds is also referred to as the "source area" in this Order. A different corrosion inhibitor was used between 1966 and 1972, with the latter date being when the unlined ponds were replaced with lined ponds. Chromium has not been used to control corrosion at the Facility since 1965.

Hydrogeology

4. In general, the groundwater flow in the Hinkley Valley is primarily to the north, towards the Harper Dry Lake Valley, located about 8 miles north and west (downgradient) of the Facility. The groundwater gradient along the north-south axis of the chromium plume ranges from 0.002 to 0.007 feet per foot (vertical drop over horizontal length), with an

average rate of 0.004 feet per foot. The Mojave River, located approximately one mile south of the Facility, contributes more than 80 percent of the natural groundwater recharge to the Hinkley Valley.

5. The hydrogeology at the Facility and north to the vicinity of Thompson Road consists of an upper, unconfined aquifer and a lower, confined aquifer separated by a clay layer that forms a regional aquitard. Within the upper aquifer, two water bearing zones are recognized as the shallow and deep zones. The hydrogeology in the western and northernmost areas consists of just the upper, unconfined aquifer, as the lower aquifer and clay aquitard pinch out (terminate against the upward sloping bedrock). Depth to groundwater in the Hinkley Valley ranges from 75 to 95 feet below ground surface.

Extent ~~*of Third Quarter 2014*~~ Chromium Contamination

6. ~~*On October 30, 2014,*~~ *On April 30, 2015,* the Water Board received PG&E's "~~*Third Quarter 2014*~~ *First Quarter 2015* Groundwater Monitoring Report and Domestic Well Sampling Results" (~~*2014 3rd*~~ *2015 1st* Quarter Report). Data and information in the ~~*2014 3rd*~~ *2015 1st* Quarter Report show monitoring and extraction well locations where hexavalent and total chromium concentrations exceed interim maximum background levels of 3.1 µg/l or ~~ppb~~ parts per billion (ppb) Cr(VI) and 3.2 ppb Cr(T)~~parts per billion~~ (discussed in Findings 8b, 14, and 15) in groundwater. Well SA-MW-05D, located at the Facility, shows the highest reported concentrations as:

   - Hexavalent Chromium Cr(VI) ~~*3,900*~~ *3,600* ppb (parts per billion)
   - Total Chromium Cr(T) ~~*4,100*~~ *3,700* ppb

7. ~~*The*~~ *PG&E's* 2014 3rd Quarter *Groundwater Monitoring* Report shows chromium in groundwater at concentrations exceeding interim maximum background levels as a plume in the southern area and two "uncertain plumes" (see Finding 8.b.) in the northern area. ~~three separate plumes in an~~ The total area is approximately 8 miles in length and approximately 2 miles in width, throughout the Hinkley Valley and into Harper Dry Lake Valley. Figure 5-5, "Chromium Results for Third Quarter 2014 Groundwater Monitoring and Domestic Well Sampling and Compliance Maximum Plume Outline in Upper Aquifer", from the 2014 3rd Quarter Report shows three non-contiguous chromium plumes in the upper aquifer within this 8-mile area. In the lower aquifer, chromium is detected up to levels exceeding the hexavalent chromium drinking water standard of 10 ppb (see Finding ~~*27*~~ *28*) in a localized area east of Mountain View Road and near Santa Fe Road. For example, the 2014 3rd Quarter Report shows lower aquifer monitoring well MW-100C containing 19.0 ppb Cr(VI). The ~~background~~ water quality in the lower aquifer water for chromium is generally at low (e.g. less than 1 ppb) or non-detectable levels, per monitoring wells MW-11C and MW-14C, between the Facility and east of Mountain View Road near Santa Fe Road. "Non-detect" refers to the lowest concentration that a laboratory analytical instrument can detect while minimizing uncertainty. According to PG&E's November 23, 2010, Work Plan for Evaluation of the Lower Aquifer, the chromium detected in this vicinity in the lower aquifer appears to be the result of contaminated upper aquifer water migrating into the lower aquifer in a localized area at the western edge of an aquitard. The downward migration appears to be a result of the observed downward gradient in the area, which likely extends beyond the edge of the aquitard. Consequently, contaminated water likely flowed from the upper aquifer to the lower aquifer in the localized area east of mountain View Road and near Santa Fe Road.

8. The locations of the upper aquifer plumes are based on Figure 5-5 of the 2014 3rd Quarter Report, and are shown in Attachment 2, "Location of Chromium Plumes (Third Quarter 2014)":

a) The southern plume is contiguous to the original source of waste chromium discharged at the Facility. The southern plume extends northward from the Facility property to just north of Thompson Road, generally following the northerly direction of groundwater flow. The southern plume includes the currently contiguous "western finger" of the chromium plume in the upper aquifer, west of Serra Road, between Highway 58 to the south and Acacia Street to the north.

b) Chromium in the~~Two~~ northern area has been mapped since 2011 as two discontinuous ~~plumes are detached~~ (i.e., non-contiguous) areas of Cr(VI) above the interim maximum background concentration and separate from the southern plume and from each other. The southern-most northern ~~plume~~ area, ~~called the North Hinkley Valley northern plume,~~ extends from just south of Sonoma Street to just south of a topographic high feature known as Red Hill at the Hinkley Gap. The north-most northern ~~plume~~area~~, referred to as the Harper Dry Lake Valley northern plume~~, extends from northwest of Red Hill up to just south of Brown Ranch Road. The boundaries of these northern ~~plumes~~ areas are referred to as "uncertain plumes" because of uncertainty in whether the Cr(VI) is naturally occurring, and if not, what is the appropriate background concentration. ~~are poorly defined or undefined by existing groundwater monitoring wells.~~

c) In general, lesser chromium concentrations (mostly in the single digits) occur in the two ~~detached~~ northern uncertain plumes, with the exception ~~of *three*~~ *a hot spot*~~s~~ of higher chromium concentrations at ~~*MW-154S1,*~~ MW-193S3~~*, and MW-196S3*~~, compared to chromium concentrations in the southern plume. ~~*At MW-154S1, chromium concentrations greater than 10 ppb have been detected since 2012.*~~ At MW-193S3, chromium concentrations have been reported at greater than 100 ppb since 2013, *but are now at 65 ppb Cr(VI) as of the 2015 1st Quarter Report*. ~~*PG&E reported elevated chromium concentrations greater than 20 ppb at MW-196S2 to the Water Board via email on December 18, 2014, subsequent to the 2014 3rd Quarter Report. The location of MW-196S2 is northwest of MW-193S3, in the downgradient flow direction. The chromium plume is undefined to the north and west of MW-196S2 where domestic wells and agricultural wells exist.*~~ *Domestic wells also exist within 1,500 feet of MW-193S3.* Chromium detected in domestic well 16N-01, located in the northeast corner of the Harper Dry Lake Valley and 12 miles from the Facility, is not believed to be from PG&E's release because domestic well 16N-01 is not located in the downgradient groundwater flow direction.

9. Finding 12 in Amended R6V-2008-0002A4 (discussed below in Findings ~~*17, 18, and 19*~~ *18, 19 and 20*) provides a theoretical calculation ~~of~~ for the potential length ~~for the~~of a chromium plume, assuming ~~since the time of~~ the initial ~~1952~~ discharge began in 1952, as 7.32 miles[1]. This value represents the potential migration distance of the leading edge of ~~the~~ a plume in the upper aquifer. This estimate is based on a groundwater flow velocity

[1] The calculation is: (2 feet/day x 365 days/year x 53 years) / 5,280 feet/mile = 7.32 miles of potential migration of the leading edge of the plume. 53 years assumes the time between issuance of CAO No. R6V-2008-0002A4 and the waste discharge is 60 years, minus 7 years for waste chromium to percolate to groundwater.

estimate of 2 feet per day, provided by PG&E and supported by data from the United States Geological Survey and the Mojave Water Agency. The value is a conservative average value from a range of measurements. Using the estimated rate of 2 feet per day groundwater flow velocity, ~~the~~ a chromium plume has the potential to migrate at least an additional 1,460 feet or 0.28 miles since Order R6V-2008-002A4 was issued ~~two years prior to this Order~~January 8, 2013. Added to the original calculation provided, there is a total potential migration distance of at least 7.6 miles, putting the plume into the Harper Dry Lake Valley which is hydraulically downgradient of the Facility. The 7.6-mile estimated calculation is consistent with the approximately 8-mile distance shown on plume maps in the 2014 3rd Quarter Report described in Finding 7.

~~9.~~ As stated in a March 13, 2015, Technical Memo from PG&E's Principal Geologist consultant from Stantec, PG&E believes the estimated calculation above does not consider the historic and current groundwater pumping in the Hinkley Valley that would limit groundwater movement to the north. Additionally, PG&E asserts the groundwater gradients and hydraulic conductivity assumed for the groundwater flow calculation are less for the northern area resulting in groundwater flow velocity less than 2 feet per day.

10. The release from PG&E's Facility is the only known source of anthropogenic chromium in groundwater in the Hinkley upper and lower aquifers. ~~Based on the data and calculations cited in Finding 9 and footnote 1, chromium detections above maximum background levels in groundwater extending from the Facility through the Hinkley Valley into Harper Dry Lake Valley are considered a result of historical releases at the Facility, and are subject to investigation and remediation required by this Order.~~

Regulatory History

11. Discharges from the Facility were first regulated by the Water Board in 1972 under Board Order No. 6-72-44. In late 1987, PG&E reported to the State that total chromium and hexavalent chromium concentrations exceeding the California drinking water standard of 50 ppb total chromium were found in groundwater beneath and downgradient of the Facility (see Finding 3 of Cleanup and Abatement Order No. 6-87-160).

12. On December 29, 1987, the Water Board issued Cleanup and Abatement Order (CAO) No. 6-87-160 to PG&E, requiring a site investigation and initiation of soil and groundwater cleanup actions. Amendments to the 1987 CAO were issued in 1994 and 1998, requiring PG&E to conduct further site assessments, cleanup actions and reporting.

13. On August 6, 2008, the Water Board Executive Officer issued CAO No. R6V-2008-0002 to PG&E, ordering further cleanup of chromium and abatement of the effects of chromium in soil and groundwater from historical discharges at the Facility. CAO No. R6V-2008-0002 also required PG&E to submit a Feasibility Study evaluating cleanup options to hydraulically contain and remediate the known extent of the chromium plume in groundwater to background concentrations.

14. The Water Board Executive Officer amended CAO No. R6V-2008-0002 on November 12, 2008. CAO No. R6V-2008-0002A1 set *the following* average and maximum background levels for Cr(VI) and Cr(T) in groundwater *based on a 2007 study conducted by PG&E* ~~*as follows*~~:

- 1.2 ppb Cr(VI), average background level
- 1.5 ppb Cr(T), average background level
- 3.1 ppb Cr(VI), maximum background level
- 3.2 ppb Cr(T), maximum background level

15. The interim maximum background levels of 3.1 ppb Cr(VI) and 3.2 ppb Cr(T) ~~are~~ have been used to determine the effectiveness of remediation actions and to determine if the chromium plume has migrated into areas previously unaffected by the discharge of waste. ~~These levels also provide for the basis for determining which wells are considered to contain waste chromium attributed to historic discharges from the Facility.~~

16. *In 2011, the approach PG&E used to develop these background values underwent scientific peer review. The reviewers were critical of several aspects of the study approach. Further, PG&E's 2007 background study did not investigate potential background values in the North Hinkley or Harper Dry Lake/Water Valleys. Therefore, it is acknowledged that the accuracy of the currently adopted background values, particularly for the Northern area, is uncertain*. A revised background study, conducted by the United States Geological Survey, is underway, expected to be completed within five years. The USGS is scheduled to produce a Background Study Preliminary Results Report no later than September 2017 and a Final Background Study no later than June 2019. *The USGS background study is investigating natural chromium occurrences throughout the Hinkley Valley, including in the North Hinkley and Harper Dry Lake/Water Valleys.* Following study completion, the Water Board may consider updating chromium background levels and setting final cleanup levels. *In the interim, the levels stated in Finding 14 will continue to be used as background values*, and will be referred to as interim maximum background concentrations.~~.~~

17. ~~*16.*~~ The Water Board Executive Officer issued a second amendment to CAO No. R6V-2008-0002 on April 7, 2009 allowing for the lateral migration of the 4 ppb Cr(VI) eastern plume boundary during implementation of remedial actions (4 ppb Cr(VI) was the level formerly used to define the chromium plume in CAO No. R6V-2008-0002). Accordingly, this Order allows for migration of the 4 ppb chromium plume boundary to accommodate remediation goals under the conditions specified in Orders section V.~~*J*~~ *H.* A map showing the location of allowed plume migration area is included as Attachment 3, "Area of Allowed Plume Expansion."

18. ~~*17.*~~ The Water Board approved and the Executive Officer issued a third amendment to CAO No. R6V-2008-0002 on March 14, 2012, CAO No. R6V-2008-0002A3, replacing plume containment requirements in CAO No. R6V-2008-0002. The Water Board Executive Officer issued a fourth amendment to CAO No. R6V-2008-0002 on January 8, 2013, CAO No. R6V-2008-0002A4, requiring PG&E to conduct further investigations to fully define the chromium boundary in groundwater to the 3.1 ppb Cr(VI) and 3.2 ppb Cr(T) levels.

19. Orders in CAO No. R6V-2008-0002A4, which were issued prior to the State of California setting the Cr(VI) drinking water standard at 10 ppb, required PG&E to define the extent of chromium in the upper aquifer ~~to~~ using the interim maximum background levels. Order A.2.a required that monitoring well locations were not to exceed one-quarter mile distance (1,320 feet) from other monitoring wells in accessible areas. Order C.2

requiredds that maps include chromium plume boundary lines drawn to connect any monitoring well located within one-half mile (2,600 feet) of any other monitoring well having chromium concentrations exceeding background levels. PG&E used this plume boundary to define who received offers for replacement water and property buyout. With the drinking water maximum contaminant level now set at 10 ppb for Cr(VI), prescriptive plume definition and mapping requirements are no longer needed, as the plume map is not being used to determine who gets replacement water (See Findings 22, 42-45; note PG&E has terminated its property purchase program). Instead, this Order requires ongoing investigation of groundwater to provide sufficient resolution of chromium concentrations to determine plume migration and to judge successful remediation, and it requires plume boundary mapping consistent with the industry standard of best professional judgment by a California licensed Professional Geologist or Professional Engineer. Accordingly, this Order requires installation of monitoring wells and mapping consistent with these criteria.

The requirement for a minimum well spacing of 1,320 feet or less is retained in part by this Order to provide regulatory consistency. With the Cr(VI) drinking water standard set at 10 ppb and the uncertainty of the interim background levels for chromium, this Order allows an alternative to the prescriptive well spacing requirement. In lieu of installing a proposed monitoring well in a location not to exceed 1,320 feet from other monitoring wells, this Order requires PG&E to use best professional judgment to evaluate and report on the need for the additional monitoring wells to meet the 1,320-foot spacing requirement.

19.20. 19. In response to requirements in CAO No. R6V-2008-0002A4, PG&E submitted the April 24, 2014 document, "Status Report for the Northern Areas." The document proposed to investigate chromium in groundwater in seven areas in the northern uncertain plumes. By late 2014Through first quarter 2015, only two areas had been investigated and a third area will hadve twoa monitoring wells cluster (MW-212S1 and MW-212S2) installed on the north sidenear of Red Hill and east of Hinkley Road in early 2015to support chromium plume boundary investigations. PG&E has claimed an inability to gain access to private properties and presence of endangered species habitat has prevented investigative activities in certain areas. PG&E has not fully defined the chromium plume boundaries in other areas of the upper aquifer based on its claim of an inability to gain access to private properties and endangered species habitat. Thus, some boundaries in the two northern plumes are not fully defined because they exceed the 1,320-ft distance criteria for monitoring wells and/or do not define chromium concentrations to maximum background levels.

20.21. 20. In compliance with CAO No. R6V-2008-0002, PG&E submitted a Feasibility Study and addenda in 2010 and 2011, identifying strategies for implementing final site cleanup for achieving background conditions of chromium, including timeframe estimates for reaching various cleanup milestones. In the June 30, 2014 document, "Remedial Timeframe Assessment", PG&E updated the estimates from the 2010 Feasibility Study to reflect current conditions and knowledge regarding site cleanup. The updated estimates range from six to 23 years to remediate 99 percent of the 50 ppb plume; and 11 to 50 years to remediate 99 percent of the 10 ppb plume. The ranges reflect remediation times for different modeled hydrologic layers of the upper aquifer (finer-grained versus coarser-grained model layers) and different assumptions of in-situ remediation modeling. These estimates inform the basis for the cleanup requirement deadlines in this Order.

~~21.~~22. ~~21.~~ On January 7, 2011, CAO No. R6V-2011-0005 was issued to PG&E requiring interim continuous drinking water (bottled water) for residents having Cr(VI) or Cr(T) in domestic wells above the interim maximum background levels. The Order also established a quarterly domestic well sampling program in Hinkley. Amended CAO No. R6V-2011-0005A1, issued on October 11, 2011, required permanent continuous drinking water (whole house water or WHW) that met drinking water standards for residents having chromium in domestic wells above the interim maximum background levels. A second amended Order, CAO No. R6V-2011-0005A2, was issued on June 7, 2012, incorporating PG&E's expanded WHW program for all Hinkley residents within the affected area having detectable chromium in domestic wells. A third amendment, CAO No. R6V-2011-0005A3, issued February 18, 2014, set bottled water quality requirements at the average background value for hexavalent chromium. These Orders are listed in Attachment 1, "CAO and Investigative Orders Replaced by CAO No. R6V-2015-PROP."

~~22.~~23. ~~22.~~ On April 9, 2008, the Water Board issued general waste discharge requirements (WDRs), Order No. R6V-2008-0014, that allow~~s~~ PG&E to implement various remediation projects to provide chromium plume containment and to clean up chromium pollution in groundwater. To date, the Water Board has issued multiple Notices of Applicability permitting PG&E to conduct in-situ (below ground) remediation in the southern plume, inject freshwater into wells along Serra Road to prevent western plume migration, and implement tracer tests and pilot studies.

~~23.~~24. ~~23.~~ Since 1991, the Water Board has issued individual WDRs to PG&E to apply extracted chromium-contaminated groundwater to crop fields as a means of converting Cr(VI) to trivalent chromium (Cr3). On March 12, 2014, the Water Board issued WDRs, Board Order No. R6V-2014-0023 allowing the discharge of extracted groundwater on up to 500 acres of agricultural fields in the Hinkley Valley to be used to facilitate cleanup of groundwater contamination in the southern plume. Attachment 4, “Active Water Board Orders and Notices Authorizing Clean up Actions” lists active WDRs and Notices of Applicability issued to PG&E since 2008.

~~24.~~25. ~~24.~~ In compliance with CAO No. R6V-2008-0002A3, PG&E has been operating a groundwater extraction system to maintain hydraulic containment of the southern chromium plume south of Thompson Road. Hydraulic containment is determined by comparing hydraulic gradients or flow direction vectors calculated from specific monitoring well pairs and triplets within the mandated capture zone. Since 2nd quarter 2014, monitoring data indicate remedial actions have reduced the area in the capture zone where chromium concentrations exist greater than 10 ppb and 50 ppb. That is, as groundwater extraction in the southern plume continues, the leading (northern) edge of the southern chromium plume is being pulled to the south (the plume area is decreasing), and the chromium concentrations within the capture area are decreasing. Therefore, the existing capture metrics are now too far north to verify containment of the chromium plume. The existing capture metrics adopted in CAO No. R6V-2008-0002A3 are shown in Attachments 5 through 7 “Hydraulic Capture Metrics,” “Hydraulic Capture Monitoring Plan, Shallow Zone of Upper Aquifer,” and “Hydraulic Capture Monitoring Plan, Deep Zone of Upper Aquifer.”

~~25.~~26. ~~25.~~ On October 3, 2014, PG&E submitted the "Work Plan to Conduct Hydraulic Testing and Capture Analysis, Winter 2014-2015", proposing to conduct hydraulic testing

activities in the northern area of the southern chromium plume. The purpose of the testing is to evaluate an alternate and more southerly capture zone configuration for the chromium plume. The Assistant Executive Officer approved PG&E's work plan on December 19, 2014. The December 19, 2014 approval letter temporarily amended CAO No. R6V-2008-0002A3 to require monitoring and reporting to determine if during the testing, chromium concentrations are increasing in nearby wells; to require contingency plan implementation if such increases are noted; and to set notification requirements. This Order incorporates the requirements and corresponding deadlines of the December 19, 2014 letter as if set forth fully herein. ~~If the winter 2014-2015 testing activities do not result in a proposal for alternate capture metrics that is approved by the Executive Officer, the existing capture metrics in Attachments 5 through 7 will remain in effect to determine compliance with plume containment requirements.~~As of August 2015, Water Board staff is reviewing PG&E's report on the completed hydraulic testing and capture analysis. The Water Board's Executive Officer may amend this Order at any time to incorporate alternate capture metrics.

Exceedances of Water Quality Objectives and Impairment of Beneficial Uses

~~26.~~27. ~~26.~~ The 1995 Water Quality Control Plan for the Lahontan Region (Basin Plan) established water quality objectives for the protection of beneficial uses. The beneficial uses of the groundwater in the Mojave Hydrologic Unit designated in the Basin Plan include municipal and domestic supply, agricultural supply, fresh water replenishment, and industrial service supply.

~~27.~~28. ~~27.~~ Basin Plan water quality objectives to protect the municipal and domestic supply beneficial use include the following Maximum Contaminant Levels (MCLs), referred to as the drinking water standards, that have been established by the California Department of Public Health (now the California Division of Drinking Water):

Hexavalent Chromium	10 ppb (effective July 1, 2014)
Total Chromium	50 ppb

~~28.~~29. ~~28.~~ The concentrations of hexavalent chromium and total chromium detected in groundwater samples taken from wells on and off the Facility of up to 3,900 and 4,100 ppb Cr(VI) and Cr(T), respectively, exceed water quality objectives specified in the Basin Plan to protect drinking water supplies. These concentrations adversely affect the groundwater in the Mojave Hydrologic Unit for its beneficial uses.

~~29.~~30. ~~29.~~ The level of waste chromium in groundwater on and off the Facility constitutes a pollution as defined in Water Code section 13050, subdivision (l):

> *"Pollution" means an alteration of the quality of waters of the state by waste to a degree which unreasonably affects either of the following:*
> *(A) The waters for beneficial uses.*
> *(B) Facilities which serve these beneficial uses.*

~~30.~~31. ~~30.~~ California Water Code section 13304, subdivision (a) states in part:

> *A person…who has caused or permitted, causes or permits, or threatens to cause or permit any waste to be discharged or deposited where it is, or probably will be, discharged to waters of the state and creates, or threatens to create, a condition of pollution or nuisance, shall, upon order of the regional board, clean up or abate the effects of the waste, or, in the case of threatened pollution or nuisance, take other necessary remedial action, including but not limited to, overseeing cleanup and abatement efforts. A cleanup and abatement order issued by the state board or a regional board may require the provision of, or payment for, uninterrupted replacement water service, which may include wellhead treatment, to each affected public water supplier or private well owner.*

~~*31.*~~*32.* ~~*31.*~~ Findings in this Order identify where chromium wastes have been discharged or deposited into waters of the state in groundwater in violation of the water quality objectives in the Basin Plan, or where PG&E has caused or permitted, or threatens to cause or permit waste to be discharged or deposited where it is or probably will be discharged into waters of the state, creating or threatening to create a condition of pollution or nuisance. PG&E is therefore subject to Water Code section 13304(a), requiring cleanup and abatement of waste discharges.

Need for Requirements in this Order

~~*32.*~~*33.* ~~*32.*~~ Soil and groundwater remediation actions have taken place since 1988. ~~Despite this~~Although progress has been made, chromium in groundwater in both the upper and lower aquifers continues to exist at levels greater than interim maximum background values, and at levels that adversely affect beneficial uses. The chromium plume in the upper aquifer ~~remains incompletely defined~~is at concentrations significantly above the drinking water standards. Therefore, this Order requires PG&E to: continue southern plume containment, continue and enhance corrective actions in both aquifers; conduct corrective actions in the northern uncertain plumes area, *when applicable*, and define the extent of chromium in the upper aquifer. To ensure progress toward restoration of beneficial uses of the groundwater, this Order sets deadlines for PG&E to reach and maintain specific concentrations of chromium in groundwater, including interim targets such as 50 ppb and~~;~~ 10 ppb.~~;~~ ~~*background values of 3.1 ppb Cr(VI) and 3.2 ppb Cr(T) in the upper aquifer*; and non-detectable levels of chromium in the lower aquifer near the Desert View Dairy.~~

~~*33.*~~*34.* ~~*33.*~~ Monitoring and reporting are required under this Order, pursuant to Water Code section 13267, which authorizes a regional board to require persons who have discharged, discharges or is suspected of having discharged, or who proposes to discharge waste within its region to furnish technical or monitoring reports. The burden, including costs of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the report. The required technical reports are necessary to evaluate PG&E's compliance with the terms and conditions of this Order, and to assure protection of waters of the state and restoration of beneficial uses. Consistent with Water Code section 13267, this Order requires implementation of a monitoring and reporting program that is intended to verify the effectiveness of remediation, track progress toward meeting remediation targets, evaluate threats to and

monitor water quality in private supply wells. The burden of the monitoring and reporting is outweighed by the need for information gained by the monitoring and reporting requirements because the monitoring is ~~not more than is~~ necessary to ~~meet the requirements of the Order~~verify the effectiveness of the remediation, track progress towards meeting remediation targets, and evaluate threats to and monitor water quality in private supply wells. Monitoring requirements for this Order are specified in Attachment 8, "Groundwater Monitoring and Reporting Program, CAO No. R6V-2015-PROP."

~~34.~~35. ~~34.~~ This Order requires PG&E to clean up and abate the effects of historical chromium discharges from the Facility. Several different cleanup methods are being implemented by PG&E to meet the requirements of past enforcement actions, including groundwater extraction and management; in-situ (subsurface) remediation, and freshwater injection. Cleanup methods are currently conducted under Board Orders (waste discharge requirements, WDRs) or Notices of Applicability of General Orders, which contain~~ing~~ specific monitoring for remediation effectiveness, plume boundary control, plume containment, remediation byproducts, and private supply well protection. This Order does not alter or revise the monitoring required by current Board Orders, but instead prescribes monitoring and reporting in addition to what is required in those Board Orders (see Attachment 4, "Active Water Board Orders and Notices Authorizing Cleanup Actions").

~~35.~~36. ~~35.~~ On December 19, 2014, PG&E submitted a document titled "Draft Groundwater Monitoring and Reporting Program, PG&E Hinkley Compressor Station" (Draft MRP), proposing a number of changes to existing monitoring and reporting programs for the Hinkley groundwater cleanup project. The Draft MRP proposed reducing the number and frequency of monitoring well sampling for the contiguous southern plume area and the non-contiguous northern uncertain plumes area north of Salinas Road; consolidating all requirements for monitoring into one site-wide plan; streamlining the current chromium monitoring well network to eliminate redundant monitoring. The Draft MRP also proposed modifying the domestic well monitoring program by reducing the sampling frequency of certain wells and eliminating other wells.

~~36.~~37. ~~36.~~ Water Board staff has reviewed PG&E's Draft MRP. ~~*and do not agree that reducing the number of monitoring wells and frequency of monitoring to the full extent proposed is appropriate at this time. The basis for this is as follows*~~ *The following conclusions from that evaluation form the basis of the MRP in this CAO:*

a) *The program presented in PG&E's Draft MRP for southern plume monitoring meets the monitoring objectives to track remediation effectiveness, chromium plume tracking and domestic well protection, with several additions incorporated into the "Groundwater Monitoring and Reporting Program, CAO No. R6V-2015-PROP", Attachment 8.*

b) Remediation system expansion is still ongoing in the southern plume area. For example, expansion of the Ranch agricultural treatment unit (ATU) was completed in third quarter 2014; construction of new ATUs in the southern portion of the southern contiguous plume are planned and under construction. In-situ remediation zones may be expanded over current operations. Expansion of remediation system will result in increased groundwater extraction, infiltration, and treated water injections over what has occurred in the past. For this reason, quarterly sampling at ~~*key monitoring*~~ *domestic*

wells is required until expanded systems have been operating for a length of time to detect and react to any unforeseen changes to water quality, *as specified in the Mitigation Monitoring and Reporting Program (MMRP) in the ATU WDRs referenced in the "Groundwater Monitoring and Reporting Program, CAO No. R6V-2015-PROP.* ~~*in the southern plume area. Also, in the "western finger" area, quarterly sampling is required to verify that recent remediation efforts are effective in achieving target concentrations.*~~

c) The extent of chromium in groundwater remains ~~incompletely defined in the northeastern part of the southern plume area and much of~~ uncertain in the northern ~~plumes~~ area. ~~Additionally, because containment actions are not being currently implemented, the two northern plumes continue to migrate with natural groundwater flow, continuing to threaten beneficial uses. Until the chromium plume is completely defined and contained from migration, quarterly monitoring of certain private supply and monitoring wells is needed to track chromium concentrations changes and protect public health.~~ The "Groundwater Monitoring and Reporting Program, CAO No. R6V-2-015-PROP", shown in Attachment 8, ~~however,~~ *allows* ~~*quarterly sampling of certain multi-depth monitoring wells to be reduced to a semi-annual and annual basis*~~ *sampling frequency modifications over time* under certain conditions. Such conditions include when *statistical trends indicate changes in sampling frequency are warranted as described in the "Groundwater Monitoring and Reporting Program, CAO No. R6V-2-015-PROP* ~~*chromium levels decrease in wells to levels below criteria set for quarterly monitoring*~~.

~~*37.*~~*38.* ~~*37.*~~ Certain monitoring wells may be eliminated from the sampling program, or their sampling frequency reduced based on well "redundancy" (i.e., monitoring wells within 200 feet of each other installed in the same aquifer layer). Over the more than 25 years of site investigation and cleanup, numerous monitoring wells have been installed for different investigations. Where the density of wells is such that duplicate wells are monitoring the same aquifer zone, removing such wells will not compromise monitoring objectives.

Replacement Water for Affected Private Supply Wells

~~*38.*~~*39.* ~~*38.*~~ The groundwater aquifer in the Hinkley Valley is the sole source of water supply for domestic and community supply wells in the area. The ~~*2014 3rd*~~ *2015 1st* Quarter Report indicates ~~*128*~~ *99* private water supply wells were sampled for hexavalent chromium. Of these, ~~*10*~~ *nine* wells contained hexavalent chromium greater than interim maximum background levels. The highest hexavalent chromium concentration measured in a private supply well in ~~*third*~~ *first* quarter ~~*2014*~~ *2015* was ~~*4.8*~~ *4.2* ppb. No private supply wells sampled contained hexavalent chromium greater than the 10 ppb ~~MCL~~drinking water standard. However, as shown in Figure 5-5 of the ~~*2014 3rd*~~ *2015 1st* Quarter Report, private supply wells are located near and downgradient of monitoring wells containing Cr(VI) concentrations at or above the ~~MCL~~drinking water standard.

~~*39.*~~*40.* ~~*39.*~~ California Water Code section 13304, subdivision (f) states:

Replacement water provided pursuant to subdivision (a) shall meet all applicable federal, state, and local drinking water standards, and shall have comparable quality to that pumped by the public water system or private well owner before the discharge of waste.

~~40.~~41. ~~40.~~ In State Water Board Water Quality Order 2005-007 (*Olin Order*), the State Water Board clarified that an "affected well," for which regional water boards have discretion to require replacement water pursuant to Water Code 13304(a), was one that did not meet the federal, state and local drinking water standards. The *Olin Order* also held that the Regional Water Boards may require dischargers to submit water replacement plans prior to documentation of contaminant levels exceeding the relevant standard. The *Olin Order* held that where water quality data exhibit trends indicating the likelihood of future exceedances, it is prudent and appropriate for regional water boards to take such action before actual well exceedances occur (*Olin Order* at p. 7).

Replacement Water Service

~~41.~~42. ~~41.~~ From 2011 to 2014, in response to CAO No. R6V-2011-0005 and amendments, PG&E provided bottled water and/or whole-house water (WHW) to residences or businesses within the affected area and having detectable chromium in well water. On July 1, 2014, the California Division of Drinking Water's adoption of the 10 ppb Cr(VI) drinking water standard became effective. PG&E ceased providing bottled water and/or WHW on October 31, 2014, since no residence or business had hexavalent chromium above the new standard. However, consistent with the Olin Order, if future monitoring data indicate water in private supply wells *with*in the *domestic well sampling area defined in the "Groundwater Monitoring and Reporting Program, CAO No. R6V-2015-PROP", Attachment 8,* ~~*affected area (defined in Finding 43) is*~~ *are* likely to exceed drinking water standards for Cr(VI) and the detections are linked to PG&E's historical releases, PG&E will be required to submit plans to provide replacement water supply to such wells in either a modification of this Order, or a separate order.

~~42.~~43. ~~42.~~ Accordingly, this Order requires that PG&E submit replacement water plans where private supply well concentrations ~~*in the affected area*~~ exhibit increasing trends indicating the likelihood of future exceedances of the hexavalent chromium drinking water standard.~~Maximum Contaminant Level (MCL)~~~~*, or if a private supply well has hexavalent chromium reaching within 20 percent of the hexavalent chromium MCL (i.e., 8 ppb)*~~. ~~Interim replacement water (i.e., bottled water) shall be provided within 2~~ 10 ~~working *business* days of receipt *of a laboratory report identifying* the first detection of chromium in a private supply well at or above the MCL. Permanent *Long-term* replacement water shall be provided within 45 days of such detection. This action requires that PG&E conduct sampling of domestic wells in the Hinkley and Harper Dry Lake Valleys.~~ This requirement for replacement water does not supersede previous, existing or future requirements to implement mitigation measures contained in the 2013 Environmental Impact Report pertaining to replacement water for private supply wells affected due to remedial activities; for example, those requirements specified in Board Order No. R6V-2014-0023.

~~*43. The* ***affected area*** *is defined as all domestic or community wells located laterally within one mile downgradient or cross-gradient from the 3.1 ppb Cr(VI) or 3.2 ppb Cr(T) plume boundaries (whether contiguous or non-contiguous) based upon monitoring data drawn in the most current quarterly site-wide groundwater monitoring report submitted by PG&E. The affected area may change based on new data collected and evaluated each quarter.*~~

44. **Affected wells** are defined as domestic or community wells in the *domestic well sampling area defined in the "Groundwater Monitoring and Reporting Program, CAO No.*

R6V-2015-PROP", Attachment 8, ~~*affected area*~~ containing chromium in concentrations (measured at any time by PG&E or by local, state or federal agencies) that are above the primary drinking water standards of 10 ppb Cr(VI) or 50 ppb Cr(T) and where the chromium detections are linked to PG&E's historical releases.

Independent Consultant

45. The Water Board recognizes the significant community interest in the site and the challenges community members may have in evaluating and understanding the technical aspects of this site and cleanup actions. The Hinkley community is in a rural setting in the unincorporated area of San Bernardino County. Community members are made up of different income levels and ethnicities. The Lahontan Water Board is committed to principles of environmental justice. This means providing fair treatment of people of all races, cultures and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies. (Gov. Code § 65040.12(e).) Fair treatment means that "no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental and commercial operations or policies." (U.S. EPA http://www.epa.gov/environmentaljustice/basics/index.html.) The goal of environmental justice is "for everyone to enjoy the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work." (*Id.*)

46. Therefore, it is important to the Water Board that environmental justice is promoted by ensuring that the cleanup and abatement of chromium contamination of this area promotes equity and affords fair treatment, accessibility and protection for all members of the community. To effectively participate in evaluating and understanding the technical aspects of cleanup actions, the Water Board finds it is essential that the community have access to independent consultants. The cost of this effort shall be borne by PG&E pursuant to Water Code section 13304.

Legal and Regulatory Authorities

47. This Order conforms to and implements policies and requirements of the Porter-Cologne Water Quality Control Act (Division 7, commencing with Water Code section 13000) including (1) sections 13267 and 13304; (2) applicable State and federal regulations; (3) all applicable provisions of statewide Water Quality Control Plans adopted by the State Water Resources Control Board (State Water Board) and the Water Quality Control Plan for the Lahontan Region (Basin Plan) adopted by the Lahontan Water Board including beneficial uses, water quality objectives, and implementation plans; (4) State Water Board policies and regulations, including State Water Board Resolution No. 68-16, Statement of Policy with Respect to Maintaining High Quality of Waters in California; Resolution No. 88-63, Sources of Drinking Water; Resolution No. 92-49, Policies and Procedures for Investigation, and Cleanup and Abatement of Discharges under Water Code Section 13304; California Code of Regulations (CCR) Title 23, Chapter 16, Article 11; CCR Title 23, section 3890 et. seq.; and (5) relevant standards, criteria, and advisories adopted by other State and federal agencies.

Consideration of California Water Code section 106.3

48. Water Code section 106.3 establishes a state policy that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes, and directs state agencies to consider this policy when adopting regulations pertinent to water uses described in the section, including the use of water for domestic purposes. This Order promotes that policy by requiring PG&E, in accordance with time schedules, to clean up its past hexavalent chromium discharges to reach, at a minimum, maximum contaminant levels designed to protect human health and ensure that water is safe for domestic use. This Order also requires replacement drinking water where PG&E has affected individual domestic water supplies to the point where maximum contaminant levels (drinking water standards) are exceeded, and replacement water plans when there is a threat of exceedance.

California Environmental Quality Act

49. This Order is a project for purposes of the California Environmental Quality Act (CEQA) and is subject to the provisions of CEQA (Public Resources Code, section 21000 et seq.). The Water Board is the lead agency for this Project, and certified an Environmental Impact Report (EIR) at a public meeting on July 17, 2013 (Resolution R6V-2013-0060). The EIR analyzed the impacts of foreseeable cleanup activities, including those that may be implemented under this Order, such as groundwater extraction and application to agricultural treatment units, in-situ remediation, and freshwater injection.

50. The EIR describes potentially significant environmental impacts that may occur as a result of implementing cleanup activities. Potentially significant and unavoidable impacts were identified for the following water quality and biological resources:

a. Impacts to water quality in the Hinkley Valley aquifer due to remedial actions:
   - Temporary chromium plume bulging;
   - Temporary increase in remedial byproducts, including those related to agricultural treatment units:
     - Total dissolved solids
     - Uranium and other radionuclides

b. Impacts to biological resources due to construction of agricultural units:
   - Conflicts with wildlife movement (i.e., desert tortoise migration corridors could be lost due to new agricultural fields for remediation purposes)

51. This Order requires cleanup of chromium-contaminated groundwater to interim remediation targets, including background conditions, which may result in one or more significant and unavoidable impacts described above. Findings required by CEQA sections 15091 through 15093, regarding any significant environmental effect of the project, including a statement of overriding considerations, were adopted by the Water Board in Board Order No. R6V-2014-0023.

Public Workshops on Draft CAO and Consensus Points

52. The Water Board's Prosecution Team sent a draft CAO on January 21, 2015, to PG&E and posted that draft on the Water Board's public webpage for public accessibility. Subsequently on February 4, 2015, the Water Board's Advisory Team issued a public notice requesting review and comment on the Prosecution Team's draft CAO by March 13, 2015. The Water Board received six comment letters by the due date.

53. Because the significance of the comments received, the Water Board held a public workshop on May 28, 2015, in Barstow to bring the various parties together, and through a facilitated discussion, reach consensus on some main policy issues in the draft CAO.

54. After the May 28, 2015, public workshop, the Water Board's Prosecution Team met with PG&E on several occasions to discuss and draft consensus points. On July 8, 2015, the Water Board's Prosecution Team submitted consensus points that it had worked out with PG&E. The submitted consensus points suggested many revisions to language in the draft CAO, including significant revisions to Attachment 8 (the Monitoring and Reporting Program).

IT IS HEREBY ORDERED that, pursuant to the Water Code sections 13267 and 13304, PG&E 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:

I. PG&E shall implement on-going corrective actions, including but not limited to agricultural treatment units (ATUs), in-situ remediation, and freshwater injections. Corrective actions shall be conducted in accordance with approved workplans, WDRs, Notices of Applicability (see Attachment 4, "Active Water Board Orders and Notices Authorizing Clean Up Actions"), monitoring programs, or as modified with the Water Board's or its Executive Officer's approval.

II. PG&E shall not cause or permit any additional waste chromium to be discharged or deposited where it is, or probably will be, discharged into waters of the State.

III. PG&E shall upload all technical documents, such as workplans, reports, letters, memorandums, etc., to the State Water Resources Control Board's Geotracker database, within **one** business day of the document date, so that they can be viewed by the public at the link: https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=SL0607111288

IV. Chromium Plume Definition in the Upper Aquifer

A. PG&E shall define, with sufficient resolution using the industry standard of best professional judgment (as defined below), the extent of total and hexavalent chromium in the upper aquifer from the source area at the compressor station into the Harper Dry Lake Valley where chromium discharge threatens beneficial uses.

1. For the southern plume, "sufficient resolution" means either data is collected from monitoring wells spaced no more than 1,320 feet apart or where monitoring wells are more than 1,320 feet apart a California licensed Professional Geologist or Civil Engineer considers all available hydrogeologic information and uses the industry standards of best professional judgment when interpreting or extrapolating the existing data.

2. For the northern area, "sufficient resolution" means that a California licensed Professional Geologist or Civil Engineer considers all available hydrogeologic information and uses the industry standards of best professional judgment when interpreting or extrapolating the existing data.

3. As of the date this Order is issued, ~~undefined plume~~certain areas exist where there is little to no subsurface information about chromium concentrations in the groundwater and these areas may exhibit insufficient resolution. These areas ~~are~~include: east of Summerset Road and Acacia Street; eastern boundary for the Hinkley Valley northern uncertain plume; northwest of MW-154S1, north and west of MW-196; and east and west of Hinkley Road starting at MW-161 and north to Grasshopper Road.

4. Best professional judgment means the California licensed Professional Geologist or Civil Engineer must consider, at a minimum, these factors when interpreting or extrapolating the existing data to define the chromium plume boundaries:

   i. Geology - pertinent subsurface features such as location and depth to bedrock, influences of structure (e.g. folding and faulting), and stratigraphy.
   ii. Hydrogeology – location and hydraulic properties of the hydrostratigraphic units including, as appropriate, hydraulic conductivity, hydraulic gradients (e.g. horizontal and vertical, regional and localized due to groundwater extraction or injection), saturated aquifer thickness, groundwater flow velocities and directions, characteristics of confined, unconfined, and vadose zones.
   iii. Geochemistry – nature and extent of contamination, pertinent groundwater chemistry, historical data from monitoring wells, and appropriate trend analyses. Location of, depth to, and hydrogeologic influences of bedrock.

~~A.~~B. To achieve ~~defining the chromium plume~~sufficient resolution for these areas listed in section VI.A.3 of this Order ~~to the maximum background levels,~~ PG&E shall conduct the following actions in areas where access is currently allowed:

~~*1. Install monitoring well Red Hill 5, east of Hinkley Road at Burnt Tree Road, as proposed in the "Status Report for Northern Areas," dated April 24, 2014 (see Finding 19) and confirmed in an October 22, 2014 electronic message. Following installation and development, add the well to the Groundwater Monitoring and Reporting Program (Attachment 8 of this CAO) beginning first quarter 2015.*~~

~~1.~~ ~~2~~. Within 30 days of the date this Order is issued, either submit a workplan proposing ~~a~~ multi-depth monitoring well locations ~~within the 2,700-foot distance separating Summerset Road and MW-110S on Acacia Street in the southern plume where chromium concentrations at both locations exceed~~

~~maximum background levels~~, or submit a technical justification based on best professional judgment explaining the reasons why additional subsurface information is not needed for sufficient resolution in these area(s). The technical justification must also consider the protection of public health. If submitting t~~T~~he workplan, then it ~~shall~~ must include proposed well designs and describe the method and manner of installation. ~~In addition, the workplan shall evaluate potential well installation areas north and west of MW-196 out to one mile.~~ If ~~a~~ locations were considered but not chosen because they are ~~is~~ inaccessible, ~~the workplan shall propose multi-depth monitoring wells and describe the method and manner of installation. If the location is not accessible,~~ explain why the area is inaccessible, and what PG&E has done to try to gain access. As access is gained over time, PG&E must use best professional judgment to assess if additional wells within those areas are necessary to define the plume boundary.

~~2. 3. Install the wells required in Order IV.A.21 within 90 days of the Executive Officer's approval. Following development and sampling, add the new wells to the Groundwater Monitoring Program (see Attachment 8) beginning in **third quarter 2015**.~~

~~B. PG&E shall submit a workplan to install monitoring wells (for further plume definition) to the Water Board **within 30 days of any change in land access status. Changes in land access status include, but are not limited to**, being provided access to private property by the owner, acquisition of private property, and approval from agencies, such as Department of Fish and Wildlife, to lands that may be considered endangered species habitat or threatened species habitat. The workplan shall state the date of the change and propose a multi-depth monitoring well(s) to determine chromium concentrations in groundwater at that location. The workplan shall include proposed well designs and describe the method and manner of installation.~~

C. Unless otherwise ordered, all monitoring wells required by the Water Board shall be installed, developed, and sampled **within 6 months of the date of approval** when access to land is allowed.

D. All monitoring wells installed under requirements in this Order shall be added to the Groundwater Monitoring and Reporting Program (MRP) (see Requirement VIII, Attachment 8) upon the first sampling event. Monitoring well designs and boring logs shall be included as attachments in quarterly groundwater monitoring reports. All new wells shall be sampled at a **quarterly frequency.**

V. Southern Plume Containment

A. For the purposes of this Order, southern plume containment is defined as:

1. No further migration or expansion of the chromium plume to locations where hexavalent chromium and total chromium is below interim maximum background levels, or

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2. No further migration or expansion of the 50 ppb Cr(VI)/Cr(T) or 10 ppb Cr(VI)/Cr(T) boundaries *to outside the area(s) of hydraulic capture* ~~*in all directions in the southern chromium plume*~~. Hydraulic containment is determined by comparing hydraulic gradients or flow direction vectors calculated from specific monitoring well pairs and triplets within the mandated capture zone.

~~*B.* ***As of the date this Order is issued****, PG&E shall continuously implement previously approved, or as subsequently approved by the Executive Officer, groundwater extraction to contain the southern chromium plume. Currently, groundwater extraction between Santa Fe Avenue and Thompson Road is at an annual average pumping rate of 1,111 gallons per minute and discharged to agricultural treatment units.*~~

B. ~~*C.*~~ **Beginning ~~July~~ January 15, 201~~5~~6**, and every three months thereafter, PG&E shall submit quarterly hydraulic capture metric reports containing **monthly** capture metric information to verify containment of the southern plume from migration. Report information shall include groundwater elevation data, groundwater extraction rates, capture metrics, and maps showing the location for all referenced wells and monitoring data and chromium plume boundaries. The report shall provide a conclusion as to whether the 50 ppb Cr(VI)/Cr(T) or 10 ppb Cr(VI)/Cr(T) boundary line has migrated or expanded ~~*1,000 feet or more in distance from boundaries*~~ *to outside the area(s) of hydraulic capture* established as of the date this Order is issued.

C. ~~*D.*~~ Compliance with containment requirements will be determined by (1) comparing hydraulic gradients or groundwater flow direction vectors calculated from groundwater elevation data from select well pairs/triplets and piezometers (2012 capture metrics), as outlined in Attachments 5-7, and (2) comparing the 50 ppb Cr(VI)/Cr(T) and 10 ppb Cr(VI)/Cr(T) boundaries to plume maps as of the date this Order is issued. PG&E is in violation of these~~is~~ r~~R~~equirements if at any time any of the following conditions occurs:

1. The third consecutive month of data (e.g., January, February, and March) indicates that the well pair/triplet capture metrics are still not being met; or

2. If approved capture metrics are not met 3 out of 12 months during the course of one year (e.g. July 2015 through July 2016); or

3. If the 50 ppb Cr(VI)/Cr(T) or 10 ppb Cr(VI)/Cr(T) boundaries migrate or expand *to outside the area(s) of hydraulic capture* ~~*1,000 feet or more from current boundaries*~~ *during any monitoring event*.

D. ~~*E.*~~ Should any of the above conditions occur, then by the 15th of the month following the quarterly report submittal, PG&E shall submit a contingency plan to re-establish capture as soon as practical. The contingency plan shall propose contingency monitoring wells located downgradient and cross gradient to the original capture zone boundary set in 2012 and a monitoring program for verifying plume capture. Upon approval by the Executive Officer, PG&E shall implement the contingency plan according to the schedule that has been approved or issued. All contingency

assessments and subsequent corrective actions shall be described in **monthly** capture metric reports due by the 15th of each month. Reports shall provide data and information to demonstrate progress towards resuming plume capture. Reports shall also include maps that show the location of all referenced wells, monitoring data, original plume boundary lines, and water supply wells within one-half mile of the original capture zone boundary lines.

E. ~~*F.*~~ PG&E shall notify the Water Board **within one week** when contingency actions are taken. The notice shall identify the date or instance leading to the contingency action, what the action is, and monitoring actions to be undertaken for verifying the contingency action is effective. A map shall accompany all data showing referenced wells, monitoring data, plume boundary lines, and water supply wells within one-half mile of the capture zone boundary lines.

F. ~~*G.*~~ As remediation continues with time, it is expected that chromium concentrations will decrease and plume lines will constrict inward and southward. In such an instance, it may not be prudent or optimal to continue operating an extraction well network and waste groundwater for the sole purpose of hydraulic containment for low chromium concentrations. As described in Finding ~~*25*~~ *26*, PG&E may propose a more optimal alternate hydraulic capture zone than the current one in place. An alternate proposal shall consist of the following information: groundwater elevation and chromium monitoring data, maps showing change in chromium plume configuration over time, proposed alternate capture zone and capture metrics, and a contingency plan proposing corrective actions and contingency monitoring wells cross and downgradient of the alternate hydraulic capture zone for monitoring chromium concentrations. The alternate hydraulic capture zone and metrics shall be implemented upon approval by the Executive Officer.

G. ~~*H.*~~ Should an approved alternate hydraulic capture zone be implemented, it is expected that some rebounding chromium concentrations may occur in groundwater in the original hydraulic capture zone. The Water Board will not find PG&E out of compliance with this r~~R~~equirement if the approved contingency plan, including corrective actions and monitoring program, is implemented and the 50 ppb Cr(VI)/Cr(T) or 10 ppb Cr(VI)/Cr(T) boundaries do not migrate or expand 1,000 feet or more in place during any monitoring event from capture boundaries established prior to the alternate hydraulic capture boundaries.

H. ~~*I.* Consistent with CAO R6V-2008-0002A2, t~~This Order allows for the lateral migration of the 4 ppb hexavalent chromium eastern plume boundary in the southern plume to no more than 1,000 feet (see Attachment 3, "Area of Allowed Plume Expansion") during implementation of remedial actions, provided PG&E ~~can~~ contains chromium from migrating to the north. The 4 ppb hexavalent chromium boundary is intended for plume containment evaluation and is not a cleanup goal. If PG&E is unable to provide data and information that clearly indicates chromium in this expanded area is being captured in the downgradient flow direction, it will constitute a violation of Requirement V for southern plume containment.

VI. Cleanup Requirements

A. *As of the date this Order is issued*, PG&E shall *continuously*[2] implement previously ~~*approved*~~ *accepted* on-going corrective actions, including but not limited to, agricultural treatment units (ATUs), in-situ remediation, and freshwater injections (see Finding Nos. ~~*22*~~ *23* and ~~*23*~~ *24*). Corrective actions shall be conducted in accordance with ~~*approved*~~ *accepted current and future* workplans, WDRs, Notices of Applicability, monitoring programs, or as modified with the Executive Officer's approval. ~~*Changes or reduction in corrective actions (the latter is defined by more than 10 percent reduced operation on a monthly basis) shall require Water Board concurrence prior to implementation.*~~

B. PG&E shall submit an annual operational plan in conjunction with the Annual Cleanup Status and Effectiveness Reports, as required in Groundwater Monitoring and Reporting Program, CAO No. R6V-2015-PROP, Attachment 8. Corrective actions will also be conducted at a level specified in the annual operational plan. Reductions in corrective actions of more than 10 percent on a monthly basis as compared to the annual operational plan shall require notification to Water Board staff prior to implementation.

C. ~~*B. Enhanced*~~ ~~*c*~~*C*orrective actions *may be* ~~*are*~~ needed in the areas listed below based on *monitoring results*. ~~*slow or poor results of on-going corrective actions to reach cleanup of chromium in groundwater.*~~

1. Southern Plume

a) "Western Finger"

PG&E shall clean up and abate chromium concentrations greater than interim maximum background levels west of Serra Road between Highway 58 and Acacia Street. During 2014, greater than interim maximum background levels existed at monitoring well locations MW-121, MW-153, and MW-169.

i. PG&E shall continue on-going remedial activities in accordance with the Water Board's October 30, 2013 conditional acceptance of the Western Area Action Plan (extraction of contaminated groundwater) and the Water Board's February 25, 2014 comment letter on the Action Plan for Western Area. PG&E shall collect groundwater samples from monitoring wells in the area of the western finger consistent with the Groundwater Monitoring and Reporting Program, CAO No. R6V-2015-PROP", Attachment 8.

ii. If Cr(VI) concentrations equal or exceed 10 ug/L at one or more of the monitoring wells set forth in Table 1 for two consecutive sampling events, PG&E shall submit a technical report within 60 calendar days from submittal of the quarterly site-wide groundwater monitoring report proposing additional actions to remediate the observed exceedances.

[2] *The term "continuously" as used in section VI.A does not apply to emergency interruptions or routine maintenance.*

Table 1. Western Area Sentry Wells
MW-57D
MW-57S
MW-58
MW-59
MW-118S
MW-147D
MW-147S
MW-148S
MW-164S
MW-168D
MW-168S
MW-201D
MW-201S
MW-202D
MW-202S

iii. No later than 60 days following acceptance of the United States Geological Survey (USGS) Background Study Preliminary Results Report by the Regional Board staff, PG&E shall submit a technical report to the Regional Board Executive Officer regarding the feasibility of achieving USGS background concentrations in the area of the western finger using the existing remedial activities, including an estimated cleanup timeframe if applicable. If additional remedial actions are required to achieve USGS background levels, the technical report shall include a proposal to implement such activities. If at any time USGS background study information becomes publically available demonstrating the chromium in the western finger is predominantly naturally occurring, no further remedial activities will be required in this area upon approval from the Regional Board Executive Officer.

~~*i. Continue implementing on-going corrective actions in accordance with the Water Board's October 30, 2013, conditional acceptance of the Western Area Action Plan (extraction of contaminated groundwater).*~~

~~*ii. Reach and maintain maximum background levels in all monitoring wells in the "Western Finger" west of Serra Road* **by July 31, 2016.***~~

b) Lower Aquifer

PG&E shall clean up and abate chromium concentrations ~~greater than non-detect levels~~ in the lower aquifer that are linked to PG&E's historical discharge or remedial actions. ~~During 2014, greater than non-detect concentrations exist at: MW-23C, MW-28C, MW-31C, MW-42C, MW-92C, and MW-100C.~~

~~i. Continue implementing on-going groundwater extraction east of Mountain View Road to remediate chromium in lower aquifer~~

~~groundwater, as proposed in PG&E's November 7, 2014 "Plan for Enhancement of Lower Aquifer Remedy" and in accordance with the Water Board's conditional acceptance dated December 22, 2014.~~

~~ii. By **March 31, 2015**, install extraction well EX-37, east of Mountain View Road and south of Santa Fe Road, as proposed in the November 7, 2014 Memorandum from Arcadis and CH2MHill.~~

~~iii. Begin pumping from EX-37 by **June 30, 2015**. Disposal options for extracted groundwater may include but are not limited to temporary or permanent storage tank(s), agricultural fields, and the South Central Reinjection Area (SCRIA).~~

~~iv. Reach and maintain non-detectable chromium concentrations in all lower aquifer monitoring wells by **December 31, 2018**.~~

c) For all remaining areas of the southern plume, reach the following cleanup goals in the upper aquifer by the listed timeframes:

i. Reach and maintain 50 ppb Cr(VI) and Cr(T) in 90% of ~~*all monitoring wells having chromium detection above*~~ *the* 50 ppb Cr(VI) and Cr(T) *plume* as of the date this Order is issued, by **December 31, ~~*2021*~~ *2025***, *as reported in the fourth quarter 2025 groundwater monitoring report*. The 90th percentile shall be based on the number of *monitoring* well locations where chromium concentrations exceed 50 ppb Cr(VI) and Cr(T) as of the date this Order is issued, as shown in Table 8.1 of Attachment 8.

ii. Reach and maintain 10 ppb Cr(VI) and Cr(T) in 80% of ~~*all monitoring wells having chromium detection between*~~ *the* 10 ppb Cr(VI) and Cr(T) and 50 ppb Cr(VI) and Cr(T) *plumes as defined* on the date this Order is issued, by **December 31, ~~*2026*~~ *2032***, *as reported in the fourth quarter 2032 groundwater monitoring report.* The 80th percentile shall be based on the number of *monitoring* well locations where chromium concentrations exceed 10 ppb Cr(VI) and Cr(T) as of the date this Order is issued, as shown in Table 8.1 of Attachment 8.

~~ii.~~iii. Reach and maintain background levels of Cr(VI) and Cr(T).

~~iii.~~*iv.* *Every four years, PG&E will evaluate chromium cleanup actions to reach the cleanup goals and submit a four-year comprehensive cleanup status and effectiveness report, per the requirements of Attachment 8, CAO MRP. If actions are not achieving expected reductions in chromium concentrations, a workplan outlining recommendations and an implementation schedule to increase effectiveness will be submitted by the deadlines listed in Attachment 8, CAO MRP. PG&E may request an extension of the cleanup goals and timelines which will be subject to Water Board review and approval.*

2. Northern Uncertain Plume Area~~s~~

a) *PG&E shall clean up and abate chromium "hot spots" in the ~~two~~ northern ~~plumes~~area~~, or any division of the two plumes~~. "Hot spots" are defined as:*

i. *any domestic well having Cr(VI) equal to or exceeding 10 µg/l during any one sampling event; or*

ii. *any monitoring, extraction, remediation well or piezometer having hexavalent chromium concentrations greater than 10 µg/L within one half mile upgradient of any active domestic well and meeting any of the following conditions (triggers):*

1. *Fifty percent (50%) or more increase above Cr(VI) concentrations reported in second quarter 2015 that persist for two consecutive sampling events;*
2. *Increasing statistical trend (using Mann-Kendall) over four sampling events.*

b) ***Within 30 days** of receiving laboratory reports contain data indicating one or more of these triggers are met, submit a workplan and implementation schedule proposing the method and manner to remediate chromium "hot spots" in groundwater. Identify all wells that trigger this action and describe their general location. The workplan shall propose a cleanup action to begin within 45 days of the date of the workplan. Describe remedial equipment needed and expected operational actions to return Cr(VI) concentrations back to second quarter 2015 levels or less. Provide an estimated cleanup time and basis for the estimate if possible.*

c) *If at any time USGS background study information becomes publically available demonstrating the chromium in the Northern Area or in specific Northern Area hot spots is predominantly naturally occurring, no further remedial activities will be required in this area upon approval from the Regional Board Executive Officer.*

~~a. *PG&E shall clean up and abate chromium "hot spots" in the two northern plumes, defined as any monitoring, extraction, remediation well or piezometer data having hexavalent or total chromium concentrations greater than 10 ppb as of the date this Order is issued. As of the date this Order is issued, "hot spots" exist at MW-154S1, MW-193S3, and MW-196S2. PG&E shall also clean up groundwater in the upgradient flow direction of any domestic/community/agricultural well with data showing chromium concentrations greater than 3.1 ppb Cr(VI) or 3.2 ppb Cr(T): wells 11-10, 21N-03, 21N-04, 21N-05, 28N-04, 28N-05, and 33N-02.*~~

~~b. ***By August 31, 2015**, submit a workplan to remediate "hot spots" in groundwater within one mile of any domestic well containing concentrations greater than 3.1 ppb Cr(VI) or 3.2 ppb Cr(T). Identify the domestic well number and describe its general location. The workplan shall propose a cleanup action to begin **by January 2, 2016** to remediate groundwater so as to reach maximum chromium background levels in the domestic well **within an 18-month period** of implementation.*~~

~~c. **By November 30, 2015**, *where no or insufficient monitoring well data exist, submit a workplan to remediate chromium in groundwater upgradient of domestic wells where data shows concentrations greater than 3.1 ppb Cr(VI) or 3.2 ppb Cr(T). Identify the domestic well number and describe its general location. The workplan shall propose a cleanup action to begin* **by April 1, 2016** *to remediate groundwater so as to reach maximum chromium background levels in the domestic well* **within a 36-month period** *of implementation.*~~

~~d. *By* **February 28, 2016**, *submit a workplan and implementation schedule to remediate remaining "hot spots" in the two northern plumes not already addressed in Requirements VI.2.a and b. Identify the monitoring well number and describe its general location. Provide a time schedule for remedial actions proposed and the estimated time to reach maximum background chromium levels for wells having concentrations between 10 ppb and 99 ppb Cr(VI)/Cr(T) as of the date this Order is issued and to 10 ppb Cr(VI)/Cr(T) for wells having concentrations of 100 ppb Cr(VI)/Cr(T) or greater as of the date this Order is issued.*~~

~~e. *If after October 31, 2015, new "hot spots" in monitoring, extraction, remediation wells and piezometer wells are identified in future quarterly groundwater monitoring reports,* **within 45 days of the quarterly report due date**, *submit a workplan and implementation schedule proposing the method and manner to remediate the "hot spot." Identify the well number and describe its general location. Provide an estimate cleanup time and basis for the estimate.*~~

VII. Replacement Water Supply

A. **Beginning with ~~*second*~~ ~~*third*~~ *first* quarter 201~~6~~5**, within each quarterly groundwater monitoring report required in section ~~*VIII*~~ *X* below, provide an analysis whether any domestic well *within the domestic well sampling area defined in the "Groundwater Monitoring and Reporting Program, CAO No. R6V-2015-PROP", Attachment 8,* ~~*a revised affected area*~~ contains hexavalent chromium concentrations exhibiting an increasing trend indicating likely future exceedances of the hexavalent chromium ~~MCL~~drinking water standard~~-~~ within one year~~*, or any private supply well with hexavalent chromium concentrations within 20 percent of the hexavalent chromium MCL (i.e., 8 ppb Cr(VI))*~~.

1. **Interim Replacement Water Supply**

a) Within ~~*2*~~ *10* business days of *receipt of a laboratory report identifying an affected well as defined by Finding 44 (i.e., an active domestic or community well containing chromium linked to PG&E's historical releases in concentrations that are above the primary drinking water standards of 10 ppb Cr(VI) or 50 ppb Cr(T))* ~~*the submittal of each quarterly report delineating a revised affected area*~~, supply interim uninterrupted replacement water (i.e., bottled water or equivalent) *to users of such affected wells.* ~~to all those served by domestic and community wells in the affected~~

~~area (Finding 43) where those wells are determined to be affected as defined in Finding 44 of this Order~~.

b) Within 7 days of the submittal of each quarterly report ~~*delineating a revised affected area*~~, provide a report to the Water Board listing all properties that have been provided interim uninterrupted water service. The report shall include the well number and describe the general area in Hinkley or the Harper Dry Lake Valley the well is located, such as the southern plume, the Hinkley Valley northern uncertain plume, or Harper Dry Lake Valley northern uncertain plume. If bottled water is provided, PG&E shall also list the bottled water service being used and the water volume being delivered. Furthermore, if other than commercially available bottled water is being provided, the report shall include documentation to show that interim water supply meets state primary and secondary drinking water standards.

2. ~~***Permanent***~~ ***Long-term*** **Replacement Water Supply**

a) Within 45 days of this Order being issued, PG&E must ~~a private supply well identified in VII.A., above, in quarterly groundwater monitoring reports,~~ submit a workplan ~~proposing~~ outlining ~~*permanent*~~ ***long-term*** ~~whole house~~ replacement water supply for all ~~indoor~~ drinking and cooking uses. ~~The workplan shall include the well number(s) and describe the general area in Hinkley Valley or the Harper Dry Lake Valley the well is located.~~ Pursuant to California Water Code section 13304(f), replacement water "shall meet all applicable federal, state, and local drinking water standards, and shall have comparable water quality to that pumped by the public water system or private well owner before the discharge of waste." The workplan must include a plan for providing replacement water for any active private supply well identified pursuant to VII.A., above, should any such well later exceed the drinking water standard and become and Affected Well, as defined in Finding 44. ~~Proposed *permanent* ***long-term*** replacement water shall meet all California primary and secondary drinking water standards, and shall have comparable quality for chromium concentrations to that historically pumped by the private well owner in the past. *prior to waste chromium exceeding the MCL within the well, or within 80 percent of the MCL.*~~ The workplan shall include the following:

i. An evaluation of at least three different methods to provide ~~*permanent*~~ ***long-term*** replacement water supply.
ii. A discussion on the feasibility and timing to implement each method including the needs for permits, approvals, and environmental analysis.
iii. An evaluation of the quantity of water (gallons per minute) that can be provided by each method compared with typical individual household supply needs for drinking and cooking.

iv. An evaluation of the quality of water that can be provided by each method in comparison to California primary and secondary drinking water standards.

v. An analysis of wastes that may be generated by each method, disposal options, costs, and an analysis of potential byproducts in groundwater created by each method. For example, reverse osmosis generates salts and potentially others compounds that are typically sent to septic systems.

vi. An operation, maintenance, and, replacement plan, such as for filters, equipment, etc., of each evaluated method.

vii. A water quality monitoring and reporting plan to verify quality and performance of each evaluated method.

viii. A complete cost analysis including construction, operations, maintenance, and replacement plan of each evaluated method.

ix. A contingency plan to ensure uninterrupted replacement water supply.

x. State how the workplan and recommended method will be presented to the owner(s) and users of the affected well(s).

b) **Within 45 days** of approval by the Executive Officer of a workplan for providing ~~*permanent*~~ ***long-term*** replacement drinking water supply and written authorization from the well owner for the installation of a long-term replacement drinking water supply, PG&E shall implement the workplan to provide a ~~*permanent*~~ ***long-term*** replacement drinking water supply for all affected wells ~~identified~~ defined in ~~section~~ Finding 44.~~1 above.~~ ~~Implementation shall be conducted with the well owner's permission.~~

c) **Within each groundwater monitoring report required as part of PG&E's domestic well monitoring and reporting program and during which long-term replacement drinking water is supplied, PG&E shall ~~150 days~~** ~~of identification of affected wells identified in section 1 above,~~ provide a report to the Water Board listing all properties that have been provided ~~*permanent*~~ ***long-term*** uninterrupted replacement water supply. The report shall include: the affected well number and general area location, the method used to provide replacement water supply, and evidence provided water supply meets state primary and secondary drinking water standards. Describe all actions completed during the quarter, such as operation and maintenance. Describe any problems that may have occurred and how and when they were corrected or remedied. For instance, if sampling indicates that alternate water supply does not meet federal and state ~~MCL~~drinking water standards~~s~~, describe what corrective actions were implemented to fix the problem. If the well owner did not respond or provide permission to access and install ~~*permanent*~~ *long-term* water supply, provide evidence of such, including actual date and time and manner of communication. Provide proof that monitoring data has been sent to the owner of the Affected Well(s).

~~d) **Within 45 days of the end of the each quarter**, submit quarterly whole house water (WHW) monitoring reports containing monitoring information~~

~~on the quality of replacement water supply consistent with the alternate water supply monitoring plan, as approved by the Executive Officer. Describe all actions completed during the quarter, such as operation and maintenance. Describe any problems that may have occurred and how and when they were corrected or remedied. Provide proof that monitoring data has been sent to the owner of the affected well(s). Quarterly WHW reports will be due February 15, May 15, August 15, and November 15 of each year.~~

VIII. 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 held in the Hinkley community.
4. Availability for one on one communications with individual or groups of Hinkley residents (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.

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

General Provisions

IX. Plan Approval and Implementation

All plans required by this Order require the Water Board's approval, and shall be incorporated and implemented as part of this Order whether expressly stated above or not. Any violation of an approved plan required by this Order shall be considered a violation of this Order. The Executive Officer is hereby delegated the authority to approve, conditionally approve, or reject plans submitted in accordance with this Order.

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X. Groundwater Monitoring and Reporting Program

California Water Code section 13267 authorizes the Regional Water Quality Control Board (Water Board) to require technical and monitoring reports. The Monitoring and Reporting Program (MRP) is incorporated as Attachment 8 in this Order. The MRP establishes monitoring requirements consistent with the California Water Code to evaluate compliance with the terms and conditions of this Order, and to assure protection of waters of the state and restoration of beneficial uses.

XI. Laboratory Analysis

All water sample analyses shall utilize the most recent testing methods. Testing for Total Chromium analysis shall be done using United State Environmental Protection Agency (US EPA) Methods 6010B or 6020A to a reporting limit of 1 ppb. Testing for hexavalent chromium shall be conducted in accordance with US EPA Method SW 218.6 with a reporting limit of 0.~~1~~2 ppb. A pa~~e~~rt per billion is equivalent to micrograms per liter or µg/L also reported by laboratories. The laboratory used shall be certified by the California Environmental Laboratory Accreditation Program (ELAP). If best available technology in the future allows for better testing methods adopted by the State of California or lower detection levels, PG&E shall implement the better method or detection level.

XII. Certifications for all Plans and Reports

All technical and monitoring plans and reports required in conjunction with this Order are required pursuant to Water Code section 13267 and shall include a statement by PG&E, or an authorized representative of PG&E, certifying under penalty of perjury in conformance with the laws of the State of California that the workplan and/or report is true, complete, and accurate. Hydrogeologic reports and engineered plans shall be prepared or directly supervised by, and signed and stamped by a Professional Geologist or Civil Engineer, respectively, registered in California. It is expected that all interpretations and conclusions of data in these documents to be truthful, supported with evidence, with no attempts to mislead by false statements, exaggerations, deceptive presentation, or failure to include essential information.

All ~~Reports~~ maps larger than 11" X 17" must~~shall~~ be submitted in hardcopy to the South Lake Tahoe and Victorville offices of the Lahontan Regional Water Quality Control Board:

~~Lisa Dernbach~~South Lake Tahoe main office
2501 Lake Tahoe Blvd.
South Lake Tahoe, CA 96150

~~Robin Coale~~Victorville office
14440 Civic Drive, Suite 200
Victorville, CA 92392

XIII. Duty to Submit Other Information

When the Discharger becomes aware that it has failed to submit any relevant facts in any report required under this CAO, or submitted incorrect information in any such report, the Discharger shall promptly submit such facts or information to the Water Board.

XIV. Liability for Oversight Costs Incurred by the Water Board

PG&E shall be liable, pursuant to Water Code 13304, to the Water Board for all reasonable costs incurred by the Water Board to investigate unauthorized discharges of waste, or to oversee cleanup of such waste, abatement of the effects thereof, or other remedial action, pursuant to this Order. PG&E shall reimburse the Water Board for all reasonable costs associated with site investigation, oversight, and cleanup. Failure to pay any invoice for the Water Board's investigation and oversight costs within the time stated in the invoice (or within thirty days after the date of invoice, if the invoice does not set forth a due date) shall be considered a violation of this Order. If this site is enrolled in a State Water Board-managed reimbursement program, reimbursement shall be made pursuant to this Order and according to the procedures established in that program.

XV. No Limitation of Water Board Authority

This Order in no way limits the authority of this Water Board to institute additional enforcement actions or to require additional investigation and cleanup of the site consistent with the Water Code. This Order may be revised by the Executive Officer as additional information becomes available.

XVI. Enforcement

Failure to comply with the requirements, 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 sections 13268 and 13350, or referral to the Attorney General of the State of California for civil liability or injunctive relief. The Water Board reserves its rights to take any enforcement action authorized by law.

XVII. Permits or Approvals

This Order does not alleviate the responsibility of PG&E to obtain necessary local, state, and/or federal permits to construct or operate facilities or take actions necessary for compliance with this Order. This Order does not prevent imposition of additional standards, requirements, or conditions by any other regulatory agency. This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code sections 2050 to 2097) or the federal Endangered Species Act (16 U.S.C.A. sections 1531 to 1544). If a "take" will result from any act required by this Order, PG&E shall obtain authorization for an incidental take from appropriate authorities prior to taking action. PG&E is responsible for meeting all requirements of the Endangered Species Acts for any acts required by this Order.

XVIII. Replacement of Prior Orders

This Order replaces all requirements of CAO No. R6V-2008-0002 and amendments; and CAO No. R6V-2011-0005 and amendments. In addition, this Order replaces requirements in Investigative Order Nos. R6V-2011-0079 and R6V-2013-0051; and Executive Officer letter directives dated October 4, 2013, December 12, 2013, and February 26, 2014. See Attachment 1 for descriptions of these Orders and Directives. This Order shall not preclude enforcement against PG&E for failure to comply with any requirement in any other Order issued by the Water Board. The Water Board reserves its rights to take any enforcement action authorized by law.

XIX. Attachments Incorporated Herein

The eight attachments referenced in this Order are hereby incorporated herein:

1) CAO and Investigative Orders Replaced by CAO No. R6V-2015-PROP
2) Location of Chromium Plumes (Third Quarter 2014)
3) Area of Allowed Plume Expansion
4) Active Water Board Orders and Notices Authorizing Clean up Actions
5) Hydraulic Capture Metrics
6) Hydraulic Capture Monitoring Plan, Shallow Zone of Upper Aquifer
7) Hydraulic Capture Monitoring Plan, Deep Zone of Upper Aquifer
8) Groundwater Monitoring and Reporting Program, CAO No. R6V-2015-~~PROP~~
~~8)~~9) Summary of Performance and Submittal Requirements

XX. Right to Petition

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 shall receive the petition by 5:00 p.m., 30 days after the date this Order is issued, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition shall 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.

_____ _____

PATTY KOUYOUMDJIAN Date
EXECUTIVE OFFICER

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ATTACHMENT 1

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Attachment 1. CAO and Investigative Orders Replaced by CAO No. R6V-2015-DRAFT~~PROP~~

Board Order, Date Issued	Summary of Key Requirements	Status
REPLACED CLEANUP AND ABATEMENT ORDERS (CAOs)		
CAO R6V-2008-0002 August 6, 2008	1. Requires: a) No further migration of plume b) Achieve plume containment by Dec 31, 2008 c) Develop and implement final cleanup strategy (Feasibility Study or FS) 2. Establishes quarterly and semiannual reporting	1 a) and b). Ongoing. Requirement for ongoing and improved plume containment for southern plume retained in 2015 CAO. See CAO sections II and V. 1 c) FS completed, implementation in progress. Interim remedial targets contained in 2015 CAO. See CAO section VI. 2. Ongoing. 2015 CAO contains monitoring and reporting requirements. See CAO Attachment 8.
CAO R6V-2008-0002A1 November 12, 2008	1. Establishes background levels of chromium (Cr) to assess remediation strategies	1. Background levels retained in 2015 CAO, including acknowledgement of USGS background study and potential future revision of background values. See findings 14and 15.
CAO R6V-2008-0002A2 April 7, 2009	1. Allows up to 1,000 feet migration of 4 parts per billion (ppb) plume line on eastern boundary to implement South Central injection area	1. Ongoing. Retained in 2015 CAO, see Attachment 2 and section V.I.
CAO R6V-2008-0002A3 March 14, 2012	1. Sets hydraulic containment metrics south of Thompson road 2. Requires plume containment north of Thompson road 3. Sets monthly monitoring and reporting	1. Ongoing. Retained in 2015 CAO, with provisions to allow for adaptive management (plume shrinkage/rebound). See section V. 2. Southern contiguous plume north of Thompson Road is contained as required. For northern plumes, 2015 CAO requires hotspot remediation. See section VI. B.2. 3. Ongoing. 2015 CAO sets monitoring and reporting requirements for hydraulic capture. See section V. C.
CAO R6V-2008-0002A4 January 8, 2013	1. Requires full definition of chromium plume 2. Sets mapping, lab analysis, reporting and submittal requirements	1. Ongoing. Retained in 2015 CAO, see section IV. 2. Ongoing. Retained in 2015 CAO, see section IX, X and Attachment 8.
CAO R6V-2011-0005	1. Requires bottled water to all well users	1. 2015 CAO requires bottled water for wells users with Cr6 at

Board Order, Date Issued	Summary of Key Requirements	Status
REPLACED CLEANUP AND ABATEMENT ORDERS (CAOs)		
January 7, 2011	with water exceeding background levels within 3,000 feet of defined chromium plume 2. Quarterly reporting	or above MCL within 2 days of first detection. 2. Retained in 2015 CAO for wells with Cr6 at or above MCL.
CAO R6V-2011-0005A1 October 11, 2011	1. Affected well definition refined: a) If well has chromium 6 (Cr6) at Public Health Goal (PHG) or greater and increasing trend is present b) If well has greater than background levels c) Notes that CAO may be amended to use future Cr6 Maximum Contaminant Level (MCL) for affected wells 2. Affected area defined as one mile down or cross gradient of defined Cr plume 3. Replacement water quality requirement of 0.06 ppb 4. Requires feasibility study for whole house replacement water and implementation of such 5. Recognizes Community Advisory Committee and need for independent consultant paid for by discharger	1 a). 2015 CAO requires replacement water plan if increasing trend in domestic wells, or within 20 percent of Cr6 MCL. 1 b) and c). Cr6 MCL now in effect for affected well definition. 2015 CAO reflects Cr6 MCL for affected well definition. 2. Retained in 2015 CAO. See findings 43 and 44. 3. Replacement water must meet MCLs. 4. Complete. 2015 CAO contains requirements for replacement water plans when private supply well contains hexavalent chromium concentrations exhibiting an increasing trend indicating likely future exceedances of the Cr6 MCL, or any private supply well with hexavalent chromium concentrations within 20 percent of the Cr6 MCL (i.e., 8 µg/L Cr6). 5. Ongoing. Requirement for independent consultant retained in 2015 CAO. See section VI and finding 45.

Attachment 1. CAO and Investigative Orders Replaced by CAO No. R6V-2015-DRAFT~~PROP~~

Board Order, Date Issued	Summary of Key Requirements	Status
REPLACED CLEANUP AND ABATEMENT ORDERS (CAOs)		
	6. Quarterly reporting	6. Ongoing. 2015 CAO contains modified requirements for monitoring and reporting. See section VII.2iii.
CAO R6V-2011-0005A2 June 7, 2012	1. Requires implementation of PG&E's expanded whole house water program: a) Affected wells are those with detectable (>0.06 ppb) Cr6 within one mile of Cr plume b) Water quality must meet at CA MCLs, and Cr6 PHG, or Cr6 MCL once adopted c) Once Cr6 MCL is adopted, MCL defines affected well 2. Suspends requirement for trend analysis to determine affected wells	1 a) and c). 2015 CAO reflects Cr6 MCL for affected well definition. See section VII.A.2 and findings 43 and 44. 1 b). Replacement water must meet Cr6 MCL. See section VII.A.2. 1 c). Cr6 MCL defines affected well in 2015 CAO. See finding 44. 2. 2015 CAO requires Discharger submit replacement water plans where private supply well concentrations exhibit increasing trends indicating the likelihood of future exceedances of the hexavalent chromium MCL, or if a private supply well has chromium reaching within 20 percent of the hexavalent chromium MCL.
CAO R6V-2011-0005A3 February 18, 2014	1. Revises replacement bottled water quality to allow up to 1.2 ppb Cr6.	1. 2015 CAO requires bottled water to meet Cr6 MCL. See section VII.1.ii.

Investigative Order or Directive, Date Issued	Summary of Key Requirements	Status
REPLACED INVESTIGATIVE ORDERS (IOs) AND LETTER DIRECTIVES		
Investigative Order (IO) R6V-2011-0079	1. Sets mapping information and content requirements. 2. Sets report content requirements.	1 and 2 retained in 2015 CAO. See Attachment 8.

Attachment 1. CAO and Investigative Orders Replaced by CAO No. R6V-2015-DRAFT~~PROP~~

Investigative Order or Directive, Date Issued	Summary of Key Requirements	Status
REPLACED INVESTIGATIVE ORDERS (IOs) AND LETTER DIRECTIVES		
September 29, 2011		
IO R6V-2013-0051 June 26, 2013	1. Approves criteria for removal of domestic wells from sampling program 2. Accepts recommendation to abandon inactive wells screened across water both aquifers 3. Outlines reporting requirements for inactive domestic wells	1, 2 and 3 retained in 2015 CAO. See Attachment 8 section IV.
IO R6V-2013-0087 October 30, 2013	1. Conditionally approves Action Plan for Western Area to reduce chromium concentrations in groundwater west of the freshwater injection area.	1. Requirement for continued operation contained in 2015 CAO. See section VI. B.1.a.i.
Prosecution Team Letter August 2, 2013	1. Requests action plan for western area and supplemental information 2. Request for additional information in semi-annual reports related to western area: a) Changes in Cr concentrations between reporting periods b) Changes in remedial operations between reporting periods c) Changes in remedial effectiveness between reporting periods	1. Complete. 2. Replaced with requirement to reach background levels in western area by 2016, see section VI.B.1a.ii.
Executive Officer Letter October 4, 2013	1. Clarifies use of historical data in Cr plume boundary.	1. Complete.
Prosecution Team Letter November 7, 2013	1. Requests a byproduct monitoring report.	1. Complete.

Attachment 1. CAO and Investigative Orders Replaced by CAO No. R6V-2015-DRAFT~~PROP~~

Investigative Order or Directive, Date Issued	Summary of Key Requirements	Status
REPLACED INVESTIGATIVE ORDERS (IOs) AND LETTER DIRECTIVES		
Executive Officer Letter December 12, 2013	1. Review of compliance versus interpreted plume maps, 3rd Quarter 2013: a) Cr detections on and east of Dixie Road no longer need to be drawn on compressor station plume maps b) Cr detections at MWs 159, 160, and 163 no longer need to be drawn on plume maps c) Cr detections at MWs 169S2, 121S and 153 are to be drawn connected to contiguous plume d) Cr detections north of Thompson Road above background are to be drawn on plume maps	1 a) through d) Ongoing interpretation, retained in 2015 CAO. • See attachment 8, section 1.G for 1 a) and b). • See CAO section IV. for requirements to install MWs in northern area.
Prosecution Team Letter February 25, 2014	1. Status report of chromium in western area	1. Complete.
Executive Officer Letter February 26, 2014	1. Accepts Northern area investigation 2. Notify Water Board within 10 days if increasing concentrations (change of 30% or more) to the north or northwest of MW-193S3 are detected 3. Sample domestic wells in eastern area of Harper Dry Lake valley each quarter 4. Include domestic wells north of Grasshopper road in plume contouring if above background	1. See CAO section IV. For requirements to install MWs in northern area. 2. 2015 CAO requires hotspot remediation in northern area. 3. Ongoing, modified requirements in 2015 CAO. See attachment 8. 4. Ongoing, retained requirements in 2015 CAO. See attachment 8.

Notes:

1. CAO R6V-2008-0034 (as amended) contains replacement water provisions and other requirements regarding nitrate pollution related to Desert View Dairy animal operations. Mr. Paul Ryken is the primary responsible party for the purposes of those CAO requirements; PG&E has secondary responsibility. That CAO is not included in this table and will not be affected by new CAO requirements.

2. Replacement water requirements for increases of chromium or remediation byproducts, and decreases in groundwater levels in domestic wells due to agricultural treatment unit operations are contained in Waste Discharge Requirements R6V-2014-0023, issued to PG&E in March 2014. Those requirements will not be affected by 2015 CAO requirements for replacement water.

ATTACHMENT 2

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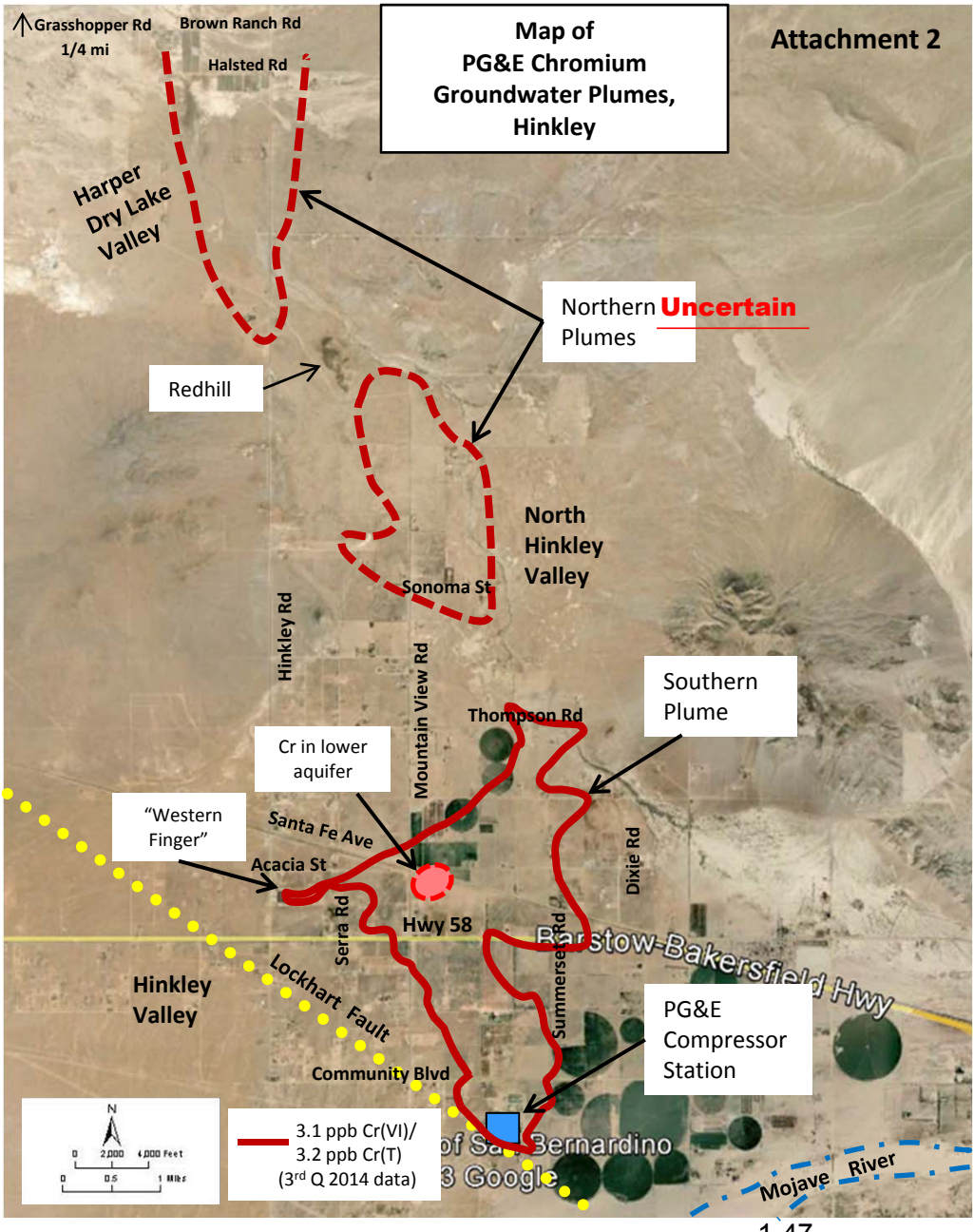
Map of
PG&E Chromium
Groundwater Plumes,
Hinkley
Attachment 2
Grasshopper Rd
1/4 mi
Brown Ranch Rd
Halsted Rd
Harper
Dry Lake
Valley
Northern Uncertain
Plumes
Redhill
North
Hinkley
Valley
Sonoma St
Hinkley Rd
Mountain View Rd
Thompson Rd
Southern
Plume
Cr in lower
aquifer
"Western
Finger"
Santa Fe Ave
Acacia St
Dixie Rd
Serra Rd
Hwy 58
Summerset Rd
Barstow-Bakersfield Hwy
Hinkley
Valley
Lockhart Fault
PG&E
Compressor
Station
Community Blvd
3.1 ppb Cr(VI)/
3.2 ppb Cr(T)
(3rd Q 2014 data)
Mojave River

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ATTACHMENT 3

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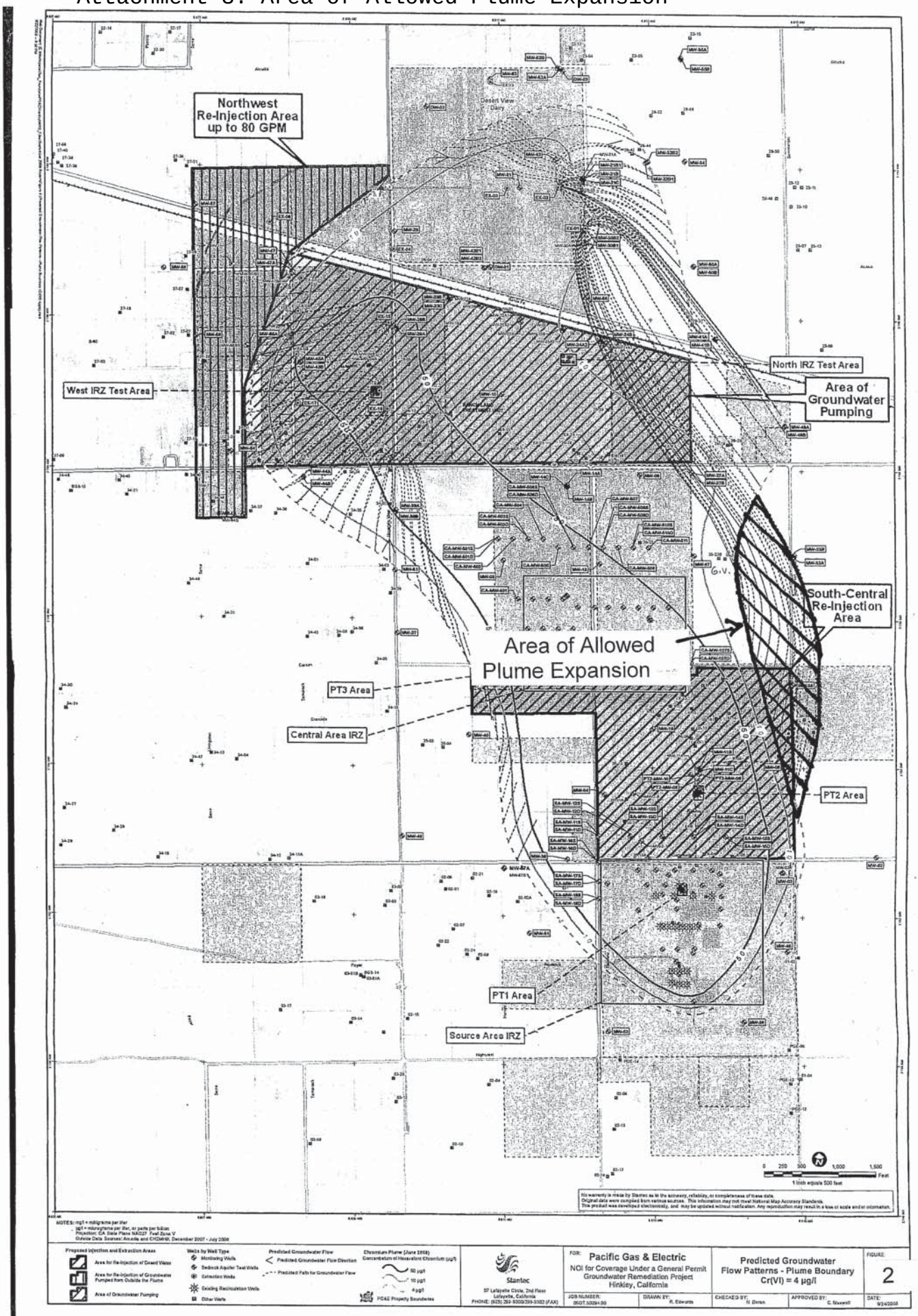
Attachment 3. Area of Allowed Plume Expansion



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ATTACHMENT 4

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Attachment 4. Active Water Board Orders and Notices Authorizing Clean up Actions

Document Type; Date	Title	Description
In-situ Remediation Waste Discharge Requirements and Notices of Applicability		
Board Order R6V-2008-0014; April 9, 2008	General Waste Discharge Requirements for PG&E General Site-wide Groundwater Remediation Project	• Authorizes extraction, management and re-injection of groundwater, included freshwater and treated water. In-situ actions consisting of injection of chemical or biological reductant directly to groundwater. • Well rehabilitation and groundwater flow tracing.
Notice of Applicability; April 7, 2009	Notice of Applicability of General Waste Discharge Requirements for the General Site-wide Groundwater Remediation Project (WDID 6B369107001, Board Order No. R6V-2008-0014)	• Authorizes South Central Re-injection area project. • Allows up to 80 gallons per minute freshwater injection near Serra Road (Northwest Freshwater Injection area). • Sets receiving water limits for TDS. • Sets monitoring and reporting requirements.
Notice of Applicability; August 17, 2009	Notice of Applicability of General Waste Discharge Requirements for the General Site-wide Groundwater Remediation Project (WDID 6B369107001, Board Order No. R6V-2008-0014)	• Authorizes increased ethanol volumes for the Source Area In-situ remediation project.
Notice of Applicability; July 7, 2010	Notice of Applicability of General Waste Discharge Requirements for the General Site-wide Groundwater Remediation Project (WDID 6B369107001, Board Order No. R6V-2008-0014) and Rescission of Monitoring and Reporting programs Nos. R6V-2006-0054A1 and R6V-2008-0032.	• Combines three ongoing in-situ remediation projects (Source area, Central area, and South Central re-injection area) into one project (called IRZ, in-situ remediation zone) for monitoring and reporting purposes. • Sets monitoring and reporting for IRZ project. • Sets contingency plan requirements and threshold limits for byproducts migration and concentrations.

Notice of Applicability; December 5, 2014	Notice of Applicability to Conduct Bioreactor Pilot Test, PG&E Compressor Station (WDID 6B369107001, Board Order No. R6V-2008-0014)	• Authorizes 14-month testing of 2-stage bioreactor (above-ground treatment system). Effluent from testing to be treated and re-injected at the South Central IRZ • Set additional monitoring and reporting requirements.
Agricultural Treatment Unit WDRs and Notice of Applicability		
Board Order R6V-2014-0023; March 12, 2014	Waste Discharge Requirements for PG&E Groundwater Remediation Project, Agricultural Treatment Units, WDID 6B361403002	• Authorizes groundwater extraction and application to irrigate up to 500 acres of agricultural fields. • Sets monitoring and reporting requirements, including Environmental Impact Report mitigation measure implementation.
Notice of Applicability; August 1, 2014	Notice of Applicability of Waste Discharge Requirements for Agricultural Treatment Units, (WDID 6B361403002, Board Order No. R6V-2014-0023)	• Describes location and acreage of agricultural fields authorized. • Sets reporting due dates. • Describes minor change to monitoring program.

ATTACHMENT 5

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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.

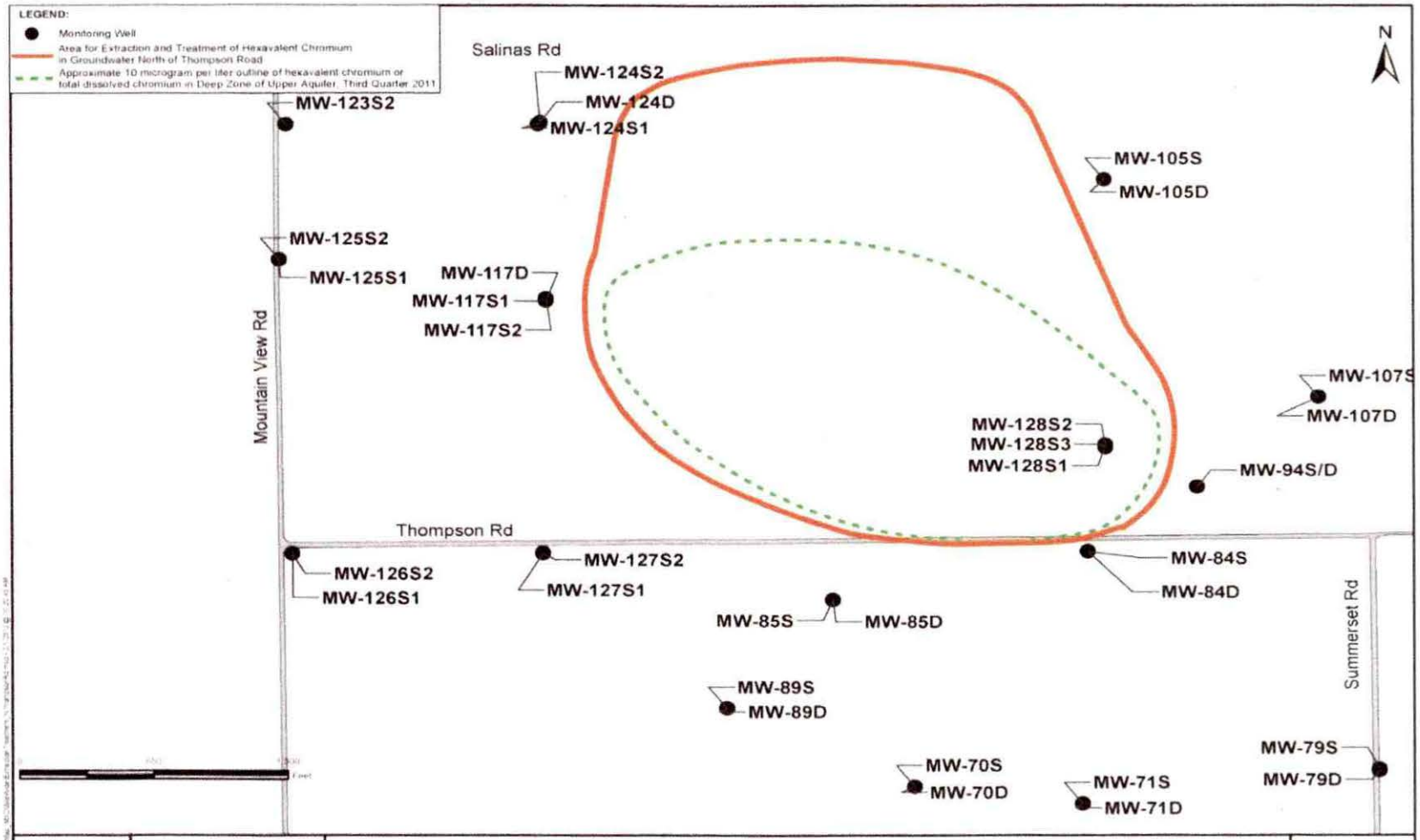
Table A-1 Hydraulic Capture Monitoring Plan

Depth Interval	Well Pairs		Well Triplets
A1Layer	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.



Program Manager: Lisa Cope
Project Manager: Jenifer Beatty
Task Manager: Margaret Gentile
Technical Writer: Scott Seyfried

ARCADIS

Area for Extraction and Treatment of
Hexavalent Chromium in Groundwater North of Thompson Road

Pacific Gas and Electric Company
Hinkley, California

FIGURE

ATTACHMENT 6

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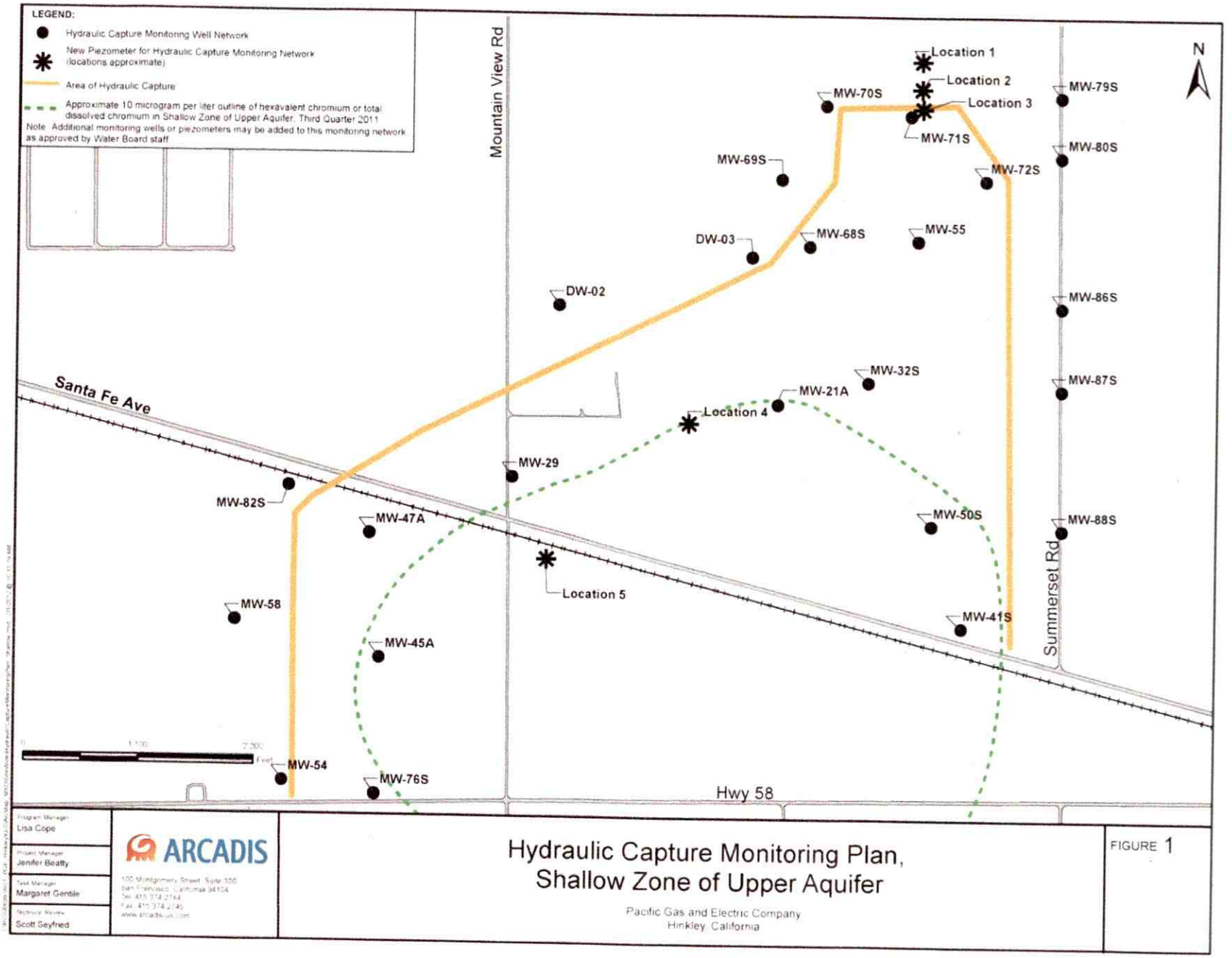
LEGEND:
Hydraulic Capture Monitoring Well Network
New Piezometer for Hydraulic Capture Monitoring Network (locations approximate)
Area of Hydraulic Capture
Approximate 10 microgram per liter outline of hexavalent chromium or total dissolved chromium in Shallow Zone of Upper Aquifer, Third Quarter 2011
Note: Additional monitoring wells or piezometers may be added to this monitoring network as approved by Water Board staff
N
Mountain View Rd
Summerset Rd
Santa Fe Ave
Hwy 58
Location 1
Location 2
Location 3
Location 4
Location 5
MW-70S
MW-71S
MW-69S
MW-72S
MW-79S
MW-80S
DW-03
MW-68S
MW-55
DW-02
MW-86S
MW-32S
MW-21A
MW-87S
MW-29
MW-82S
MW-47A
MW-50S
MW-88S
MW-58
MW-41S
MW-45A
MW-54
MW-76S
Program Manager
Lisa Cope
Project Manager
Jenifer Beatty
Task Manager
Margaret Gentile
Technical Review
Scott Seyfried
ARCADIS
Hydraulic Capture Monitoring Plan,
Shallow Zone of Upper Aquifer
Pacific Gas and Electric Company
Hinkley, California
FIGURE 1

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ATTACHMENT 7

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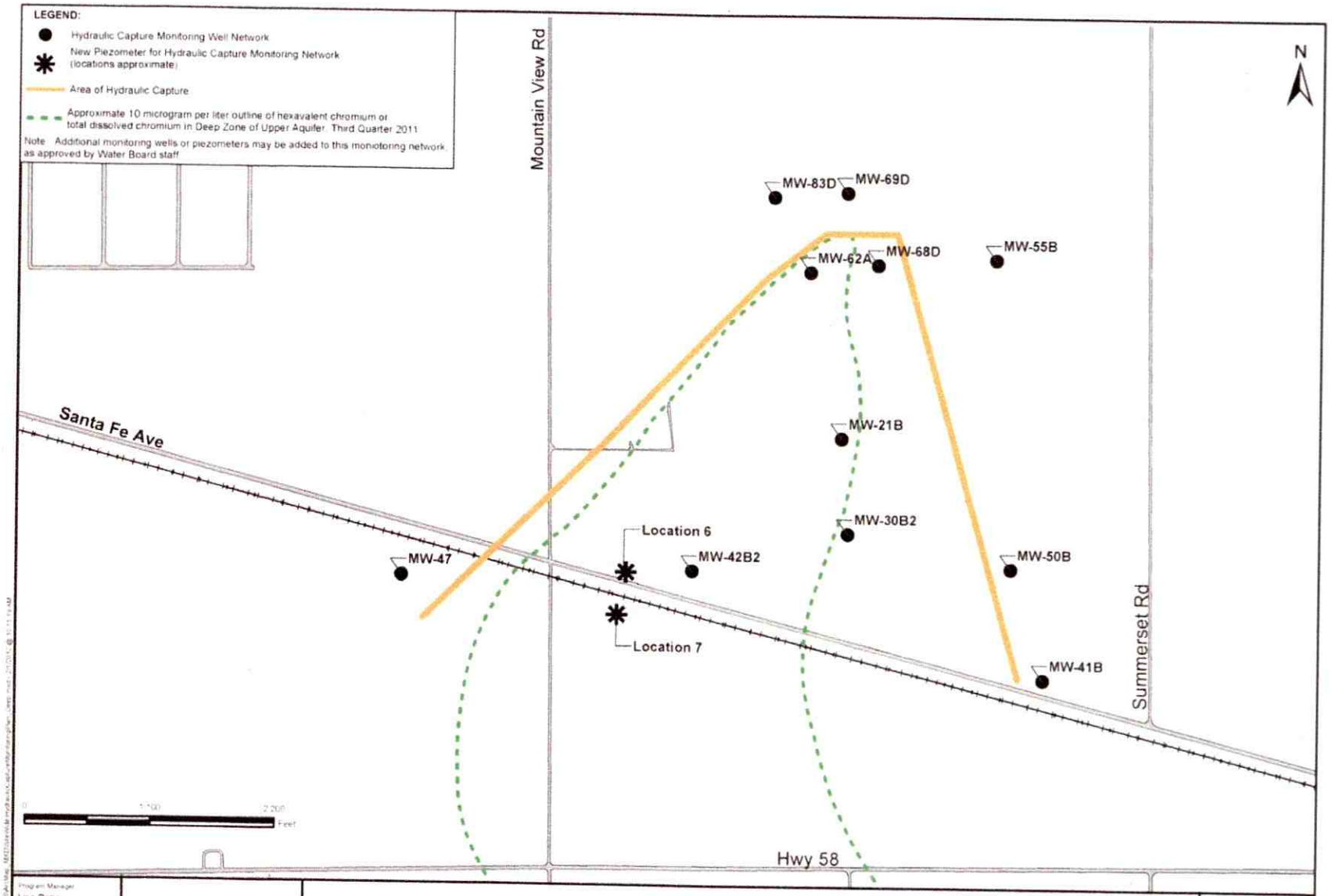

Program Manager: Lisa Cope
Project Manager: Jenifer Beatty
Task Manager: Margaret Gentile
Technical Review: Scott Seyfried

ARCADIS
100 Montgomery Street, Suite 300
San Francisco, California 94104
Tel: 415.374.2744
Fax: 415.374.2745
www.arcadis-us.com

Hydraulic Capture Monitoring Plan, Deep Zone of Upper Aquifer

Pacific Gas and Electric Company
Hinkley, California

FIGURE 2

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ATTACHMENT 8

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Attachment 8

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

CLEANUP AND ABATEMENT ORDER
NO. R6V-2015-~~PROP~~DRAFT
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

Groundwater Monitoring and Reporting Program

San Bernardino County

California Water Code section 13267 authorizes the Regional Water Quality Control Board (Water Board) to require technical and monitoring reports. This Monitoring and Reporting Program (MRP) establishes ~~monitoring~~ requirements consistent with the California Water Code. Pursuant to Water California Water Code section 13223, this ~~monitoring~~ MRP ~~program~~ may be amended by the Water Board Executive Officer.

This ~~monitoring and reporting program (~~MRP~~)~~ requires PG&E to collect water samples, conduct monitoring actions, and submit technical reports to evaluate compliance with the terms and conditions of this Order, and to assure protection of waters of the state and restoration of beneficial uses. Consistent with Water Code section 13267, this Order requires implementation of a MRP that is intended to verify the effectiveness of remediation, track progress toward meeting remediation targets, and evaluate threats to and monitor water quality in private supply wells.

As cleanup progresses and conditions change, it may be necessary to modify the requirements in order to best effectuate those goals. The Executive Officer has the ability to modify the requirements of this Order, as necessary.

I. GROUNDWATER MONITORING REQUIREMENTS

A. **Beginning ~~second~~ first quarter 2016~~5~~, and every quarter (three months) thereafter,** PG&E shall implement a site-wide monitoring well and domestic well sampling and monitoring program. Monitoring well and domestic/community~~/*agricultural*~~ well sampling shall be conducted at the frequency and using the criteria prescribed in this "Groundwater Monitoring and Reporting Program."

B. PG&E shall:
   1. Collect groundwater elevation data to the nearest 0.01 foot from all monitoring wells required for that quarter.

2. Collect groundwater samples from monitoring wells and active domestic/community~~/agricultural~~ wells required for that quarter. Active is defined as any water supply well used during that quarter or planned for use within the next six months. Active wells include those wells on PG&E-owned property and used that quarter for any purpose. Inactive wells are defined as any water supply well not used that quarter or not planned for use within the next six months.
3. Water samples shall be analyzed for Cr(VI) using EPA Method 218.6 with a *reporting limit* ~~*detection level*~~ of 0.~~1~~2 parts per billion (ppb) and Cr(T) using EPA Method 6020*A or 6010B* with a *reporting limit* ~~*detection level*~~ of 1 ppb.

C. **Southern Plume Area, including "Western Finger" and Lower Aquifer**

This area is defined as the southern plume area connected to the source area at the Facility, shown in *CAO* Attachment 2. Within this area, the Discharger shall conduct ~~*the following*~~ sampling *to meet the following objectives*:

1. *To track remediation effectiveness, sampling will be conducted in accordance with the monitoring and reporting programs specified for the ATUs and In-Situ Reactive Zones (IRZs) in the permits for those systems, as summarized in Attachment A to this MRP. The ATU monitoring program is currently established in the ATU WDRs (Finding 24~~3~~) and associated documents. The IRZ program was proposed by the Water Board staff in a letter dated February 19, 2014 and will be included in a revised IRZ monitoring program that will be circulated for public comment along with revised/combined Notice of Applicability for the general Waste Discharge Requirements for In-situ Activities.*
2. *To track the chromium plume, to protect domestic wells, and for general monitoring, sampling will be conducted according to the chromium monitoring program listed in MRP Attachment A.*

Once every year in the Annual Cleanup Status and Effectiveness Reports, the monitoring frequency of monitoring wells used to contour the plume boundary will be reviewed to determine whether the sampling frequency for an individual well should be changed. The decision tree shown in Figure 8.1 (MRP Attachment B) will be used to determine if a change in monitoring frequency is warranted.

- *Quarterly Branch: For quarterly monitoring wells, if the Cr(VI) concentration is less than 3.1 µg/L for a period of four consecutive sampling events, the monitoring frequency will be reduced to semi-annual. If there are 12 consecutive sampling events of data in which the Cr(VI) concentrations are less than 10 µg/L then the sampling frequency will be changed to semiannual if either of the two following conditions are met: 1) Cr(VI) concentration is greater than 3.1 µg/L and there is a*

decreasing Mann-Kendall statistical trend based on 12 consecutive sampling events of data or 2) no trend based on 12 consecutive sampling events of data. If these conditions are not met, the sampling frequency will remain quarterly.

- *Semi-Annual Branch: For semiannual monitoring wells, if the Cr(VI) concentration is greater than or equal to 3.1 µg/L for four consecutive sampling events and there is an increasing Mann-Kendall trend, then the sampling frequency will be changed to quarterly. If the Cr(VI) concentration is less than 3.1 µg/L for four consecutive sampling events, then the frequency will stay at semi- annual. If the Cr(VI) concentration is greater than 3.1 µg/L and there is not an increasing Mann Kendall statistical trend, then the sampling frequency will stay semi- annual.*
- *The few wells that are monitored on an annual sampling frequency, as specified in MRP Attachment A will continue on an annual sampling frequency. If changes to sampling frequency for these wells are needed, the evaluation will occur separately.*
- *This process will not apply to ATU and IRZ program wells which are under separate monitoring programs.*

MRP Attachment A presents the initial sampling program. This program will be updated in the Annual Cleanup Status and Effectiveness Reports each year to reflect any changes made in the annual program evaluation or other changes made during the year.

~~1. At wells with concentrations greater than or equal to maximum background values as of fourth quarter 2014:~~

~~a) Quarterly sampling at all single monitoring wells and at multi-depth monitoring wells showing the highest hexavalent or total chromium detections as of fourth quarter 2014.~~

~~b) Semi-annual sampling in the second and fourth quarter of each year at multi-depth monitoring wells showing the second and third highest hexavalent or total chromium detections above maximum background levels as of fourth quarter 2014.~~

*~~c) Annual sampling in the fourth quarter of each year for all **multi-depth** monitoring wells showing the third highest hexavalent or total chromium detections as of fourth quarter 2014.~~*

~~2. At wells with concentrations less than maximum background values as of fourth quarter 2014:~~

~~a) Quarterly sampling at all monitoring wells showing unstable hexavalent or total chromium detections below maximum background levels as of fourth quarter 2014. "Unstable" is defined as any chromium detection above maximum background levels since first quarter 2013.~~

~~b) Semi-annual sampling in second and fourth quarter of each year at all monitoring wells showing stable hexavalent or total chromium detections below maximum background levels as of fourth quarter 2014. "Stable" is~~

~~*defined as all chromium detections below maximum background levels since first quarter 2013. Once four consecutive sampling events show chromium concentrations below maximum background levels, sampling frequency can be reduced to annual sampling.*~~

~~*c) Annual sampling in the fourth quarter of each year at all monitoring wells showing hexavalent or total chromium detections that have always been below maximum background levels and were installed and sampled by January 2011.*~~

~~***3. "Western Finger" (west of Serra Road)***~~

~~*a) Quarterly sampling within the plume (i.e., chromium concentrations exceed the maximum background levels), at all monitoring wells showing hexavalent or total chromium detections* **above** *the maximum background levels as of fourth quarter 2014.*~~

~~*b) Semiannual sampling in the second and fourth quarter of each year at multi-depth monitoring wells showing hexavalent or total chromium detections* **at or below** *the maximum background levels as of fourth quarter 2014.*~~

~~*c) If four consecutive or four out of five samples in different sampling periods detect chromium in monitoring wells at increasing or decreasing concentrations that puts the well into one of the above categories, the Discharger shall increase or decrease, respectively, the sampling frequency accordingly.*~~

~~***4. Lower Aquifer***~~

~~*a) Quarterly sampling within the plume (i.e., chromium concentrations* **exceed non-detect levels***) at all lower aquifer monitoring wells showing hexavalent or total chromium detections* **above** *the non-detect level as of fourth quarter 2014.*~~

~~*b) Semiannual sampling outside the plume at all lower aquifer monitoring wells showing hexavalent or total chromium detections* **at or below** *non-detect level as of fourth quarter 2014.*~~

~~*c) If four consecutive or four out of five samples in different sampling periods detect chromium in monitoring wells at increasing or decreasing concentrations that puts the well into one of the above categories, the Discharger shall increase or decrease, respectively, the sampling frequency accordingly.*~~

~~*d) If a single well, or all depths at a multi-depth monitoring well location contain less than the maximum background levels for four or more consecutive sampling events with a stable or decreasing trend, monitoring should follow section E below for Outside Plume Boundaries.*~~

D. **Northern Uncertain Plume~~s~~ Area**

This area is defined as north of Thompson Road and into the Harper Dry Lake Valley, shown on *CAO* Attachment 2. ~~Plume(s) may be contiguous or non-contiguous.~~ The Discharger shall conduct the following sampling:

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1. Quarterly sampling at all **single** monitoring wells and at **multi-depth** monitoring wells showing the **highest** hexavalent or total chromium detections greater than the interim maximum background levels as of fourth quarter 2014. If four consecutive or four out of five samples in different sampling periods detect chromium in monitoring wells at decreasing concentrations that puts the well into one of the below categories, the Discharger may decrease the sampling frequency accordingly. In this instance, the new well showing the highest chromium concentrations greater than the interim maximum background levels is then moved to a quarterly sampling frequency.
2. Semi-annual sampling in the second and fourth quarter of each year at **multi-depth** monitoring wells showing the **second highest** hexavalent or total chromium detections as of fourth quarter 2014.
3. Annual sampling in the fourth quarter of each year for all **multi-depth** monitoring wells showing the third highest hexavalent or total chromium detections as of fourth quarter 2014.
4. *Once every year in the Annual Cleanup Status and Effectiveness Reports, the sampling frequency of monitoring wells used to contour the plume boundary will be reviewed to determine whether the sampling frequency for an individual well should be changed. The decision tree shown in Figure 8.2 (MRP Attachment C) will be used to determine changes to the monitoring frequencies.*

   a) *Quarterly Branch: For quarterly monitoring wells, if the Cr(VI) concentration is less than 3.1 µg/L for a period of four consecutive sampling events, the monitoring frequency will be reduced to semi-annual. If the Cr(VI) concentration is greater than 3.1 µg/L and there is a decreasing Mann-Kendall statistical trend based on 12 consecutive quarters of data and there are 12 consecutive quarters of data in which the Cr(VI) concentrations are less than 10 µg/L or no trend based on 12 consecutive quarters of data and there are 12 consecutive quarters of data in which the Cr(VI) concentrations are less than 10 µg/L, then the sampling frequency will be changed to semiannual. For the remaining quarterly wells, the sampling frequency will remain quarterly.*
   b) *Semi-Annual Branch: For semiannual monitoring wells, if the Cr(VI) concentration is greater than or equal to 3.1 µg/L for four consecutive sampling events and there is an increasing Mann-Kendall trend, then the sampling frequency will be changed to quarterly. If the Cr(VI) concentration is less than 3.1 µg/L for four consecutive sampling events, then the frequency will be changed to annual. If the Cr(VI) concentration is greater than 3.1 µg/L and there a not an increasing Mann Kendall statistical trend, then the sampling frequency will be decreased to annual.*

If all of the wells in the cluster meet the criteria for annual sampling, the well with the highest Cr(VI) concentration will be retained for semi-annual sampling.

c) *Annual Branch: For annual monitoring wells, if the Cr(VI) concentration is non-detect for four consecutive sampling events, the sampling frequency will be reduced to biennial. If the Cr(VI) concentration is detected within four consecutive sampling events and there is an increasing Mann-Kendall statistical trend, then the sampling frequency will be increased to semi-annual. If the Cr(VI) concentration is detected within four consecutive sampling events and there is not an increasing Mann-Kendall statistical trend, then the sampling frequency will remain annual.*

5. ~~*For wells in semi-annual or annual sampling frequency, if two consecutive or two out of three samples in different sampling periods detect chromium in monitoring wells at increasing or decreasing concentrations that puts the well into another of the above categories, the Discharger shall increase or decrease, respectively, the sampling frequency accordingly.*~~
6. ~~*If a single well or all depths at a multi-depth monitoring well location contain less than the maximum background levels for four or more consecutive sampling events with a stable or decreasing trend, monitoring should follow section E below for Outside Plume Boundaries.*~~

~~*E.* ***Outside Plume Boundaries (site-wide), Upper Aquifer***~~

~~*Outside all upper aquifer plume boundary lines (except in the "Western Finger"), the Discharger shall conduct the following monitoring well sampling:*~~

1. ~~*Quarterly sampling at all monitoring wells showing hexavalent or total chromium detections between 3.0 ppb Cr(VI) or 3.1 ppb Cr(T) and 80 percent of the maximum background levels (i.e., 2.5 ppb Cr(VI) or 2.6 ppb CrT) as of fourth quarter 2014.*~~
2. ~~*Semi-annual sampling in the second and fourth quarter of each year at all monitoring wells showing hexavalent or total chromium detections* **less than** *80 percent of the maximum background levels (i.e., 2.5 µg/l Cr(VI) or 2.6 ppb CrT) as of fourth quarter 2014.*~~
3. ~~*Annual sampling in the fourth quarter of each year for all monitoring wells showing hexavalent or total chromium detections less than 2.5 ppb Cr(VI) or 2.6 ppb CrT in four or more consecutive sampling events with a stable or decreasing trend.*~~
4. ~~*If four consecutive or four out of five samples in different sampling periods detect chromium in monitoring wells at increasing or decreasing concentrations that puts the well into one of the above categories, the Discharger shall increase or decrease, respectively, the sampling frequency accordingly.*~~

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E. ~~*F.*~~ Domestic/Community~~/*Agricultural*~~ Water Supply Wells, Northern Uncertain Plume~~s~~[1]

For the northern ~~plume~~ area where the plume is uncertain, the following sampling requirements apply to all active drinking water supply wells one-half mile downgradient and cross gradient of any northern ~~plume~~ area monitoring well showing detections of total or hexavalent chromium above the maximum contaminant levels established for drinking water.

1. Quarterly sampling at all domestic and community wells having hexavalent or total chromium detections at or above drinking water standards following any sampling event.
2. Semi-annual sampling in the second and fourth quarter of each year at all domestic and community wells having hexavalent or total chromium detections at or above the interim maximum background levels.
3. ~~Annual sampling in the fourth quarter of each year at all domestic and community wells having hexavalent or total chromium detections below the maximum background levels.~~
4. ~~If two consecutive or two out of three samples in different sampling periods detect chromium in supply wells at increasing or decreasing concentrations that puts the well into one of the above categories, the Discharger shall increase or decrease, respectively, the sampling frequency accordingly.~~
3. Requests to modify the quarterly or semi-annual sampling frequency must follow the decision tree process specified in Attachment C of this MRP.

F. ~~*G.*~~ No Monitoring *or Domestic* Well Sampling is Required for the Following Locations:

1. Southwest (i.e., upgradient) of the Lockhart Fault
2. *On or* ~~*E*~~*e*ast of Dixie Road
3. Redundant monitoring wells (defined as being less than 200 feet from other monitoring wells except those screened across different depths) having the lower of chromium detections compared to the other nearby well may be removed from all sampling events.

II. REPORTING TYPES

A. Quarterly Groundwater Monitoring Reports

~~Beginning with third quarter 2015, q~~Quarterly groundwater monitoring reports for site-wide monitoring well and domestic/community~~/*agricultural*~~ well monitoring are due ~~by **October 30, 2015,** and~~ every quarter (three months) ~~thereafter~~

[1] Domestic supply well monitoring in the southern plume area is required as part of Board Order R6V-2014-0023 (Waste Discharge Requirements for Agricultural Treatment Units).

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~~(i.e.,~~on January 30th, April 30th, July 30th, and October 30th of each year~~)~~. The quarterly reports shall include required information for maps and reports as described below in Requirements III.B.1., B.2., and B.3. Chromium plume maps and Geotracker submittals shall be implemented according to the due dates described in Requirements *III* ~~II~~.C. and *III* ~~II~~.D.

B. **Annual Cleanup Status and Effectiveness Reports, *and Operational Plans***

Beginning February 28, 2016, submit annual cleanup effectiveness reports to reach target concentrations listed in CAO Requirement VI. The reports shall describe all clean up actions planned and/or implemented during the previous calendar year. PG&E shall explain why any planned cleanup actions were not implemented. Each report shall discuss the actual effectiveness of the final cleanup remedy compared to the prior year's data and expected effectiveness *showing the fourth quarter chromium plume boundary for the year before versus that year's fourth quarter chromium plume boundary map on the same figure.* Provide a calculation for chromium mass removed over the year and the cumulative mass removed since initial remedial actions were implemented in 1992. If current actions are not achieving expected reductions in chromium concentrations, the report shall propose recommendations and an implementation schedule to increase effectiveness. **Within 30 days of the annual report due date**, implement the recommended actions that do not require Water Board approval.

Each annual report shall also include operational plans for the upcoming year. Operational plans shall be specific to each remediation system (e.g., ATUs, IRZs, and freshwater injection areas), and shall describe minimum planned flow rates, injection rates, reagent volumes, or other pertinent measures of operational effort to maintain plume capture, and demonstrate progress toward meeting remediation goals. Subsequent annual status reports shall be submitted by February 28 of each calendar year, starting with the year 2017*. In the fourth year, the annual report shall be replaced by a four-year Comprehensive Cleanup Status and Effectiveness Report, as described in the next section.*

C. **Four-Year Comprehensive Cleanup Status and Effectiveness Reports**

Beginning March 30, 2020, and every four years thereafter *in lieu of the annual report*, submit a report containing a comprehensive evaluation of chromium cleanup actions to reach target concentrations listed in CAO Requirement VI. These four-year comprehensive reports shall summarize the information listed above in the annual reports, II.B, during the previous four years of remedial action. *Each report shall contain a figure showing the fourth quarter chromium plume boundary map for each of the four years. Using this figure and other information, each report shall compare the fourth year data to data from the previous three years to discuss remediation effectiveness.* The fourth year data shall *also* be compared to data from the year this Order is issued, and all

intermittent four-year reports. Data collected over the four-year period shall be used to update groundwater models for predicting chromium cleanup to target concentrations. The report shall also provide research of best available technologies that may be available to remediate chromium in groundwater sooner than target deadlines in this Order. Using the groundwater model results, evaluate the progress to reach target chromium concentrations by the associated deadlines. Describe whether current actions are or are not achieving expected reductions in chromium concentrations. If cleanup actions are not achieving expected reductions, submit a workplan **within 30 days of the date of the 4-year report due date** proposing recommendations and an implementation schedule to increase effectiveness. If best available technology is not recommended, the report and workplan shall state why and provide supporting information. The 4-year reports can consider, evaluate, and include corrective actions previously approved by the Water Board. Subsequent four-year comprehensive reports shall be submitted by March 30 every four years, starting with the year 2024.

III. GROUNDWATER MONITORING REPORTS

A. Quarterly groundwater monitoring reports shall include all monitoring data, laboratory reports, related maps, tables of historical data, calculations, statistical test results for that quarter, and recommendations, such as locations for the installation of additional monitoring wells,as required by section IV.B of the Order to provide subsurface information for sufficient resolution in the areas identified. ~~within a quarter mile of any domestic well(s), as needed.~~ .

B. Using data from the monitoring wells, q~~Q~~uarterly reports shall define the full lateral and vertical extent of chromium in groundwater, based on the monitoring information gathered pursuant to the MRP, for hexavalent and total chromium to at least the interim maximum background levels of 3.1 ppb and 3.2 ppb, respectively, in the upper aquifer, and to non-detect concentrations in the lower aquifer, and determine the direction of groundwater flow. ~~-~~At a minimum, quarterly monitoring reports shall contain the information listed below.

1. **Map Types**

a. Show the extent of total and hexavalent chromium in groundwater in the upper and lower aquifers. ~~These maps are not to show the approximate limit of saturated alluvium in upper aquifer or flow directional arrows.~~ Each quarterly report shall contain two maps:

i. A map showing the maximum plume boundary throughout the uppermost saturated zone. Chromium concentrations shall be shown next to each monitoring well sampled. Include the location of

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domestic wells sampled; however, data from domestic wells shall not be used to draw the plume boundary lines.

ii. A separate map showing the maximum plume boundary that quarter compared to the plume boundary in the prior quarter.

b. Potentiometric map for the upper aquifer showing the groundwater flow directions, estimated flow velocity, and calculated gradients, along the length of the mapped chromium plume and areas where PG&E collected water table data. Do not include the approximate limit of saturated alluvium in upper aquifer.
c. Potentiometric map for the lower aquifer showing the groundwater flow directions, estimated flow velocity, and calculated gradients, along the length of the mapped chromium plume where water table data exist. Include the approximate limit of saturated alluvium in upper aquifer.
d. Map showing all active and inactive domestic/community~~/agricultural~~ supply wells, including those wells on PG&E-owned property and used that quarter for any purpose. Chromium concentrations shall be shown next to each water supply well sampled.
e. Chromium plume maps shall be submitted to the Water Board in digitized form (such as a pdf document). At least one of the submitted maps shall contain monitoring data and plume lines and be printed by the public on 8-1/2 inch by 11 inch and 11 inch by 17 inch paper. Another submitted map shall contain only plume lines and be printed by the public on 8-1/2 inch by 11 inch paper.

2. **Map Content**

a. Map contents shall be consistent between each map, including data, color, symbols, etc.
b. Text font size on maps shall be 9 points or greater.
c. Street names shall be shown in black color to be easily legible.
d. Location of all active supply wells used for remedial actions and the compressor station operations.
e. Approximate location of the Lockhart Fault.
~~f.~~ Chromium boundary lines on plume maps shall reflect the ~~reported maximum hexavalent or total chromium concentration~~groundwater physical and chemical characteristics as interpreted from data reported in monitoring wells and extraction wells at all locations for that quarter. ~~Monitoring wells used to draw the 3.1 ppb Cr(VI) or 3.2 ppb Cr(T) boundary lines shall have plume lines drawn through the monitoring well.~~
~~g.~~ f. Chromium plume boundary lines shall show monitoring and extraction well concentration contours representing the maximum extent of the following: 1,000 ppb Cr(VI) or Cr(T), 50 ppb Cr(T), 10 ppb Cr(VI), 3.1 ppb Cr(VI) or 3.2 ppb Cr(T).

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g. Plume boundary lines shall be drawn ~~to connect any monitoring well located within one-half mile (2,600 ft) of any other monitoring well having chromium concentrations of 3.1 ppb Cr(VI) or 3.2 ppb Cr(T) or greater. Where access is not granted to install additional monitoring wells, plume boundary lines shall be drawn to connect monitoring wells exceeding background concentrations up to one mile apart.~~by a California licensed Professional Geologist or Civil Engineer by evaluating and reporting the site specific conditions using best professional judgment of the following factors, at a minimum:

i. Geology – pertinent subsurface features such as location and depth to bedrock, influences of structure (e.g. folding and faulting), and stratigraphy
ii. Hydrogeology – location and hydraulic properties of the hydrostratigraphic units including, as appropriate, hydraulic conductivity, hydraulic gradients (e.g. horizontal and vertical, regional and localized due to groundwater extraction or injection), saturated aquifer thickness, groundwater flow velocities and directions, characteristics of confined, unconfined, and vadose zones.
iii. Geochemistry – nature and extent of contamination, pertinent groundwater chemistry, historical data from monitoring wells, and appropriate trend analyses.

h. Identify all areas within one-mile outside of the plume boundary where data points in excess of 3.1 ppb Cr(VI) or 3.2 Cr(T) are located more than 1,320 feet apart, submit a narrative statement explaining the technical rationale relied upon to make the conclusion of either connecting or not connecting those data points when drawing the plume boundary.
i. The dashed line representing the inferred chromium boundary of 3.1 ppb Cr(VI) or 3.2 ppb Cr(T) shall be a dark color so as to stand out in contrast to other markings on the map.
j. ~~Where access to private property or endangered species habitat has not been granted for six months or more, the chromium plume boundary shall be drawn around any domestic well containing chromium concentrations exceeding 3.1 ppb Cr(VI) or 3.2 ppb Cr(T) and within a one mile distance of the prior quarter's plume boundary.~~
k. Domestic wells having chromium concentrations exceeding maximum background levels and which become inactive in the prior quarter can be removed from maps only if a monitoring well exists and is monitored within one-quarter mile distance of that domestic well.

3. **Report Content**

a. Describe depth to groundwater, changes from prior quarter, and calculated gradients and flow direction.

b. Table of groundwater elevation data for all monitoring and remediation wells sampled over prior 12 months,
c. Potentiometric map showing the groundwater flow direction and the calculated flow gradient,
d. Laboratory results:

i. If s~~S~~ample results show~~ing~~ a relative percent difference of 25% or greater between Cr(VI) and Cr(T) concentrations and if both concentrations are greater than 4 ppb, then the samples must~~shall~~ be re-analyzed within the same quarter and the ensuing results described. In addition, if sample results have Cr(VI)/Cr(T) difference greater than 1.0 ppb at concentrations below 4 ppb, then the sample must be re-analyzed within the same quarter and the ensuing results described.

ii. Tabulate laboratory results for monitoring wells, remediation wells, domestic/community~~/*agricultural*~~ supply wells, and include data over the prior 12-months of sampling for each well.

e. Describe all required monitoring wells or water supply wells not sampled during quarter and provide an explanation why.
f. Interpret chromium plume boundary in the upper and lower aquifers compared to boundary lines in prior quarter. State if this quarter's boundary lines are stable or have migrated. If migration occurred, explain why it migrated (if due to PG&E's actions, natural groundwater movement, or actions by others).
~~g. If the chromium plume boundary is undefined in certain areas (sampling locations are more than one-quarter mile distance), submit a workplan proposing additional sampling locations in accessible areas and an implementation schedule.~~
~~h.~~g. Describe methods and actions for installing wells, as needed.
~~i.~~h. The domestic well sampling and monitoring requirements shall be included in the main body of the report (not as an appendix) and include:

i. Total number and sampling results for wells that quarter, including number of wells exceeding maximum background levels and chromium MCLs.
~~i.~~ii. An analysis of whether any domestic well within the domestic well sampling area contains Cr(VI) exhibiting an increasing trend, indicating likely future exceedances of the Cr(VI) MCL within one year.
~~ii.~~iii. Required water supply wells not sampled that quarter with an explanation.
~~iii.~~iv. Map showing all active domestic wells in sampling program and detected chromium concentrations for each monitoring event.
~~iv.~~v. Table of inactive water supply wells.

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~~j.~~i. Include appendices for boring logs and well designs for any wells installed during the quarter.

~~k.~~j. Include appendix with description explaining the difference between monitoring well labels, such as A, B, C versus S and D, etc.

~~l.~~k. Include appendix of Standard Operating Procedures for sampling procedures of monitoring wells and domestic wells.

~~m.~~l. Include appendix of laboratory reports and field notes.

~~n.~~m. Discuss calculated groundwater flow direction and velocity based on groundwater elevation data and not surface topography.

~~o. Discuss the status of conditions that prevent access to land for installation of monitoring wells. Such conditions may include, but not be limited too, permission to access to private property by the owner, acquisition of private property, and approval from agencies, such as Department of Fish and Wildlife, to lands that may be considered endangered species habitat or threatened species habitat. Note if conditions change such that access is available.~~

C. **Plume Map Submittals**

Chromium plume maps shall be submitted to the Water Board in digitized form (such as a pdf document) within **one** business day of the report due date. At least one of the submitted maps shall contain monitoring data and plume lines and be printed by the public on 8-1/2 inch by 11 inch and 11 inch by 17 inch paper. Another submitted map shall contain only plume lines and be printed by the public on 8-1/2 inch by 11 inch paper.

D. **Geotracker Submittals**

Reports shall be uploaded to the State Water Resources Control Board's Geotracker database, within **one** business day of the report due date, so that reports can be viewed by the public at the link: https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=SL0607111288. If report appendices are uploaded as separate files, the appendix number or letter shall be included in the file name.

E. **Other Monitoring Requirements Not Superseded**

Requirements for site-wide groundwater monitoring and domestic well sampling and monitoring do not supersede sampling requirements in Water Board orders R6V-2008-0014 and R6V-2014-0023 and related Notices of Applicability.

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III. MONITORING FOR COMPLIANCE WITH CAO CLEANUP REQUIREMENTS FOR SOUTHERN PLUME

The monitoring and remediation wells listed in Table 8.1 shall be evaluated in four-year comprehensive reports required above by Requirement II.C. All wells in Table 8.1 shall be monitored *at the frequency specified in MRP Attachment A* ~~***quarterly***~~ for total and hexavalent chromium to assess progress toward and compliance with cleanup requirements specified in CAO Requirement VI.B. The concentrations of chromium listed in Table 8.1 are of third quarter 2014.

Table 8.1. Monitoring Wells for Evaluating Compliance with CAO Cleanup Requirements for Southern Plume.

Compliance MWs for 50 ppb Target	Cr(VI) (ppb)	CrT (ppb)	Compliance MWs for 10 ppb Target	Cr(VI) (ppb)	CrT (ppb)
CA-MW-107D	150		PMW-01	42	
CA-MW-108S	76		CA-MW-204D	29	
CA-MW302D	99	99	CA-MW-312D	28	29
CA-MW-315D	75	76	CA-MW-402S	40	39
CA-MW-405D	74	75	CA-MW-404S	19	19
~~*D*~~*P*MW-03	320	360	CA-MW-411S	25	25
MW-*0*1	550	610	CA-MW-412D	28	29
MW-11B	1400	1400	CA-MW-506D	13	14
MW-15	1700	1800	CA-MW-508D	32	32
MW-17	110	99	EX-02	20	18
MW-178D	290		EX-15	11	11
MW-178S	220		EX-20	13	13
MW-18	53		EX-26	22	
MW-180RD	95		EX-30	41	43
MW-180RS	92		EX-34	21	
~~*MW-193S3*~~	~~*140*~~	~~*150*~~	IW-01	26	28
MW-20	700	720	IW-02	15	17
MW-36	84	87	MW-03	13	12
PT2-MW-10	510		MW-04	33	34
SA-MW-01S	400	450	MW-10	22	23
SA-MW-02D	150	160	MW-108D	35	35
SA-MW-04S	220	250	MW-108S	41	39
SA-MW-05D	3900	4100	MW-109	13	12
SA-MW-06S	520	570	MW-12B	12	13
SA-MW-07D	880		MW-13	22	23
SA-MW-09S	470		MW-14B	35	32
SA-MW-10D	400	430	MW-14S	29	29
SA-MW-11S	430		~~*MW-154S1*~~	~~*13*~~	~~*14*~~

Compliance MWs for 50 ppb Target	Cr(VI) (ppb)	CrT (ppb)	Compliance MWs for 10 ppb Target	Cr(VI) (ppb)	CrT (ppb)
SA-MW-11D	120		MW-179D	26	
SA-MW-15D	90		MW-182D	39	
SA-MW-16S	340	390	MW-182S	30	
SA-MW-17S	190	210	MW-183D	22	
SA-MW-18D	64	69	MW-183S	33	
SA-MW-20D	830	910	MW-22B	29	29
SA-MW-26S	360	380	MW-23B	44	47
SA-SM-~~015~~ *01S*	740		MW-27A	12	11
SA-SM-02D	1800		MW-28B	14	15
SA-SM-08D	290	310	MW-30B2	12	13
SA-SM-11D	95	100	MW-38B	28	27
SC-MW-03D	320	350	MW-39D	23	
SC-MW-12S	330	340	MW-41S	11	14
SC-MW-13S	110	120	MW-42B1	33	33
SC-MW-21S	440		MW-42B2	45	48
SC-MW-26D	1000		MW-43	10	11
SC-MW-38D	55	52	MW-50S	14	14
# OF WELLS	***44*** ~~**45**~~		MW-68D	12	11
90 % OF TOTAL (compliance target)	***40*** ~~**41**~~		SA-SM-10D	22	
Minimum Cr value (3Q 2014, ppb)	52		X-16	15	
Maximum Cr value (3Q 2014, ppb)	4100		Y-01	12	
			Y-03	11	
			# OF WELLS	***49*** ~~**50**~~	
			80% OF TOTAL (compliance target)	***39*** ~~**40**~~	
			Minimum Cr value (3Q 2014, ppb)	10	
			Maximum Cr value (3Q 2014, ppb)	48	

IV. CRITERIA FOR REMOVAL OR ABANDONMENT OF *PG&E-OWNED* INACTIVE DOMESTIC WELLS FROM SAMPLING PROGRAM

A. The Discharger may remove inactive wells from the domestic well sampling requirements specified above in Requirement I.B.2, if such wells meet the following criteria:

1. The domestic well is located within 2,000 feet of a multi-depth monitoring well, or
2. The domestic well does not contain hexavalent or total chromium concentrations of 2.0 µg/L or greater since September 2011.
3. Prior to removing domestic wells from the sampling program, the Discharger shall provide the Water Board with a list of inactive domestic wells and the rationale for removal from the sampling program within each quarterly report.
4. Domestic wells removed from the sampling program shall be left in place and secured (capped in place) *until they become active or a decision is made to abandon them under IV.B, below* ~~*to be evaluated in the future for potential sampling*~~.

B. The Discharger may abandon inactive domestic wells, *for example, those* which are screened across both the upper and lower aquifers.

1. Prior to abandonment, the Discharger will provide the Water Board with a list of inactive domestic wells proposed for abandonment at least 14 days before initiating abandonment actions.
2. Upon Water Board staff's acceptance of the list, the Discharger will abandon inactive domestic wells in accordance with state Well Standards and county ordinances.

Attachments:

Attachment A: Southern Plume Area Monitoring Program

Attachment B: Figure 8.1, Decision Tree for Monitoring Frequency, Southern Plume Area

Attachment C: Figure 8.2, Decision Tree for Monitoring Frequency, Northern Area

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MRP Attachment A: Southern Plume Area Monitoring Program

Attachment A
Southern Plume Area Monitoring Program

		Remediation Effectiveness Monitoring			Chromium Monitoring		
Well ID	**Aquifer Zone**	**ATU Monitoring Plan [a]**	**IRZ Monitoring Plan [b]**	**Hydraulic Control Monitoring Plan (water levels only) [c d]**	**Used for contouring plume boundary**	**Downgradient of main contiguous plume**	**Domestic well protection**
BW-01D	LUA				Q		
BW-01S	UUA				Q		
C-01	UA				Q		
C-02	UUA				Q		
C-04	UA				Q		
CA-MW-101D	LUA		Q				
CA-MW-102D	LUA		SA				
CA-MW-103D	LUA		SA				
CA-MW-104D	LUA		SA				
CA-MW-104S	UUA		SA				
CA-MW-105	UA		SA				
CA-MW-105D	LUA		SA				
CA-MW-106D	LUA		SA				
CA-MW-107D	LUA		Q				
CA-MW-108D	LUA		Q				
CA-MW-108S	UUA		SA				
CA-MW-109D	LUA		Q				
CA-MW-109S	UUA		A				
CA-MW-110	UUA	Q					
CA-MW-201	UUA		A				
CA-MW-202	UUA		A				
CA-MW-203	UA		A				
CA-MW-204D	LUA		SA				
CA-MW-204S	UUA		A				
CA-MW-301	UUA		Q				
CA-MW-302D	LUA		SA				
CA-MW-302S	UUA		SA				
CA-MW-303D	LUA		SA				
CA-MW-303S	UUA		SA				
CA-MW-304	UUA		SA				
CA-MW-305	UUA		A				
CA-MW-306D	LUA		SA				
CA-MW-306S	UUA		A				
CA-MW-307D	LUA		A				
CA-MW-307S	UUA		A				
CA-MW-308	UUA		A				
CA-MW-309	UUA		A				
CA-MW-310D	LUA		SA				
CA-MW-310S	UUA		SA				
CA-MW-311	UUA		A				
CA-MW-312D	LUA		Q				
CA-MW-313	UUA		Q				
CA-MW-314	UUA		A				

Attachment A
Southern Plume Area Monitoring Program

		Remediation Effectiveness Monitoring			Chromium Monitoring		
Well ID	Aquifer Zone	ATU Monitoring Plan [a]	IRZ Monitoring Plan [b]	Hydraulic Control Monitoring Plan (water levels only) [c d]	Used for contouring plume boundary	Downgradient of main contiguous plume	Domestic well protection
CA-MW-315D	LUA		SA				
CA-MW-315S	UUA		A				
CA-MW-316	UUA		A				
CA-MW-317D	LUA		SA				
CA-MW-317S	UUA		A				
CA-MW-401	UUA		SA				
CA-MW-402D	LUA		A				
CA-MW-402S	UUA		SA				
CA-MW-403D	LUA		A				
CA-MW-403S	UUA		A				
CA-MW-404D	LUA		A				
CA-MW-404S	UUA		SA				
CA-MW-405D	LUA		SA				
CA-MW-405S	UUA		A				
CA-MW-406	UUA		SA				
CA-MW-407	UUA		A				
CA-MW-408	UUA		SA				
CA-MW-409D	LUA		SA				
CA-MW-409S	UUA		A				
CA-MW-410	UUA		SA				
CA-MW-411D	LUA		A				
CA-MW-411S	UUA		SA				
CA-MW-412D	LUA		Q				
CA-MW-412S	UUA		Q				
CA-MW-501D	LUA		Q				
CA-MW-501S	UUA		Q				
CA-MW-502	UUA		SA				
CA-MW-503D	LUA		A				
CA-MW-503S	UUA		SA				
CA-MW-504	UUA		SA				
CA-MW-505	UUA		SA				
CA-MW-506D	LUA		SA				
CA-MW-506S	UUA		Q				
CA-MW-507	UUA		SA				
CA-MW-508D	LUA		SA				
CA-MW-508S	UUA		A				
CA-MW-509	UUA		A				
CA-MW-510D	LUA		Q				
CA-MW-510S	UUA		A				
CA-MW-511	UUA		Q				
CA-MW-601	UUA		Q				
CA-MW-602	UUA		Q				
CA-MW-603	UUA		Q				

Attachment A
Southern Plume Area Monitoring Program

		Remediation Effectiveness Monitoring			Chromium Monitoring		
Well ID	**Aquifer Zone**	**ATU Monitoring Plan [a]**	**IRZ Monitoring Plan [b]**	**Hydraulic Control Monitoring Plan (water levels only) [c d]**	**Used for contouring plume boundary**	**Downgradient of main contiguous plume**	**Domestic well protection**
CPVT	UNK	Q					
DVD-BS-01	UNK	Q					
DW-02	UUA	Q		X			
DW-03	UUA			X	Q		
EX-02	UA				Q		
EX-03	UA				Q		
EX-04	LUA				Q		
EX-05	UUA				Q		
EX-15	UA				Q		
EX-16	UA				Q		
EX-17	UUA				Q		
EX-20	UA				Q		
EX-21	UA				Q		
EX-23	UA				Q		
EX-31	UUA				Q		
EX-32	UUA				Q		
EX-33	UUA				Q		
EX-35	UUA				Q		
EX-36	UA				Q		
G-1R	UA				Q		
G-2R	UUA				Q		
GPVTN	UNK	Q					
GPVTS	UNK	Q					
IW-01	UA				Q		
IW-02	UA				Q		
IW-03	UA				Q		
MW-01	UUA		A				
MW-03	LUA				Q		
MW-03A	UA		Q				
MW-04	UUA		SA				
MW-05	UUA				Q		
MW-06	UUA		A				
MW-09	LUA				Q		
MW-100C	LA				Q		
MW-101D	LUA				Q		
MW-102D	LUA				Q		
MW-105D	LUA	Q					
MW-105S	UUA	Q					
MW-107S	UUA				Q		
MW-108S	UUA				Q		
MW-109	UUA				Q		
MW-110S	UUA				Q		
MW-112S	UUA				Q		

Attachment A
Southern Plume Area Monitoring Program

		Remediation Effectiveness Monitoring			Chromium Monitoring		
Well ID	**Aquifer Zone**	**ATU Monitoring Plan [a]**	**IRZ Monitoring Plan [b]**	**Hydraulic Control Monitoring Plan (water levels only) [c d]**	**Used for contouring plume boundary**	**Downgradient of main contiguous plume**	**Domestic well protection**
MW-116D1	LUA				Q		
MW-118S	UUA						Q
MW-11A	UUA		A				
MW-11B	LUA		Q				
MW-11C	LA				A		
MW-121D	LUA				Q		
MW-121S	UUA				SA		
MW-122D	LUA				Q		
MW-124S1	UUA				Q		
MW-124S2	UUA				Q		
MW-126S1	UUA				Q		
MW-126S2	UUA				Q		
MW-127S1	UUA	Q					
MW-127S2	UUA	Q					
MW-128S1	UUA				Q		
MW-12B	LUA		A				
MW-13	LUA		A				
MW-147D	LUA					SA	
MW-147S	UUA				Q		
MW-148S	UUA					SA	
MW-14A	UUA		SA				
MW-14B	LUA	SA					
MW-14C	LA				A		
MW-14S	UUA	SA					
MW-153S	LUA				Q		
MW-155D	LUA		Q				
MW-155S	UUA		Q				
MW-158CR	LA				A		
MW-16	UUA	Q					
MW-164D	LUA				SA		
MW-164S	UUA				SA		
MW-168D	LUA					A	
MW-168S	UUA					SA	
MW-169S2	UUA				Q		
MW-17	UUA		Q				
MW-170S	UUA	Q		X			
MW-172S1	UUA				Q		
MW-172S2	UUA				Q		
MW-177D	LUA		Q				
MW-177S	UUA		SA				
MW-178D	LUA		Q				
MW-178S	UUA	Q					
MW-179D	LUA		Q				

Attachment A
Southern Plume Area Monitoring Program

		Remediation Effectiveness Monitoring			Chromium Monitoring		
Well ID	**Aquifer Zone**	**ATU Monitoring Plan [a]**	**IRZ Monitoring Plan [b]**	**Hydraulic Control Monitoring Plan (water levels only) [c d]**	**Used for contouring plume boundary**	**Downgradient of main contiguous plume**	**Domestic well protection**
MW-179S	UUA		SA				
MW-17D	LUA		SA				
MW-18	UA		SA				
MW-180RD	LUA		Q				
MW-180RS	UUA		Q				
MW-181D	LUA		SA				
MW-181S	UUA		SA				
MW-182D	LUA		Q				
MW-182S	UUA		Q				
MW-183D	LUA		Q				
MW-183S	UUA		Q				
MW-20	UUA		Q				
MW-201D	LUA						A
MW-201S	UUA						SA
MW-202S	UUA				Q		
MW-203D	LUA				Q		
MW-206S	UUA	Q					
MW-208S	UUA	Q					
MW-209S	UUA	Q					
MW-210S	UUA	SA					
MW-211S	UUA	Q					
MW-21A	UA	Q		X			
MW-21B	LUA			X			
MW-21B1	LUA	Q					
MW-21C	LA				SA		
MW-22A1	UA	SA					
MW-22B	LUA	SA					
MW-23B	LUA				Q		
MW-23C	LA				Q		
MW-27A	UUA	SA					
MW-27B	LUA	SA					
MW-28A	UUA	SA					
MW-28B	LUA	SA					
MW-28C	LA				Q		
MW-29	UUA	SA		X			
MW-30B2	LUA			X			
MW-31	LUA	Q					
MW-31C	LA				Q		
MW-32B1	LUA	Q					
MW-32S	UUA	Q		X			
MW-34	LA				SA		
MW-36	UUA		Q				
MW-37	UUA				Q		

Attachment A
Southern Plume Area Monitoring Program

		Remediation Effectiveness Monitoring			Chromium Monitoring		
Well ID	**Aquifer Zone**	**ATU Monitoring Plan [a]**	**IRZ Monitoring Plan [b]**	**Hydraulic Control Monitoring Plan (water levels only) [c d]**	**Used for contouring plume boundary**	**Downgradient of main contiguous plume**	**Domestic well protection**
MW-38A	UUA		SA				
MW-38B	LUA		Q				
MW-39	UUA		SA				
MW-39D	LUA		Q				
MW-41B	LUA			X			
MW-41S	UUA			X	Q		
MW-42B1	LUA	SA					
MW-42B2	LUA	SA		X			
MW-42C	LA				Q		
MW-43	LUA				Q		
MW-44A	UUA				Q		
MW-44B	LUA				Q		
MW-45A	UUA			X	Q		
MW-45B	LUA				Q		
MW-46	UUA		SA				
MW-47	UA			X	Q		
MW-47A	UUA			X			
MW-49A	LUA	SA					
MW-49B	LUA	SA					
MW-49S	UUA				Q		
MW-50B	LUA			X	Q		
MW-50S	UUA			X	Q		
MW-54	UUA			X	Q		
MW-55A	LUA	Q					
MW-55B	LUA			X			
MW-55C	LA				SA		
MW-55S	UUA	Q		X			
MW-56	LUA	SA					
MW-57	UUA					SA	
MW-57D	LUA					SA	
MW-58	UUA			X	Q		
MW-59	UUA				A		
MW-61	UUA		SA				
MW-62A	LUA			X	Q		
MW-62C	LA				SA		
MW-63	UUA	Q					
MW-66A	UUA				Q		
MW-67A	UUA		Q				
MW-67B	LUA		Q				
MW-68C	LA				SA		
MW-68D	LUA	Q		X			
MW-68S	UUA	Q		X			
MW-69D	LUA			X	Q		

Attachment A
Southern Plume Area Monitoring Program

		Remediation Effectiveness Monitoring			Chromium Monitoring		
Well ID	**Aquifer Zone**	**ATU Monitoring Plan [a]**	**IRZ Monitoring Plan [b]**	**Hydraulic Control Monitoring Plan (water levels only) [c d]**	**Used for contouring plume boundary**	**Downgradient of main contiguous plume**	**Domestic well protection**
MW-69S	UUA			X	Q		
MW-70D	LUA	Q					
MW-70S	UUA	Q		X			
MW-71D	LUA	Q					
MW-71S	UUA	Q		X			
MW-72S	UUA			X	Q		
MW-73D	LUA		Q				
MW-73S	UUA		Q				
MW-74D	UUA		Q				
MW-74S	UUA		Q				
MW-75D	LUA		Q				
MW-76S	UUA			X	Q		
MW-78D	LUA		SA				
MW-78S	UUA		Q				
MW-79S	UUA			X	Q		
MW-80S	UUA			X	Q		
MW-82S	UUA			X			
MW-83D	UUA	Q		X			
MW-83S	UUA	Q					
MW-84D	LUA	Q					
MW-84S	UUA	Q					
MW-85D	LUA	Q					
MW-85S	UUA	Q					
MW-86D	LUA	SA					
MW-86S	UUA	SA		X			
MW-87D	LUA				Q		
MW-87S	UUA			X	Q		
MW-88D	LUA	SA					
MW-88S	UUA	SA		X			
MW-89D	LUA	Q					
MW-89S	UUA	Q					
MW-90C	LA				Q		
MW-91C	LA				Q		
MW-92C	LA				Q		
MW-93C	LA				SA		
MW-94S	UUA				Q		
MW-95S	UUA				Q		
MW-96S	UUA				Q		
MW-97S	UUA				Q		
MW-98C	LA				Q		
MW-99C	LA				SA		
PMW-02	UUA	SA					
PMW-03	LUA		Q				

Attachment A
Southern Plume Area Monitoring Program

		Remediation Effectiveness Monitoring			Chromium Monitoring		
Well ID	**Aquifer Zone**	**ATU Monitoring Plan [a]**	**IRZ Monitoring Plan [b]**	**Hydraulic Control Monitoring Plan (water levels only) [c d]**	**Used for contouring plume boundary**	**Downgradient of main contiguous plume**	**Domestic well protection**
PMW-04	UA		SA				
PMW-05	UA		Q				
PMW-06	UA		A				
PT1-MW-01	UA		SA				
PT1-MW-04	UA		Q				
PT2-MW-08	UA		A				
PT2-MW-09	UA		SA				
PT2-MW-10	LUA		Q				
PT2-MW-11	UA		SA				
PZ-04	UUA			X			
PZ-05	UUA			X			
PZ-06	UUA			X			
PZ-08	UUA			X			
RPVT	UNK	Q					
SA-MW-01D	LUA		SA				
SA-MW-01S	UUA		Q				
SA-MW-02D	LUA		A				
SA-MW-02S	UUA		Q				
SA-MW-03D	LUA		A				
SA-MW-03S	UUA		A				
SA-MW-04D	LUA		SA				
SA-MW-04S	UUA		SA				
SA-MW-05D	LUA		Q				
SA-MW-05S	UUA		A				
SA-MW-06D	LUA		SA				
SA-MW-06S	UUA		Q				
SA-MW-07D	LUA		Q				
SA-MW-07S	UUA		Q				
SA-MW-08D	LUA		Q				
SA-MW-08S	UUA		SA				
SA-MW-09D	LUA		A				
SA-MW-09S	UUA		Q				
SA-MW-10D	LUA		Q				
SA-MW-10S	UUA		SA				
SA-MW-11D	LUA		SA				
SA-MW-11S	UUA		Q				
SA-MW-12D	LUA		SA				
SA-MW-12S	UUA		Q				
SA-MW-13D	LUA		A				
SA-MW-13S	UUA		Q				
SA-MW-14D	LUA		SA				
SA-MW-14S	UUA		SA				
SA-MW-15D	LUA		SA				

Attachment A
Southern Plume Area Monitoring Program

		Remediation Effectiveness Monitoring			Chromium Monitoring		
Well ID	Aquifer Zone	ATU Monitoring Plan [a]	IRZ Monitoring Plan [b]	Hydraulic Control Monitoring Plan (water levels only) [c d]	Used for contouring plume boundary	Downgradient of main contiguous plume	Domestic well protection
SA-MW-15S	UUA	Q					
SA-MW-16D	LUA		Q				
SA-MW-16S	UUA		Q				
SA-MW-17D	LUA		SA				
SA-MW-17S	UUA		Q				
SA-MW-18D	LUA		SA				
SA-MW-18S	UUA		Q				
SA-MW-20D	LUA		Q				
SA-MW-20S	UUA		SA				
SA-MW-21D	LUA		SA				
SA-MW-21S	UUA		A				
SA-MW-22D	LUA		A				
SA-MW-22S	UUA		A				
SA-MW-24D	LUA		SA				
SA-MW-24S	UUA		SA				
SA-MW-25D	LUA		Q				
SA-MW-25S	UUA		Q				
SA-MW-26D	LUA		Q				
SA-MW-26S	UUA		Q				
SA-MW-27D	LUA		Q				
SA-MW-27S	UUA		Q				
SA-SM-01D	LUA		Q				
SA-SM-01S	UUA		Q				
SA-SM-02D	LUA		A				
SA-SM-02S	UUA		Q				
SA-SM-03D	LUA		A				
SA-SM-03S	UUA		A				
SA-SM-04S	UUA		A				
SA-SM-05S	UUA		A				
SA-SM-06D	LUA		A				
SA-SM-06S	UUA		SA				
SA-SM-07D	LUA		A				
SA-SM-07S	UUA		A				
SA-SM-08D	LUA		Q				
SA-SM-08S	UUA		A				
SA-SM-09D	LUA		A				
SA-SM-09S	UUA		SA				
SA-SM-10D	LUA		A				
SA-SM-10S	UUA		A				
SA-SM-11D	LUA		SA				
SA-SM-11S	UUA		A				
SC-MW-01D	LUA		Q				
SC-MW-01S	UUA		Q				

Attachment A
Southern Plume Area Monitoring Program

		Remediation Effectiveness Monitoring			Chromium Monitoring		
Well ID	Aquifer Zone	ATU Monitoring Plan [a]	IRZ Monitoring Plan [b]	Hydraulic Control Monitoring Plan (water levels only) [c d]	Used for contouring plume boundary	Downgradient of main contiguous plume	Domestic well protection
SC-MW-02D	LUA		Q				
SC-MW-02S	UUA		Q				
SC-MW-03D	LUA		Q				
SC-MW-03S	UUA		Q				
SC-MW-04D	LUA		Q				
SC-MW-04S	UUA		Q				
SC-MW-05D	LUA		Q				
SC-MW-05S	UUA		SA				
SC-MW-06D	LUA		Q				
SC-MW-06S	UUA		Q				
SC-MW-07D	LUA		SA				
SC-MW-07S	UUA		Q				
SC-MW-08D	LUA		SA				
SC-MW-08S	UUA		SA				
SC-MW-09D	LUA		Q				
SC-MW-09S	UUA		SA				
SC-MW-10D	LUA		Q				
SC-MW-10S	UUA		Q				
SC-MW-11D	LUA		Q				
SC-MW-11S	UUA		Q				
SC-MW-12D	LUA		Q				
SC-MW-12S	UUA		Q				
SC-MW-13D	LUA		Q				
SC-MW-13S	UUA	Q					
SC-MW-14D	LUA		Q				
SC-MW-14S	UUA	SA					
SC-MW-15D	LUA		Q				
SC-MW-15S	UUA		SA				
SC-MW-16C	LA				A		
SC-MW-16D	LUA		Q				
SC-MW-16S	UUA		SA				
SC-MW-21D	LUA		A				
SC-MW-21S	UUA	Q					
SC-MW-22D	LUA		A				
SC-MW-22S	UUA		A				
SC-MW-23D	LUA		A				
SC-MW-23S	UUA		A				
SC-MW-26D	LUA		Q				
SC-MW-26S	UUA		A				
SC-MW-32D	LUA		SA				
SC-MW-32S	UUA		A				
SC-MW-38D	LUA		SA				
SC-MW-38S	UUA		A				

Attachment A
Southern Plume Area Monitoring Program

		Remediation Effectiveness Monitoring			Chromium Monitoring		
Well ID	**Aquifer Zone**	**ATU Monitoring Plan [a]**	**IRZ Monitoring Plan [b]**	**Hydraulic Control Monitoring Plan (water levels only) [c d]**	**Used for contouring plume boundary**	**Downgradient of main contiguous plume**	**Domestic well protection**
X-10	UA		SA				
X-11	LUA		A				
X-12	UA	Q					
X-16	LUA		A				
YAU	UNK	Q					
TOTAL NUMBER OF WELLS:			**434**				

[a] WDRs set forth in Water Board Order No. R6V 2014-0023 (Water Board 2014a)

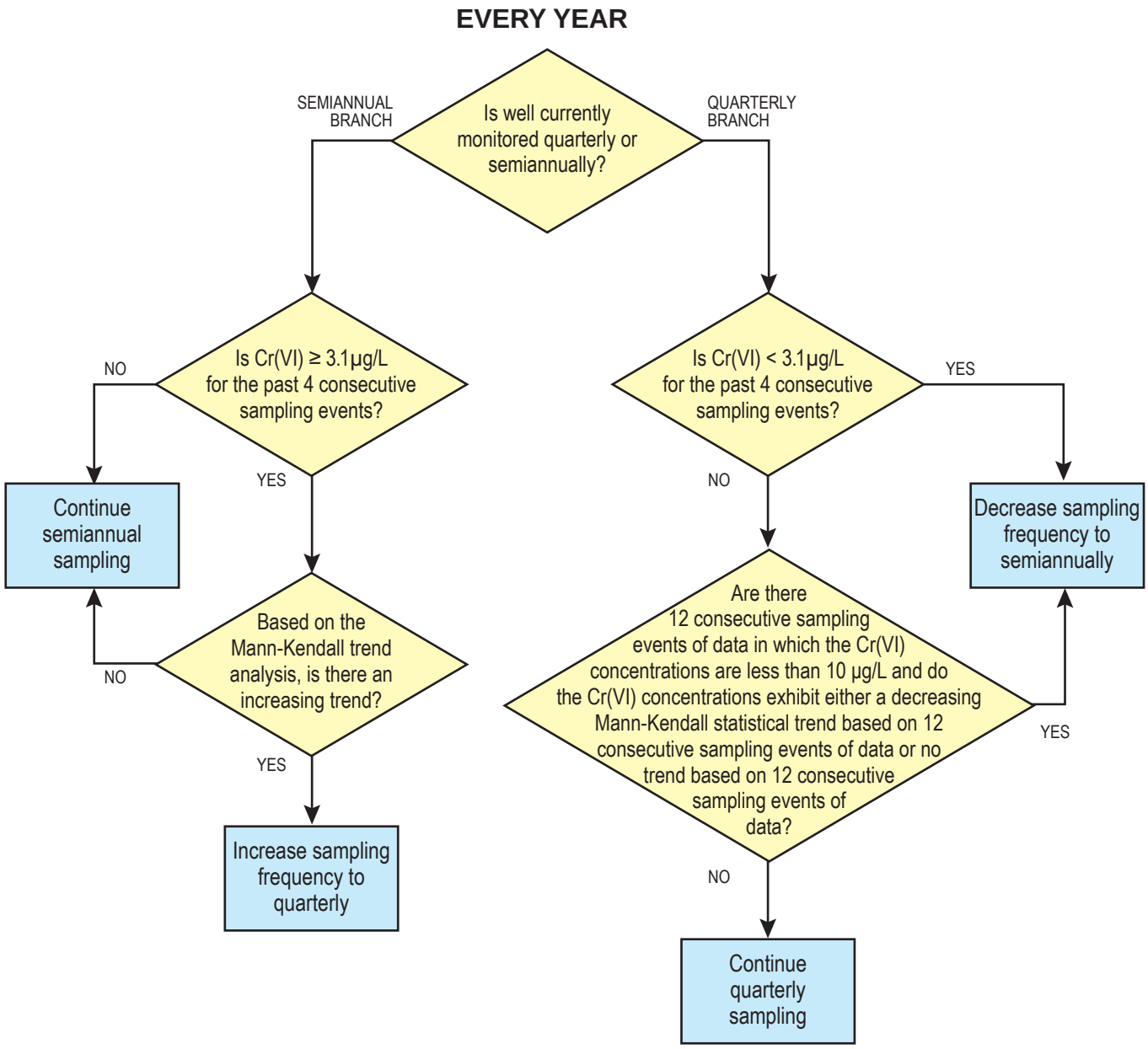
[b] Water Board Letter "Comments on Manganese Investigation Technical Report, Pacific Gas and Electric (PG&E), Hinkley Compressor Station, San Bernardino County" (Water Board 2014b)

[c] Water Board Order No. R6V 2008 0002A3 (Water Board 2012). A proposed revision to the hydraulic control monitoring program was submitted to the Water Board on June 2, 2015

[d] Monitoring wells in Hydraulic Capture Monitoring Program have pressure transducers installed and record nearly continuous water level measurements (every 30 minutes). Manual water levels are also collected at these monitoring locations periodically

B = biennial monitoring frequency (sampled every two years)
Q = quarterly monitoring frequency
SA = semiannual monitoring frequency (sampled twice per year)
LA = lower aquifer
LUA = deep zone of the upper aquifer
UUA = shallow zone of the upper aquifer

MRP Attachment B: Figure 8.1, Decision Tree for Monitoring Frequency, Southern Plume Area



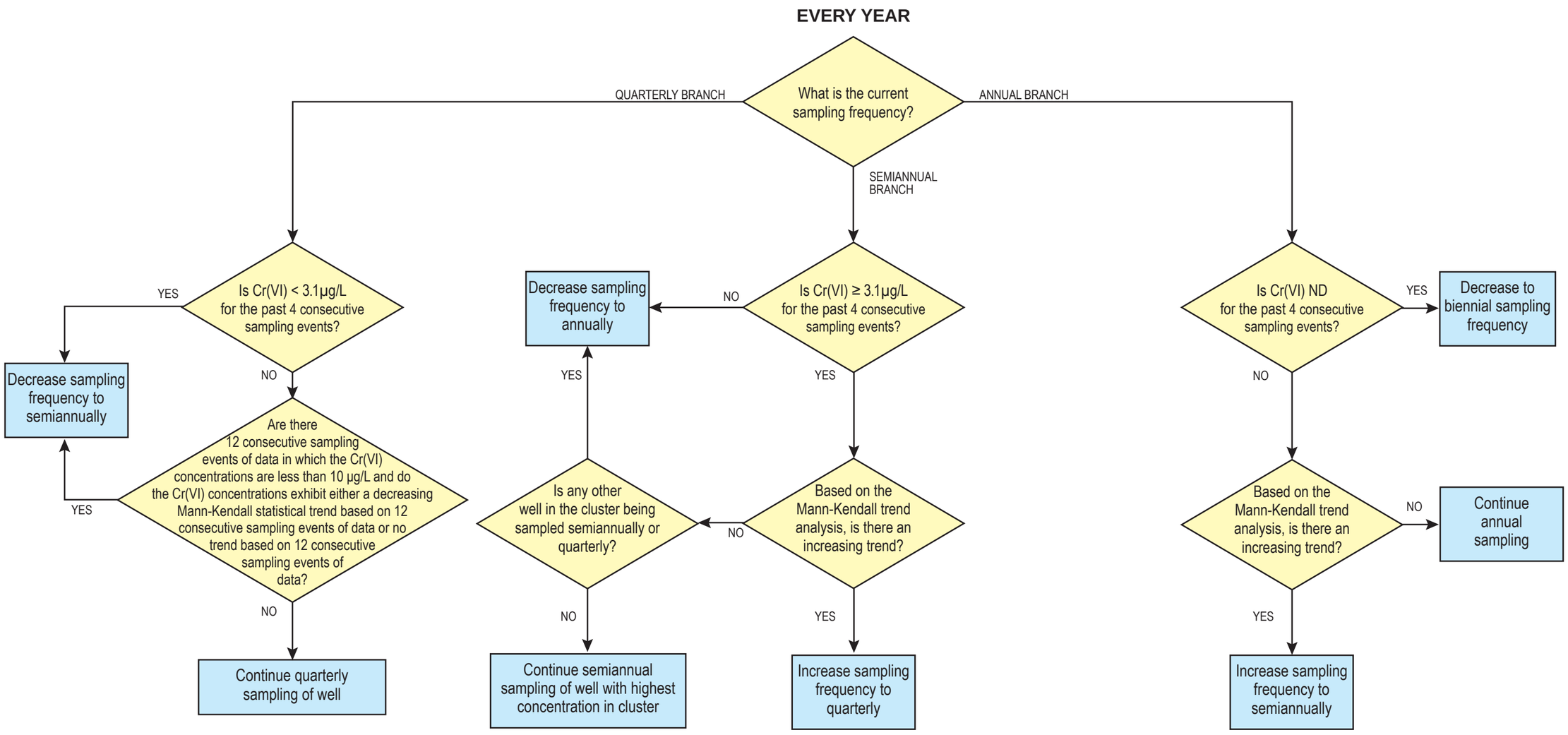
Note:
The few wells in this area that are monitored in the Southern Plume Area on an annual sampling frequency will continue on an annual sampling frequency. If changes to sampling frequency for these wells is needed, the evaluation will occur separately.

Legend

Cr(VI)	hexavalent chromium
µg/L	micrograms per litter
Semiannual	Sampled twice per year

FIGURE 8-1
Decision Tree for Monitoring Frequency, Southern Plume Area

MRP Attachment C: Decision Tree for Monitoring Frequency, Northern Area



Note: Sampling frequency for wells sampled biennially will be evaluated on a case-by-case basis using similar logic as shown above.

Legend

Cr(VI)	hexavalent chromium
µg/L	micrograms per litter
ND	Not detected
Semiannual	Sampled twice per year
Biennial	Sampled every two years

FIGURE 8-2
Decision Tree for Monitoring Frequency, Northern Area

ATTACHMENT 9

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Attachment 9
PG&E Hinkley - proposed Cleanup and Abatement Order
Summary of Performance Requirements

General

I	Implement on-going corrective actions. [“Continue to implement”]	Ongoing.
II	Shall not cause additional waste chromium to be discharges or deposited where it is, or probably will be, discharged into waters of the State.	Ongoing.

Chromium Plume Definition in the Upper Aquifer

IV.A.	Define extent with sufficient resolution	Ongoing.
IV.C. (Contingent)	Develop and sample new MWs installed in Order IV.A. and report results in Groundwater Monitoring Program (Attachment 8).	Within 60 days of EO approval.
IV.D. (Contingent)	Add any MWs installed under requirements in this Order to the Groundwater Monitoring Program (Attachment 8).	Upon first sampling event.
IV.D. (Contingent)	Sample new MWs quarterly.	Quarterly.

Southern Plume Containment

V.C.1. though V.C.3.	Compliance requirements and violation specifics for Southern Plume Hydraulic Capture Metrics.	Duration.
V.D. (Contingent)	Implement contingency plan to re-establish Southern Plume capture, if necessary.	According to approved schedule.
V.G.	If alternative hydraulic capture zone implemented (Order V.F.), 50 ppb Cr(VI)/Cr(T) or 10 ppb Cr(VI)/Cr(T) boundaries may not expand more than 1,000 feet.	Ongoing, if contingency implemented.
V.H.	Maintain 4 ppb boundary to within 1,000 feet in eastern boundary of Southern Plume.	Ongoing.

Summary of Performance Requirements (continued)

Cleanup Requirements

VI.A.	Implement previously accepted corrective actions.	Continuously.
VI.C.	Conduct corrective actions at specified level.	Ongoing.
VI.C.1.a. (Western Area)	Cleanup and abate chromium above background in Western Area. (Continue ongoing remedial activities.)	Ongoing.
VI.C.1.b. (Lower Aquifer)	Cleanup and abate chromium in Lower Aquifer linked to PG&E.	Ongoing.
VI.C.1.c.i.	Reach and maintain 50 ppb Cr(VI)/Cr(T) in 90% of the 50 ppb CrVI/CrT plume.	December 31, 2025.
VI.C.1.c.ii.	Reach and maintain 10 ppb Cr(VI)/Cr(T) in 80% of the 10 ppb Cr(VI)/Cr(T0 and 50 ppb Cr(VI)/Cr(T) plumes.	December 31, 2032.
V.C.1.c.iii	Reach and maintain background levels of Cr(VI) and Cr(T).	No date specified. Dependent on USGS BGS.
VI.C.2.b. (Contingent)	Cleanup and abate any “hot spots” in the Northern Area.	Within 45 days of accepted workplan.
VI.C.2.c. (Contingent)	If USGS BGS indicates, no further remedial action required in the Northern Area.	-

Replacement Water Supply

VII.A.1.a. (Contingent)	Supply interim water supply if a domestic well exceeds the MCL.	Within 10 days of lab report.
VII.A.2.a. (Contingent)	Supply long-term water supply if a domestic well qualifies.	Within 45 days of EO approval of workplan.

Independent Consultant

VIII.A.	Continue to fund an independent consultant.	Ongoing.

Monitoring and Reporting Program (See Attachment 8)

I.B.1. & 2.	Collect groundwater elevation data and samples from MWs.	Quarterly (or less).
II.B.3.	Analyze groundwater samples for required constituents.	Quarterly.
II.C.1.	Sample MWs as specified in the monitoring programs for the ATU and IRZ permits.	As specified in ATU and IRZ permits.
II.D.	Collect groundwater elevation data and samples from MWs in the Northern Areas.	Quarterly (or less).
II.B. (Contingent)	Implement recommended cleanup actions not requiring Water Board approval.	Within 30 days of the Annual Report due date.

PG&E Hinkley CAO

Summary of Submittal Requirements

General

III	Upload documents to Geotracker	Within one business day of the document date.

Chromium Plume Definition in the Upper Aquifer

IV.B.	Either submit a workplan to install MWs if change in land access status occurs or submit a technical justification explaining why additional wells are not necessary.	Within 30 days of the date the Order is adopted.

Southern Plume Containment

V.B.	Submit Hydraulic Capture Metric Reports	Quarterly, beginning January 15, 2016.
V.D. (Contingent)	Submit contingency plan to re-establish capture, if necessary.	15th of the month following quarterly report submittal.
V.D. (Contingent)	Submit Hydraulic Capture Metric contingency assessments and subsequent corrective actions, if necessary.	Monthly, by the 15th of the month.
V.E. (Contingent)	Notify Water Board when hydraulic capture contingency actions are taken, if necessary.	Within one week.
V.F. (Optional)	PG&E may propose more optimal alternative hydraulic capture zone.	Upon EO approval.

Summary of Submittal Requirements (continued)

Cleanup Requirements

VI.B.	Submit "Annual Cleanup Status and Effectiveness" report and an "Operations Plan"	Annually, beginning February 28, 2016 until February 2020 (when the Operations Plan will be replaced by a Four-Year report).
VI.B.	Notify the Water Board if reductions of more than 10 percent in corrective actions are necessary.	Prior to implementing the corrective actions.
VI.C.1.a.ii. (Contingent)	Submit technical report if CrVI exceeds 10 ppb in Western Area sentry MWs.	Within 60 days from submittal of quarterly site-wide groundwater monitoring report.
VI.C.1.a.iii.	Submit technical report regarding feasibility of achieving background based on USGS Preliminary BGS.	Within 60 days of acceptance of USGS Preliminary BGS (scheduled for release by September 2017).
VI.C.1.c.iv.	Submit a four-year cleanup status and effectiveness report.	Beginning March 30, 2020, and every four years thereafter (in lieu of the Annual Report required in MRP Order VI.B.).
VI.C.1.c.iv. (Contingent)	Submit workplan if cleanup actions are not achieving expected results.	Within 30 days of the Four-Year Report due date.
VI.C.2.b. (Contingent)	Submit a workplan if a "hot spot" trigger is met.	Within 30 days of receiving lab report.

Summary of Submittal Requirements (continued)

Replacement Water Supply

VII.A. (Contingent)	Provide an analysis whether a domestic well water is subject to increasing trend likely to exceed CrVI MCL within a year.	In each quarterly monitoring report, beginning first quarter 2016.
VII.A.1.b. (Contingent)	Submit a report of properties being provided with interim replacement water.	Within 7 days of each quarterly report.
VII.A.2.a. (Contingent)	Submit a workplan outlining long-term replacement water supply for all drinking and cooking uses.	Within 45 days of the Order being issued.
VII.A.2.c. (contingent)	Submit a report of properties being supplied long-term water supply.	Quarterly.

Independent Consultant

VIII.B.	Submit a report that includes the scope of work and budget for 12-month past and 12-month future, for the independent consultant.	Annually.
VIII.C.	The annual workplan for the independent consultant is subject to EO approval.	Annually.

Monitoring and Reporting Program (Attachment 8)

II.A.	Submit groundwater monitoring reports	Quarterly, on Jan 30th, April 30th, July 30th, and Oct 30th.
II.B.	Submit Annual Cleanup Status and Effectiveness and Operational Plan report ("Annual Report")	February 28, 2016 February 28, 2017 February 28, 2018 February 28, 2019
II.C.	Submit Four-Year Comprehensive Cleanup Status and Effectiveness reports ("Four-Year Report")	March 30, 2020, and every four years thereafter.
II.C. (Contingent)	Submit workplan if cleanup actions are not achieving expected results.	Within 30 days of the Four-Year Report due date.
III.D.	Upload documents to Geotracker	Within one business day of the document date.

Abbreviations:

ATU – Agricultural Treatment Unit **IRZ** – In-Situ Reactive Zone
BGS – Background Study **MCL** – Maximum Contaminant Level
EO – Executive Officer **MW** – monitoring well **USGS** – United States Geological Survey

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ENCLOSURE 2

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September 1, 2015

To Interested Stakeholders and Public:

REQUEST FOR COMMENTS

On
Draft Cleanup and Abatement Order (CAO)
Requiring Pacific Gas and Electric Company to
Clean Up Discharges of Chromium to
Groundwaters in Hinkley

Comments Due September 30, 2015, by 5:00pm

Instructions for Submitting Comments

All comments less than 50 MB that do not contain large maps or attachments (those which need to be printed on larger than 8½ x 11" paper to be legible) may be submitted electronically to the following email address: RB6enfproceed@waterboards.ca.gov . All electronic submittals should be submitted in a searchable pdf format in a legible font no smaller than 11-point size.

If your submittal is more 50 MB, or contains maps or attachments that need to be printed on paper larger than 8½ x 11" to be legible, then you must provide an electronic copy on a compact disc and 10 hard copies to the following address:

Attn: Sue Genera, Executive Assistant and Water Board Clerk
Lahontan Regional Water Quality Control Board
2501 Lake Tahoe Blvd.
South Lake Tahoe, CA 96150

The Lahontan Regional Water Quality Control Board (Water Board) requests your review and comment on a draft CAO, which consists of the draft order and nine attachments, including a map describing an area of allowed plume expansion related to the plume remediation, hydraulic capture metrics, and monitoring requirements.

The Water Board Advisory Team (Advisory Team) developed this draft CAO after reviewing input received from stakeholders at the May 28, 2015, public workshop and by addressing written comments received from stakeholders. This draft CAO also includes suggested changes received on July 8, 2015, which were crafted from consensus between the Water Board Prosecution Team (Prosecution Team) and

PG&E. The consensus changes and previous comments received on the draft CAO can be viewed at the Water Board's public website for this item:

http://www.waterboards.ca.gov/lahontan/water_issues/projects/pge/cao/

Public Participation

Before the 30-day Public Comment period ends, the Water Board will hold a public workshop on the draft CAO on September 16, 2015, in Barstow. The purpose of the public workshop is for the Advisory Team to 1) briefly describe the consensus changes received from PG&E and the Water Board Prosecution Team, and 2) explain the Advisory Team's recommended changes in the draft CAO and attachments. The Water Board is tentatively scheduled to consider the draft CAO at its November 4-5, 2015, Board meeting in Barstow. In anticipation of that Board meeting, the Water Board may issue special instructions regarding the procedures the Water Board wishes to follow when it hears the draft CAO item at its meeting. At that Board meeting, the Water Board will consider the comments received and would either adopt the CAO as proposed, adopt it with modifications, or reject it.

Purpose and Overview of the CAO

Since 1987, the Water Board has been requiring PG&E's to investigate, cleanup and abate its discharges of total and hexavalent chromium to the groundwaters beneath the Hinkley area. During that time, the Water Board has issued numerous orders directing PG&E's actions. The draft CAO reduces confusion by consolidating requirements and replacing 15 previous orders issued; directs PG&E to continue to remediate chromium-contaminated groundwater; requires specific factors be considered when investigating and mapping the chromium plume boundary; sets plume capture requirements; and sets deadlines to meet interim cleanup targets. A monitoring and reporting program is presented in Attachment 8, which includes a decision tree flow chart for determining when certain wells are to be monitored.

Background

PG&E's Hinkley Compressor Station is located southeast of the community of Hinkley, about 8 miles west of Barstow in San Bernardino County. The Compressor Station has operated since 1952. From 1952 to 1965, hexavalent chromium-based corrosion inhibitor was added to water used in the cooling towers, and the untreated cooling tower water was discharged to unlined evaporation ponds. In 1987, PG&E reported to the State that total chromium and hexavalent chromium concentrations exceeding the California drinking water standard of 50 parts per billion (ppb) total chromium were found in groundwater beneath and down gradient of the site. Since 1987, the Water Board has been requiring PG&E to carry out investigation and cleanup actions for chromium in groundwater at the Hinkley Compressor Station. Various cleanup methods have been operated on a limited-scale basis to stop the spreading of chromium in groundwater and to test cleanup methods to remove chromium from soils and groundwater, including excavation of contaminated

soil, groundwater extraction and agricultural land treatment, in-situ (subsurface) treatment, and freshwater injection into the aquifer.

CONSENSUS TEXT SUBMITTED

The Prosecution Team submitted on July 8, 2015, a version of the draft CAO showing redline changes that depict specific text agreed upon with PG&E. The agreed upon text is a result of collaboration between the two parties and nearly half of the draft CAO issues have been resolved between these parties. These consensus points are also in line with the IRP Manager's written recommendations. Some of the consensus points included using preliminary results from the USGS background study to modify the interim cleanup levels, removing duplicative monitoring requirements, using a decision tree and statistical tests to determine well sampling frequency, and removing the concept of "affected area".

UNRESOLVED ISSUES

While many consensus points have been reached between the Prosecution Team and PG&E, four main issues are unresolved. These unresolved issues are discussed separately below. The Prosecution Teams and PG&E's opposing positions are summarized based upon the draft CAO the Prosecution Team released in January 2015, and PG&E's comments submitted on March 12, 2015. The Advisory Team recommendation, which follows each issue, was developed based upon several factors: previous Board actions, input and comments received from stakeholders, technical accuracy supported by factual findings, and consistency with existing law.

A. Cleanup of Lower Aquifer

Prosecution Team: Require cleanup of Cr (VI) in lower aquifer to non-detect.

PG&E: Remove requirement to cleanup to non-detect, and allow process of determining background values, completing delineation, and conducting feasibility studies for this area, consistent with the sequential process set forth in State Water Board Resolution 92-49.

Advisory Team Recommendation: Require cleanup of Cr(VI) that has migrated from PG&E's release in upper aquifer to the lower aquifer, based on technical evaluations, including determination of the background levels of chromium in the lower aquifer.

B. Plume Definition & Mapping Requirements

Prosecution Team: Draw the Cr(VI) plume by connecting monitoring wells with Cr(VI) detections above 3.1 ppb CrVI or 3.2 Cr(T) that are within 2,600 feet of one another. Where there is no access to install additional monitoring wells, plume boundary lines must be drawn to connect monitoring wells exceeding interim background concentrations up to one mile apart.

PG&E: Map the Cr (VI) plume using Best Professional Judgment, which considers all available information.

Advisory Team Recommendation: Require PG&E to define with sufficient resolution the extent of the total and hexavalent chromium in the upper aquifer.

> For the southern chromium plume, sufficient resolution means either use data points from monitoring wells spaced no more than 1,320 feet apart, or submit a technical justification explaining the reasons why additional monitoring points are not needed based on Best Professional Judgment.
>
> For the northern area, sufficient resolution means to use Best Professional Judgment to define and map the chromium.
>
> Best Professional Judgment is defined as a CA-licensed Professional Geologist or Civil Engineer reviewing all available information in line with the industry standards, and considering, at a minimum, specific factors about the site's geology, hydrogeology, and geochemistry.

C. Replacement Water Requirements if domestic well > 10 ppb Cr(VI) or showing increasing trends

Prosecution Team: Require replacement water for "all indoor uses."

PG&E: Replacement water is only necessary for replacing drinking water. The most efficient and least disruptive option is the installation of reverse osmosis treatment units on drinking water taps.

Advisory Team Recommendation: For long-term water replacement, PG&E must evaluate three different options and consider several factors to provide water for drinking and cooking purposes. Bottled water is required at a minimum.

D. Technical Corrections

Advisory Team Explanation and Recommendation: This draft CAO contains corrections to some findings to ensure that the requirements of the Order are supported by facts and evidence, and provide the Water Board's rationale.

Additional findings were also necessary to support the new requirements provided by the Water Board Prosecution Team and PG&E as part of their consensus text. Other parts of the findings and requirements were rearranged and rewritten in an attempt to provide more clarity and consistency.

QUESTIONS OR NEED ADDITIONAL INFORMATION?

Please contact the Advisory Team members if you have questions or need additional information.

Doug Smith (doug.smith@waterboards.ca.gov or 530-542-5453)
Rich Booth (richard.booth@waterboards.ca.gov or 530-542-5574)
Kim Niemeyer (kim.niemeyer@waterboards.ca.gov or 916-341-5547)

Enclosure:

Draft Cleanup and Abatement Order (CAO)

Attachment 1: Orders Replaced by CAO No. R6V-2015-DRAFT
Attachment 2: Location of Chromium Plumes (3rd quarter 2014)
Attachment 3: Area of Plume Expansion
Attachment 4: Active Water Board Orders and Notices Authorizing Cleanup Actions
Attachment 5: Hydraulic Capture Metrics
Attachment 6: Hydraulic Capture Monitoring Plan, Shallow Zone of Upper Aquifer
Attachment 7: Hydraulic Capture Monitoring Plan, Deep Zone of Upper Aquifer
Attachment 8: Groundwater MRP, CAO No. R6V-2015-DRAFT
Attachment 9: Summary of Performance and Submittal Requirements

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ENCLOSURE 3

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Lahontan Regional Water Quality Control Board

PUBLIC WORKSHOP-Sept. 16, 2015, 1pm

For Parties to discuss key changes in the draft order requiring Pacific Gas & Electric Company to cleanup and abate its discharges of chromium to groundwater in the Hinkley area.

This workshop will take place as part of the Water Board's regularly scheduled meeting. Therefore, a quorum of the Water Board may be present at the workshop, but no action or voting by the Board will take place on this item.

The workshop purpose is to bring the various parties together, and through facilitation, to discuss key changes in the proposed Cleanup and Abatement Order (CAO). No formal comment on the proposed CAO will be taken at the workshop, but the Water Board Advisory Team will forward consensus points to the Water Board for its consideration of adoption of a CAO, tentatively scheduled for November 4-5, 2015.

AGENDA

Location: *Holiday Inn Express & Suites*
2700 Lenwood Road, Barstow, CA 92311 (760) 253-9200
Facilitator: *Ms. Gita Kapahi, State Water Board*

September 16, 2015

1:00pm – WELCOME followed by presentation on process
1:30pm – Facilitated discussion
3:00pm – BREAK
3:30pm – Facilitated discussion continuation
5:00pm – DINNER BREAK
7:00pm – Report Out from facilitated discussion
8:00pm – Next Steps

For more information about the workshop, please contact Douglas F. Smith, at doug.smith@waterboards.ca.gov or 530-542-5453