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March13, 2015

Anne Holden, PG
Lisa Dernbach, PG, CHG, CEG
Lauri Kemper, PE
California Regional Water Quality Control Board, Lahontan Region
2501 Lake Tahoe Boulevard
South Lake Tahoe, California96150

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

Dear Anne, Lisa and Lauri:

The Hinkley Chromium-6 Groundwater Remediation Project's "Independent Review Panel (IRP) Manager" and the Hinkley Community Advisory Committee (CAC) thank the California Regional Water Quality Control Board, Lahontan Region (Water Board) for providing an opportunity for public comment on the Proposed Cleanup and Abatement Order No. R6V-2015-Prop (the Proposed CAO) issued on January 21, 2015.

Community stakeholders are very much aware that the Proposed CAO is an important milestone for the Hinkley Groundwater Remediation Program that will set regulatory requirements for the management of Pacific Gas & Electric's (PG&E) Chromium-6 (Cr6) discharge for the next 5 to 10 years, critical "treatment years," when the Community will be expecting to see the currently defined plume shape decrease in size.

1. Introductory Remarks

The Proposed CAO is a major step in the long cleanup pathway depicted in **Figure 1**. **Figure 1** has been used by the IRP Manager several times during community meetings to explain to the Hinkley Community the major steps in the long pathway to cleanup. In the function of the independent technical reviewer we strongly advocate that future permits be formulated with the flexibility to allow for "adaptive management" and "operational optimization" best practices to thereby insure that the final remedy is protective of human health and the environment.

During our IRP work, we are constantly reminded of the fact that Community stakeholders wish to be assured that future groundwater remedial actions and remediation progress are ***appropriately monitored to measure clean up performance versus the remedial targets***[1], which are outlined and discussed in the Proposed CAO. A flexible CAO that incorporates "adaptive management" will help insure the final remedial approach will be based on the most current information, and allow the program to be optimized on the basis of new in-coming data and information.

Herein the IRP Manager is submitting formal comments on the Proposed CAO[2]. We have also briefed and extensively consulted with the CAC over a series of six regularly scheduled Thursday-evening meetings (during February and March) at the IRP Manager's office in Hinkley. In these two-hour meetings we have condensed and interpreted the CAO, and explained how the operational path-forward is expected to function under the governance of the CAO. As usual, we have made extensive use of charts and diagrams to explain the CAO and the "clean up –vision" it will drive. The CAC understands and agrees with the Water Board's proposed approach of using adaptive management[3] to optimize the operations and "right-size" the final remedy and associated monitoring program. Some of the CAC's comments are also included in this letter.

As discussed in the Proposed CAO, the Cr-6 Plume is defined as three distinct sections shown in **Figure 2**. **Figure 2** shows the Southern, Northern Hinkley Valley and Harper Dry Lake Valley plumes. Each of these areas has specific monitoring criteria outlined in the Water Board's Proposed MRP.

Our two main comments focus on the Water Board's MRP and the Remedial Targets.

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[1] The IRP Manager does wish to acknowledge and record that the remedial targets have (in part) been established as the result of an extensive plume modeling and remediation forecasting effort by PG&E. This work was complex. The IRP Manager has spent considerable time with key Community leaders and the CAC to explain the plume modeling activities and computations. These parties acknowledge and appreciate the efforts of both the Water Board and PG&E to make the plume modeling and "plume shape forecasting" work as understandable as possible. This was achieved via presentations, workshops with significant Q&A sessions and accompanying handouts.

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

[3] Lauri Kemper, Assistant Executive Officer, presented her approach to adaptive management during the January 22, 2015 Hinkley Community Meeting at the Community and Senior Center. The adaptive management approach was further described at the Water Board Public Meeting and Hearing on the Proposed CAO in Hinkley on February 26, 2015.

2. Water Boards Monitoring Reporting Plan Comments

Water Board Response to PG&E Draft MRP[4] Issued on December 19, 2014

On page 10, items 35 through 37 of the Proposed CAO, the Water Board responded to PG&E's draft MRP submitted on December 19, 2014. The Water Board stated the following:

Water Board staff has reviewed PG&E's Draft MRP and does 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:

1. *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 systems will result in increased groundwater extraction, infiltration, and treated water injection over what has occurred in the past. For this reason, quarterly sampling at key monitoring 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 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.*

2. *The extent of chromium in groundwater remains incompletely defined in the northeastern part of the southern plume area and much of the northern plume's 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 concentration changes and protect public health. The "Groundwater Monitoring and Reporting Program, CAO No.6V-2-015-Prop", shown in Attachment 8, however, allows quarterly sampling of certain multi-depth monitoring wells to be reduced to semi-annual and annual basis under certain conditions. Such conditions include when chromium levels decrease in wells to levels below criteria set for quarterly monitoring.*

[4] CH2M Hill. 2014. *Draft Groundwater Monitoring and Reporting Program, Pacific Gas and Electric Company, Hinkley Compressor Station, Hinkley, California*. December 19.

In follow-up to the above Water Board Comments, the IRP Manager's Comments regarding PG&E's Draft MRP are the following:

One hundred seventy groundwater monitoring (170) wells were proposed for monitoring in PG&E's Draft MRP (161 upper aquifer and 9 lower aquifer monitoring wells). The sampling frequency at each well was conditioned upon two factors: 1. the results of a Mann-Kendall Trend Analysis, and 2. the magnitude of the Cr-6 measurement versus the currently established 3.1ppb Cr-6 background number. Monitoring wells that are less than the current background number, and show a decreasing Man-Kendall trend were proposed to be sampled less frequently. Monitoring wells that were above the background number and had an increasing Mann-Kendall trend were proposed to be sampled quarterly. The IRP Manager agrees that using an agreed upon, universally-employed statistical method should be part of the criteria used to determine the sampling frequency at monitoring wells. However, the IRP Manager does have continuing questions about the number of monitoring wells that were proposed in PG&E's Draft MRP, when the aforementioned two criteria are applied to the monitoring well Cr-6 data.

For the domestic well sampling program, PG&E proposed sampling **90 domestic wells**. PG&E proposed to sample 84 domestic wells on a semi-annually basis and 6 domestic wells on a quarterly basis. In the interests of data transparency and "being a good neighbor," the IRP Manager's recommends that *any* domestic well *within the affected area* should be sampled if 1) the wells are in use, and 2) if the owner allows the well to be sampled. As the upgraded remedy starts to more effectively treat the plume and new concentration trends are established, this recommendation should be revisited; say in 2017.

The IRP Manager and the CAC acknowledge PG&E's effort in carefully and logically analyzing the metrics of the existing program, then in turn proposing a re-sized program for future monitoring. The IRP Manager also acknowledges PG&E's efforts at incorporating our preliminary comments on the Draft MRP, which were described in our October 20, 2014 letter addressed to the Water Board. In addition, most key stakeholders (PG&E, Water Board, CAC, IRP Manager, USGS and community members) participated in a Technical Exchange Meeting (TEM) in November 13, 2014 to discuss the content for the Draft MRP.

The IRP Manager has long-noted that the well sampling decision-making logic should be cast in the form of "decision-trees," so that in the long-term there are no misunderstandings regarding the scope and frequency of the groundwater monitoring program. Decision-tree thinking was incorporated into PG&E's Draft MRP; however, we have a few further suggestions to offer to improve the Decision Trees that we suggest become a part of the Water Board's MRP.

Further Comments on PG&E's Decision Tree for the Southern Plume:

- If a monitoring well that has had its sampling frequency reduced shows an increasing Mann-Kendall trend in future sampling events, and is above background levels, then that monitoring well should be sampled quarterly, along with the nearest upgradient and downgradient monitoring wells;
- If future remediation activities shows groundwater levels are affected at certain monitoring wells (i.e. monitoring wells sampled semi-annually or annually) then those monitoring wells should be sampled quarterly;
- If future sampling events for a monitoring well cluster show an increase in the Mann-Kendall trend, then all the monitoring wells in the cluster should be sampled quarterly; and finally and importantly,
- Pertinent, timely, information from the forthcoming three to four year USGS Background Study (BGS) should also be considered in decision-making. We feel this is both technically and administratively important, given the innovative, new information the study could inject into the project, combined with the significant interest and belief the Community has in the study. For example:
    - Perhaps the decision tree could be suitably annotated to acknowledge the BGS, and,
    - The CAO could discuss the existence of the BGS, and with reference to adaptive management practices, discuss how BGS-generated data and information could be considered in making future modifications to the MRP. Such thinking would seem to be consistent with the Water Board's and PG&E's remedial culture of "adaptive management", here simply applying it to plume monitoring. (e.g., if an area is shown to contain anthropogenic Cr6 or geogenic Cr6 then this observation should be taken into account regarding sampling frequencies).

IRP Manager Comments on PG&E's Decision Tree for the Northern Plume:

- Mann-Kendall analyzed trends should also be a component of this decision tree on whether to change the sampling frequency at the northern monitoring wells (adaptive management); and,
- If the concentration increases at a monitoring well in the North and is above the background number then the nearest upgradient and downgradient monitoring well's data specifically evaluated, and a change in the well's sampling frequency should be considered.

The above IRP Manager comments regarding plume monitoring are also based, in part, on Project Navigator, Ltd.'s extensive experience in working on many significant groundwater remediation programs in the Los Angeles basin, where after the completion of significant groundwater site assessment programs, and the installation of a site remedy, the scope of future groundwater monitoring efforts was "right-sized" to match the location of known release point-created impacts, and future remedy operations.

The IRP Manager has also, extensively, separately briefed, CAC Members on the Proposed CAO and associated MRP. Somewhat naturally, and consistent with the CAC's (more conservative) prior opinions about any changes which would reduce the frequency and scope of the monitoring program, the CAC continues to advocate that all monitoring and domestic wells in the current program continue to be sampled at the current frequency until the *completion* of the USGS background study. The CAC asserts that once the background study is completed, and if defined monitoring wells can be proven to not have been impacted by the Cr6 release from the compressor station, then those wells could be removed from the groundwater monitoring program[5].

IRP Manager's Specific Comments regarding the Water Board's Proposed CAO MRP[6]

Southern Plume Area, Including "Western Finger" and Lower Aquifer

- A footnote should be included clarifying that the "maximum background values" is computed at the 95% Upper Tolerance Limit.
- A discussion of why the maximum value is used instead of the average should also be included in the text. Hinkley community and CAC Members would like to see the rationale discussed in the Proposed CAO.
- Our overall suggestions to this section of the Proposed MRP include the following:
    - Use of the criteria in this section to develop a decision-tree to better explain the logic of sampling frequency at monitoring wells (See above discussion in this letter);

[5] Note that the IRP Manager believes, and has discussed with the CAC that there is a "middle ground", they should consider, given the CAC's strong endorsement of the BGS. That is, as mentioned above in this letter, if the BGS study delivers new, monitoring-pertinent information into the program, under the best-practices philosophy of "adaptive management," this information should be considered in future decision-making on the scope and frequency of the groundwater monitoring program. The CAO could acknowledge this and allow PG&E a mechanism to submit a plan based on the new data.

[6] The Water Board's MRP is included as Attachment 8 of the Proposed CAO.

- Using statistical tools such as the Mann-Kendall analysis to define the stability of the Cr-6 profile at monitoring wells to thereby establish the sampling frequency;
- If the Cr-6 measurement in a less-sampled monitoring well (semi-annual or annual) contained within a monitoring well cluster exceeds the monitoring well in the same cluster with the highest Cr-6 concentration, then that less-sampled monitoring well should be converted to being sampled on a quarterly basis;
- If a monitoring well that is sampled annually or semi-annually shows an increased statistical trend, and rises above the maximum background number in that area, then that monitoring well should be sampled on a quarterly basis. Also it is recommended that nearest downgradient and upgradient monitoring wells should also be considered for quarterly sampling until the elevated levels of Cr-6 are better understood and identified;
- Clarification sought on section C.1.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 detection above maximum background levels as of fourth quarter 2014."* Do the words ***"and third***" require to be deleted in section C.1.b since section C.1.c. discusses "the third highest hexavalent detections"?
- Is annually the minimum sampling frequency for monitoring wells in the southern plume area? ;
- We recommend a map of the sampling program for the southern plume area be included in the MRP; and
- We recommend a table identifying all monitoring wells and sampling frequencies to be included in the MRP.

Figures 3 to 6 describe the IRP Manager's interpretation of the Water Board's proposed monitoring well sampling program for the southern plume area. **Figure 3** shows the monitoring wells that fall under requirements I.C.1 in the MRP for monitoring wells greater than or equal to maximum values as of the fourth quarter, 2014. A total of **170 monitoring wells** fall into this category and consist of **132 quarterly** and **38 semi-annual** monitoring wells. **Figure 4** shows monitoring wells that fall under requirements I.C.2 for wells with concentrations less than maximum background values as of fourth-quarter, 2014. A total of **132 monitoring wells** fall into this category, consisting of **30 quarterly** and **102**

semi-annual monitoring wells. Monitoring wells that are under quarterly sampling in accordance with requirement I.C.2 of the MRP are defined as "unstable[7]".

Figure 5 shows monitoring wells under requirement I.C.3 for the "Western Finger" located west of Serra Road. **7 monitoring wells** fall under this category consisting of **2 quarterly**, **2 semi-annual** and **3 annual monitoring wells**. **Figure 6** shows the monitoring requirements for the lower aquifer in accordance with I.C.4. A total of **13 monitoring wells** are included, consisting of **10 quarterly** and **3 semi-annual** monitoring wells. These maps, prepared by the IRP Manager's staff indicate that the southern plume will be comprehensively monitored via the Water Board's proposed monitoring plan.

However, and most importantly, the IRP Manager continues to suggest using a "decision-tree" approach for the southern plume area monitoring program to allow for "adaptive management" best practices to "right-size" the monitoring program, especially in light of new in-coming data (e.g. either as result of routine monitoring, or via the BGS).

Northern Plume(s) Area

The IRP Manger's suggestions regarding the southern plume area are also applicable to the Northern Plume, although we await the results of the BGS which will help answer how significant PG&E's Cr-6 contribution might be to the northern-measured impacts which exceed 3.1 ppb Cr6. Section I.D of the Proposed Monitoring Plan lays out the monitoring plan for the northern plume(s) area. Our additional comments and questions are:

- What is the minimum sampling frequency for monitoring wells in the northern plume area?;
- What is the general sampling reduction plan for monitoring wells discussed in Section I.D.4 (e.g. quarterly → semi-annual → annual)?;

Figure 7 shows the IRP Manager's interpretation of the sampling program in the Northern Plume(s) Area.

Monitoring External to Currently Defined, Site-Wide, Plume Boundaries in the Upper Aquifer

Figure 8 shows the monitoring wells that are under requirement I.E**.** Under I.E there are **161 monitoring wells**. They consist of **5 quarterly**, **128 semi-annual** and **28 annual** monitoring wells. Our suggestions regarding

[7] The Water Board defines "unstable" as any chromium detection above maximum background levels since first quarter 2013.

Section I.E is that statistical trends (e.g. Mann-Kendall test) should be a component to determine the sampling frequency in this area.

Domestic/Community/Agricultural Water Supply Wells, Northern Plumes

The IRP Manager is in agreement with the Water Board's Northern Plume Domestic Well Sampling program outlined in section I.F. However, we seek clarification regarding what is the minimum sampling frequency for domestic wells in the Northern Plume Area.

Figure 9 shows the location and sampling frequency for domestic wells in the Northern Area as interpreted by the IRP Manager. A total of **13 domestic wells** are included under section I.F, consisting of **2 quarterly** and **11 annual** monitoring wells.

No Monitoring Well Sampling is Required for the Following Location

The IRP Manager is in agreement with Section I.G.1 and I.G.3 requiring no sampling specifically for the area southwest of the Lockhart Fault and redundant monitoring wells less than 200 ft screen across the same depth in the aquifer. The CAC, however, has different opinions[8] about the "no further monitoring" areas. (The IRP Manager has spent significant time with the CAC during the past 2 years describing groundwater flow directions, (and the information and data about how to deduce such), and how today's Cr-6 impacts are a result of present-day and historical groundwater flow directions).

Other Comments on Water Board MRP

- On page 11 of the MRP, the Cr (VI) and Cr (T) values for DMW-03 are 320 ppb and 360 ppb, respectively. The well associated with this data for the Third Quarter 2014 is PMW-03, and not DMW-03.
- **Figures 10** and **11** are the IRP Manager's interpretations of the Water Board's monitoring wells for evaluating compliance with the CAO cleanup requirements for the Southern Plume to the 10 ppb and 50 ppb targets.

[8] The CAC does not agree with I.G.3, which advises that no monitoring wells East of Dixie Road should be sampled. The CAC believes that historical pumping in this area could have pulled Cr-6 towards this area. This opinion is consistent with earlier CAC-thinking that there be no change in monitoring well sampling until the background study is completed and the source of Cr in this area has been identified.

3. Remedial Targets

Cleanup Requirements

According to numerical calculations conducted by PG&E the cleanup requirements timeframe targets required under the proposed CAO may not be feasible as presented in PG&E Remedial Timeframe Assessment[9]. The remedial timeframe assessment was conducted only for the southern plume and targeted the 10ppb and 50ppb threshold. PG&E's complex numerical model is based on key input parameters (e.g. boundary conditions, hydraulic conductivity, pumping rates, injection rates etc.).The IRP Manager is fully cognizant and appreciative of the complexity and difficulties inherent in PG&E's significant efforts in plume location modeling and remedial performance forecasting. We are also appreciative of the presentations and clear report graphics delivered over the past 8 months as the modeling effort has progressed. We also recognize that, despite the model's possible limitations[10], the use of such a modeling tool will be a key component of future plume management activities.

We suggest that the PG&E numerical model should be run annually, and updated biannually, to constantly refine the forecasts for the Cr-6 distributions in the next 5, 10 , 20,30 and 40 years. Such information on predicted future trends via the model, based on newly updated data, will be of interest to the Hinkley Community. If future field conditions are modified (construction changes to the IRZ or ATUs), then adaptive management principles should be applied to appropriately, realistically, adjust the remedial targets to insure that the proposed timeframes are feasible.

Finally, the IRP Manger would like further clarification and logic on how the Water Board determined the cleanup timeframe[11] for the Lower Aquifer, which is discussed in Section VI.B.b.

[9] Arcadis. 2014. *Remedial Timeframe Assessment, PG&E Hinkley Compressor Station, Hinkley, California*. June 30.

[10] If the actual field conditions are not reflective of the key variables in the model, then the results of the numerical model may not be sufficiently representative of current and future conditions (e.g. changes in pumping rates or future modifications to the IRZ).

[11] December 31, 2018.

4. Other Comments

4.1 Reporting Types

We agree with the reporting requirements outlined in the Proposed CAO, except for the Four-Year Comprehensive Cleanup Status and Effectiveness Reports. The United States Environmental Protection Agency (EPA) requires responsible parties who are remediating a site which is in the operations and maintenance phase of work to prepare a major report every five years to evaluate the performance of the remedy. Five Year Review reports evaluate if the remedy is working as designed and is protective of human health and the environment. We recommend that the Water Board require the preparation of "5-Year Status Reports" evaluating the effectiveness of the remedy to evaluate if the remedy is continuing to be protective of human health and the environment. "5-Year Status Reports" could be prepared in accordance with EPA guidelines[12].

4.2 Groundwater Monitoring Reporting

We suggest that the Quarterly Reports include a Summary Table of all the wells that are part of the MRP with the associated sampling frequencies for both domestic and monitoring wells. Wells that are candidates for both a reduction, and conversely an increase, in their sampling frequencies should be identified and discussed in the text of the report.

As the project matures and Quarterly Reporting becomes more "mature", we expect that the Water Board and PG&E will discuss how to optimize reporting, with an emphasis on clarity and highlighting changes from the prior reporting periods. We have recently observed O&M Reports using a succinctly prepared "Observations and Activities Risk Register," symbol and color coded in a tabular format, in O&M reporting. That might be a good approach here, especially as the Community will still be interested in plan-modifications as the project advances over the next decade.

4.3 Criteria for Removal or Abandonment of Inactive Domestic Wells from the Sampling Program

The IRP Manager and the CAC are in agreement with the Water Board's decision that if a PG&E owned domestic well is screened in both aquifers, then this well should be properly abandoned to eliminate the risk of any cross contamination of Cr6 from one aquifer to the other.

[12] U.S. EPA, 2001. O*SWER No. 93355.7-03B-P: Comprehensive Five-Year Review Guidance*. June.

Page 13, item 44 defines "affected wells"[13], however, no list is provided in the Proposed CAO indicating which wells are considered to be "affected wells". We suggest including language in the text specifically identifying "affected wells" or verifying that there are no "affected wells" in the "affected area[14]".

4.4 Replacement Water Supply

The IRP Manager and the Hinkley Community[15] understand that the Water Board cannot require PG&E to provide replacement water to Hinkley residents that is below the California Maximum Contaminant Level (MCL) of 10 ppb for Cr-6, as described in the Olin Order[16]. The IRP Manager has extensively discussed with the CAC, the specific implications of this Order as it applies to Hinkley and Cr-6[17].

5. Conclusions

It is our continuing objective in the IRP Manager role, to assist the Community project stakeholders participate in the technical and regulatory process towards a right-sized groundwater Cr-6 treatment and monitoring program, which all parties believe is adequate to (a) measure the progress of the remedy, and (b) continue to insure the protectiveness of human health and the environment.

The IRP Manager and staff continue to be thankful for the opportunity, on behalf of the Community, to contribute to the solution of Hinkley's Cr-6 groundwater issues.

Should you have any questions or comments, please feel free to contact either of the undersigned via email or phone:

Dr. Raudel Sanchez: rsanchez@projectnavigator.com, 714-388-1821.
Dr. Ian A. Webster: iwebster@projectnavigator.com, 714-863-0483.

[13] "Affected Wells" are defined as domestic wells or community wells in the affected area containing chromium in concentrations (measured at any time by PG&E or the local, state or federal agencies) that are above the primary drinking water standards of 10 ppb Cr(VI) or 50 ppb Cr(T).

[14] Which is the area encompassed by a line drawn 1-mile external to the most recently computed Cr-6 groundwater plume as defined by the 3.1ppb Cr6 cut off number.

[15] The topic of the Water Board being unable to require PG&E to supply replacement water to locations where Cr6 measurements are less than the Cr6 MCL of 10 ppb, has been extensively addressed by the Water Board during the past 9-months at the monthly Community Meetings.

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

[17] Despite this, the CAC continues to assert that PG&E should provide an alternative water supply to Hinkley residents that have been "affected" by PG&E Cr-6 discharge.

Sincerely yours,

Raudel Sanchez, Ph.D.
Project Manager

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

Attachments

Figure1: The Proposed Cleanup and Abatement Order (CAO) is a Major Step in the Long Cleanup Pathway

Figure 2: Southern and Northern Plumes

Figure 3: Proposed CAO Groundwater Monitoring and Reporting Program Section IC1: *At wells with concentrations greater than or equal to maximum background values as of fourth quarter 2014*

Figure 4: Proposed CAO Groundwater Monitoring and Reporting Program Section IC2: *At wells with concentrations less than maximum background values as of fourth quarter 2014*

Figure 5: Proposed CAO Groundwater Monitoring and Reporting Program Section IC3: "Western Finger" *(west of Serra Road)*

Figure 6: Proposed CAO Groundwater Monitoring and Reporting Program Section IC4: Lower Aquifer

Figure 7: Proposed CAO Groundwater Monitoring and Reporting Program Section ID: Northern Plumes Area

Figure 8: Proposed CAO Groundwater Monitoring and Reporting Program Section IE: Outside Plume Boundaries (Site-wide), Upper Aquifer

Figure 9: Proposed CAO Groundwater Monitoring and Reporting Program Section IF: Domestic/Community/Agricultural Water Supply Wells, Northern Plumes

Figure 10: Monitoring Wells for Evaluating Compliance with CAO Cleanup Requirements for Southern Plume (10 ppb Target)

Figure 11: Monitoring Wells for Evaluating Compliance with CAO Cleanup Requirements for Southern Plume (50 ppb Target)

CC: CAC Members

FIGURE 1

Proposed Cleanup and Abatement Order (CAO) is a Major Step in the Long Cleanup Pathway

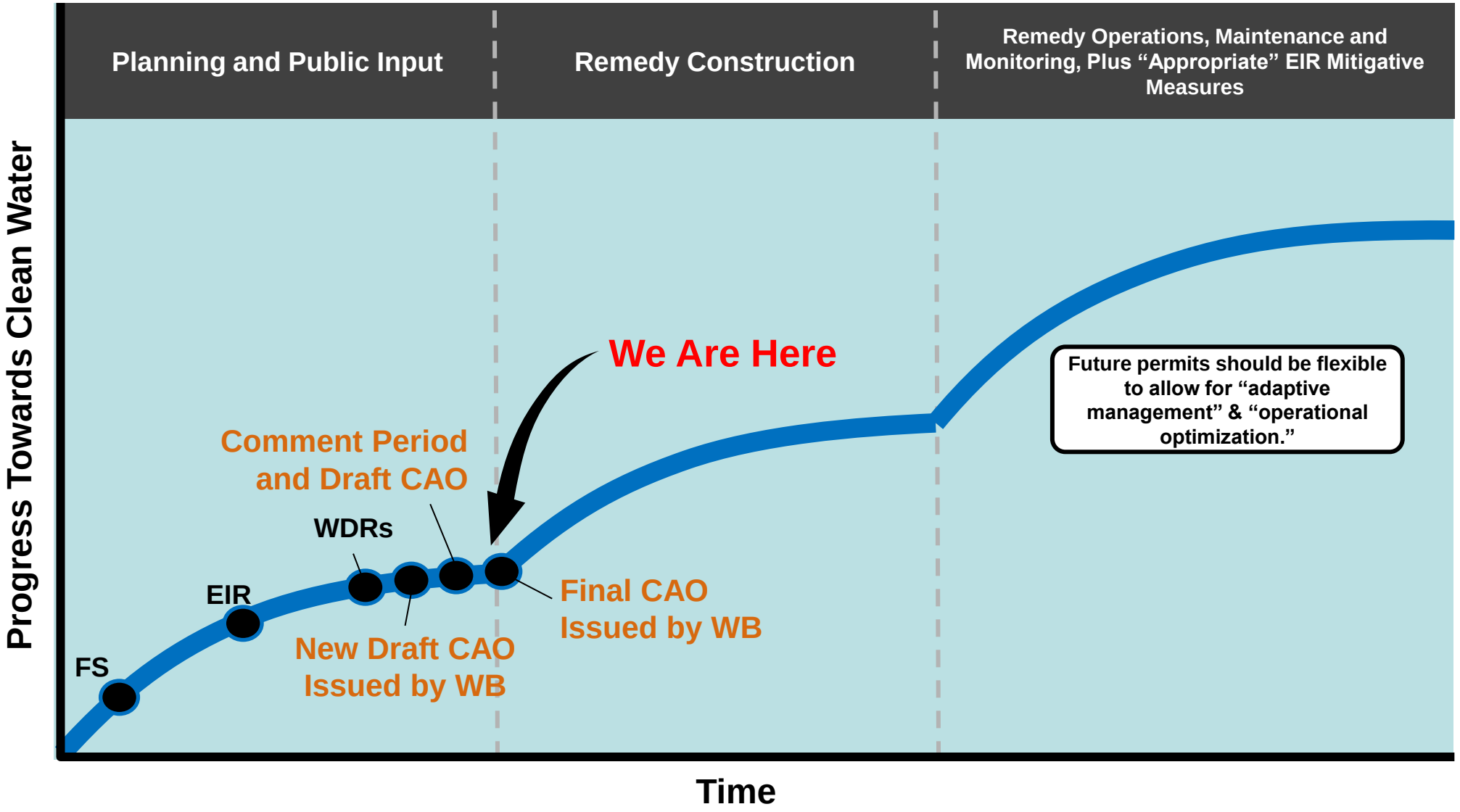
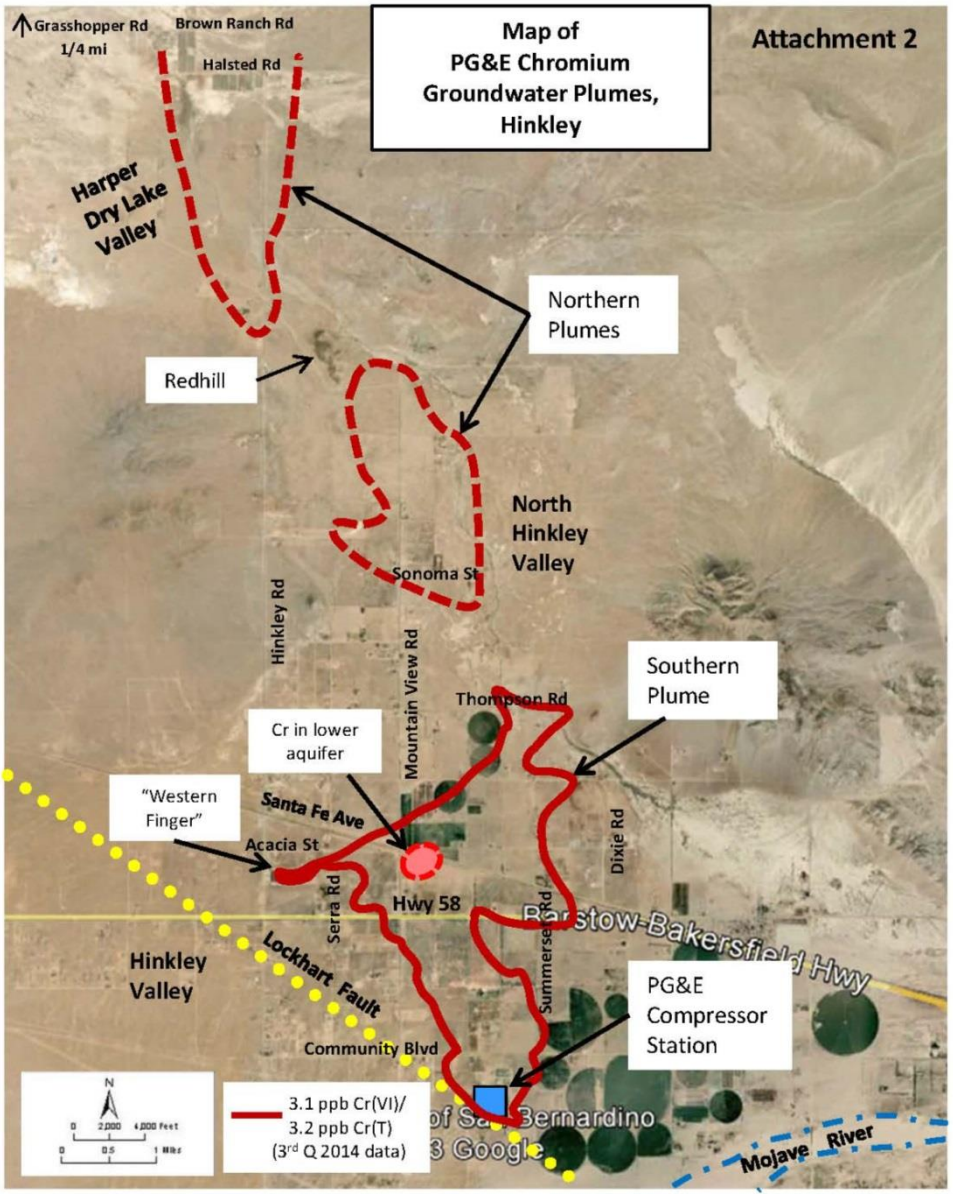


FIGURE 2

Southern and Northern Plumes



Northern Plume

3.1 ppb Cr (VI)
3.2 ppb Cr (T)

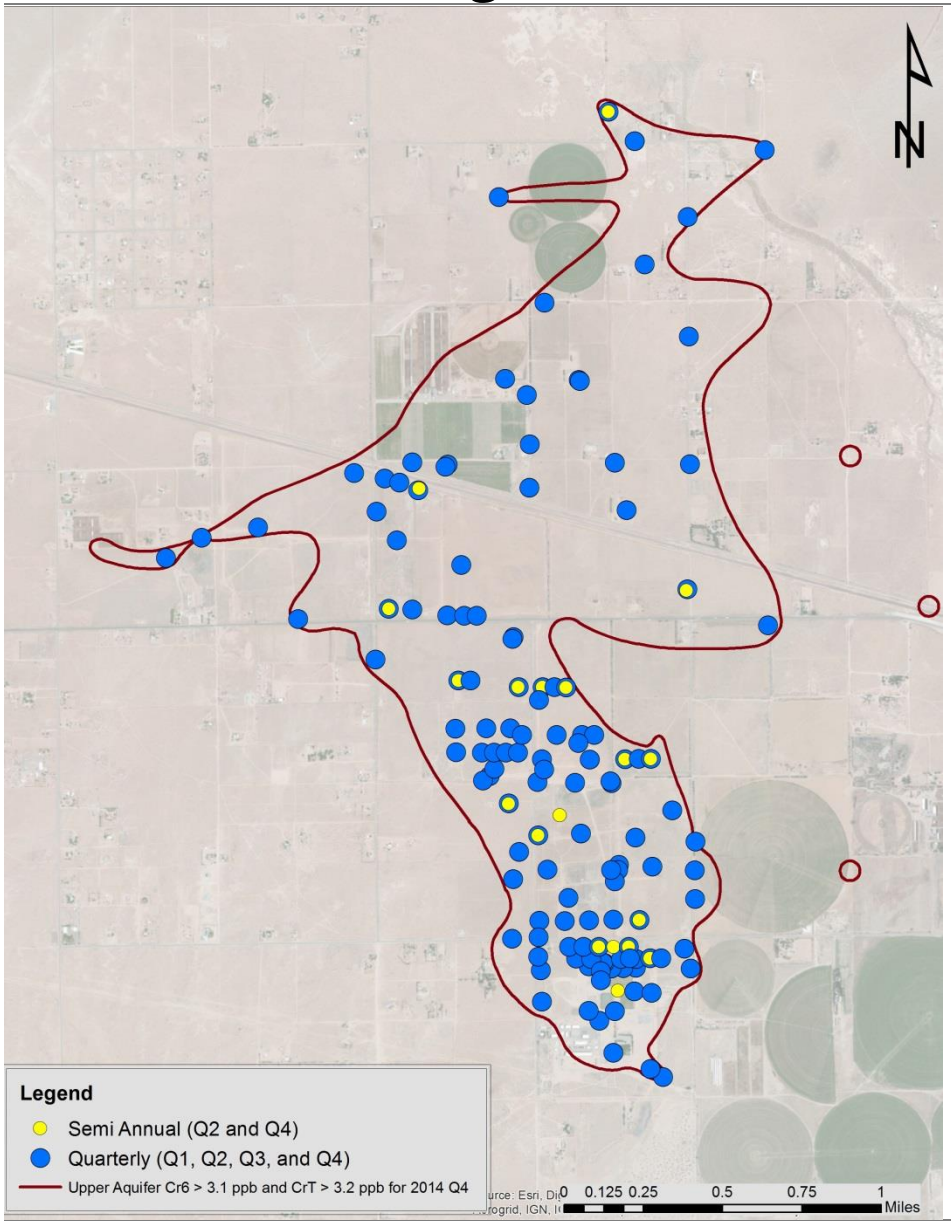
Southern Plume

3.1 ppb Cr (VI)
3.2 ppb Cr (T)

(3rd Q 2014 data)

FIGURE 3

Proposed CAO Groundwater Monitoring and Reporting Program Section IC1: *At wells with concentrations greater than or equal to maximum background values as of fourth quarter 2014*



Quarterly sampling
All single monitoring wells and multi-depth monitoring wells showing the highest hexavalent or total chromium detections.

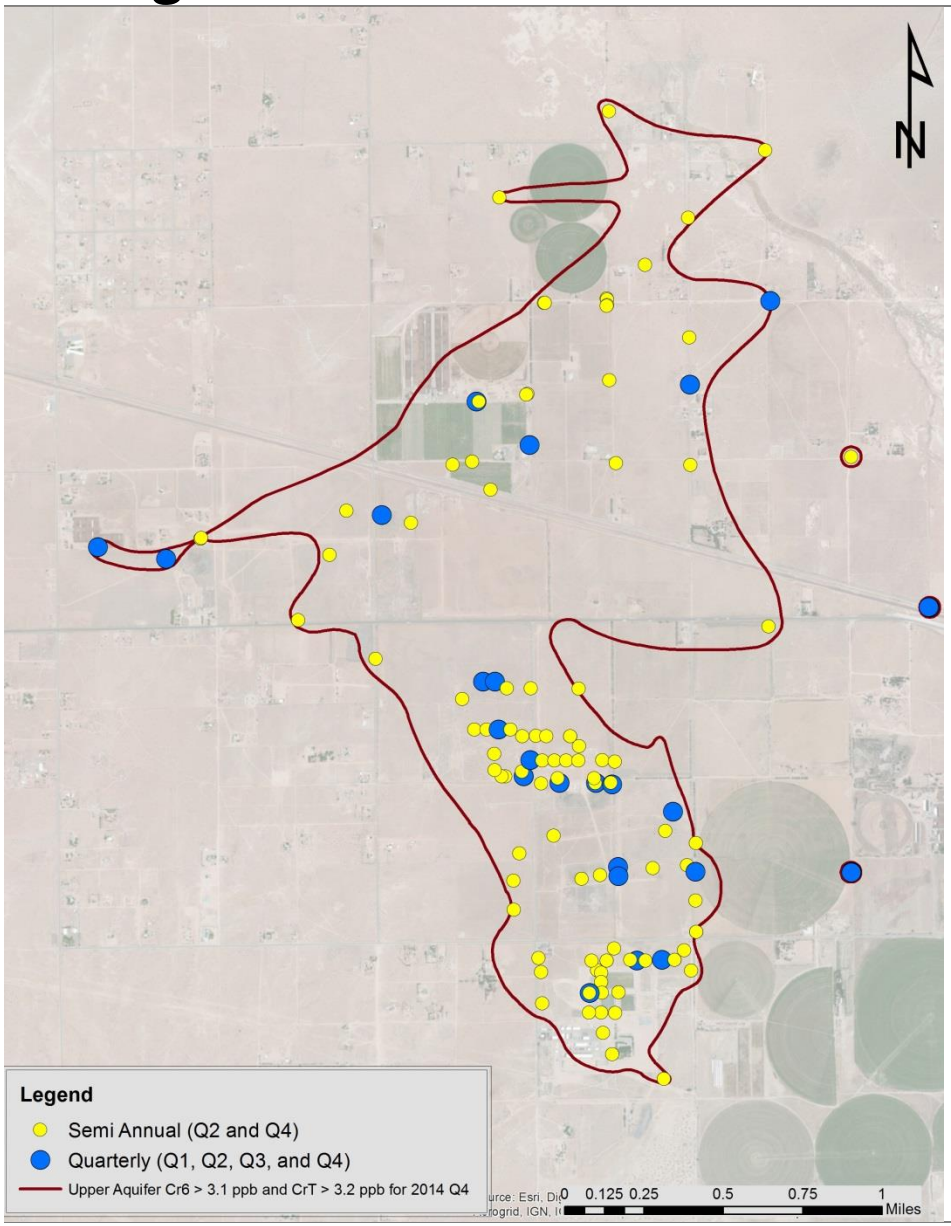
Semi-annual sampling (2nd & 4th Qtr)
Multi-depth monitoring wells showing the second and third highest hexavalent or total chromium detections above maximum background levels.

Annual sampling (4th Q)
All multi-depth monitoring wells showing the third highest hexavalent or total chromium detections.

Monitoring Wells	
Total	170
Quarterly	132
Semi Annually	38
Annually	0

FIGURE 4

Proposed CAO Groundwater Monitoring and Reporting Program Section IC2: *At wells with concentrations less than maximum background values as of fourth quarter 2014*



Quarterly sampling

All monitoring wells showing unstable hexavalent or total chromium detections below maximum background levels.

Semi-annual sampling (2nd & 4th Qtr)

All monitoring wells showing stable* hexavalent or total chromium detections below maximum background levels.

Annual sampling (4th Q)

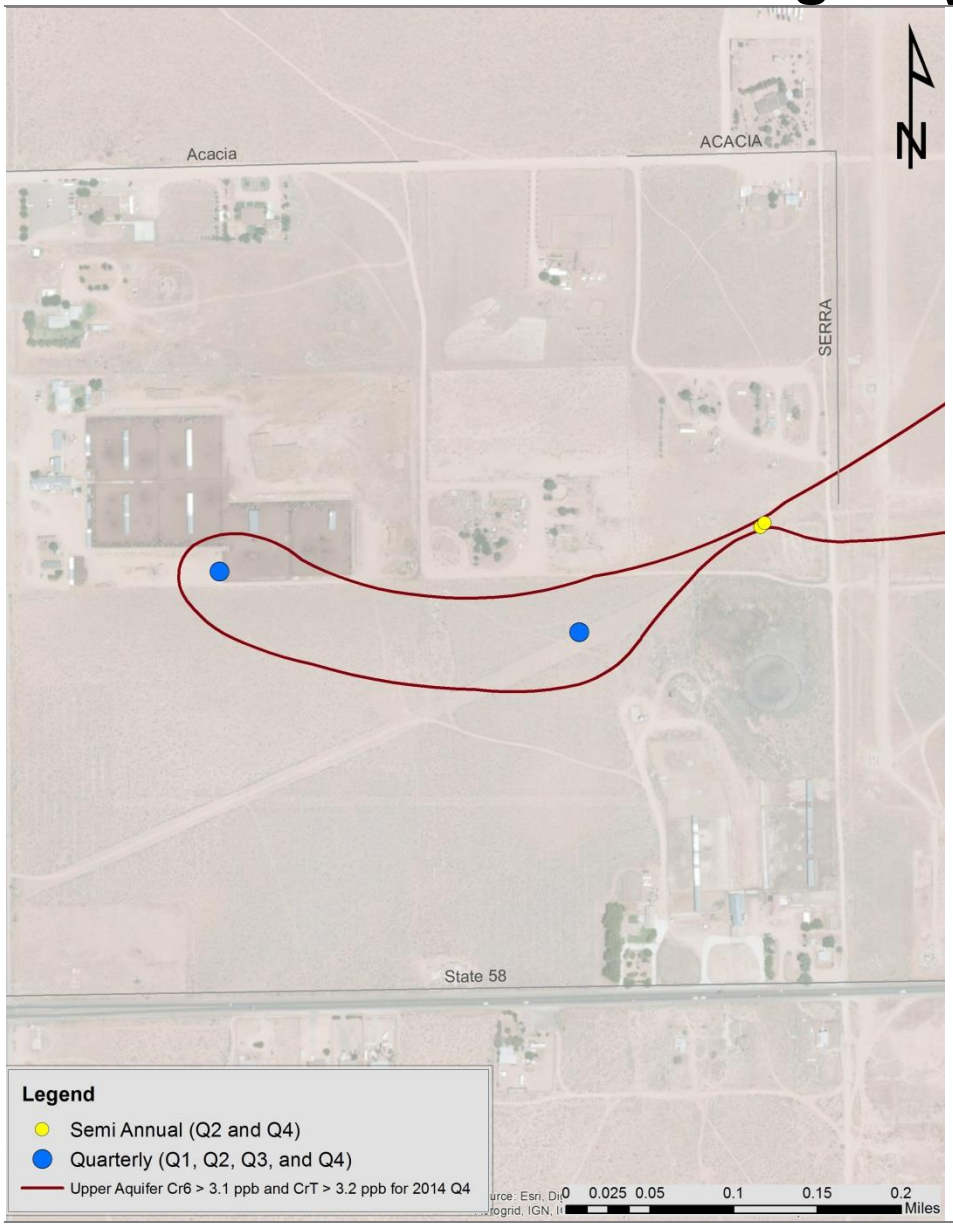
All monitoring wells showing hexavalent or total chromium detections that have always been below maximum background levels and were installed and sampled by January 2011.

* *"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.*

Monitoring Wells	
Total	132
Quarterly	30
Semi Annually	102
Annually	0

FIGURE 5

Proposed CAO Groundwater Monitoring and Reporting Program Section IC3: "Western Finger" *(west of Serra Road)*



Quarterly Sampling within the Plume

All monitoring wells showing hexavalent or total chromium detections **above** the maximum background levels.

Semi-annual Sampling (2nd & 4th Qtr)

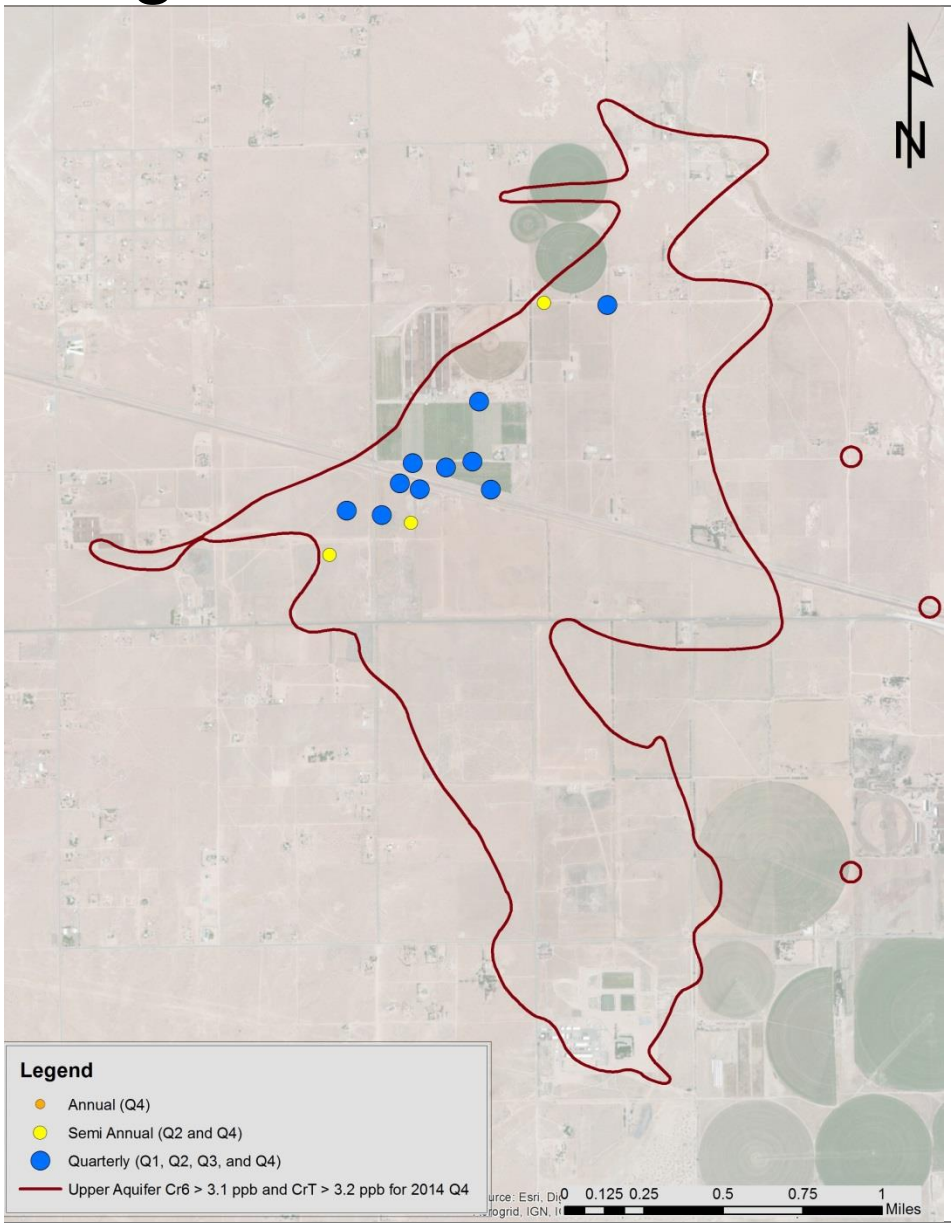
Multi-depth monitoring wells showing hexavalent or total chromium detections **at or below** the maximum background levels.

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.

Monitoring Wells	
Total	7
Quarterly	2
Semi Annually	2
Annually	3

FIGURE 6

Proposed CAO Groundwater Monitoring and Reporting Program Section IC4: Lower Aquifer



Quarterly Sampling within the Plume
All lower aquifer monitoring wells showing hexavalent or total chromium detections above the non-detect level.

Semi-annual Sampling outside the Plume (2nd & 4th Qtr)
All lower aquifer monitoring wells showing hexavalent or total chromium detections **at or below** non-detect level.

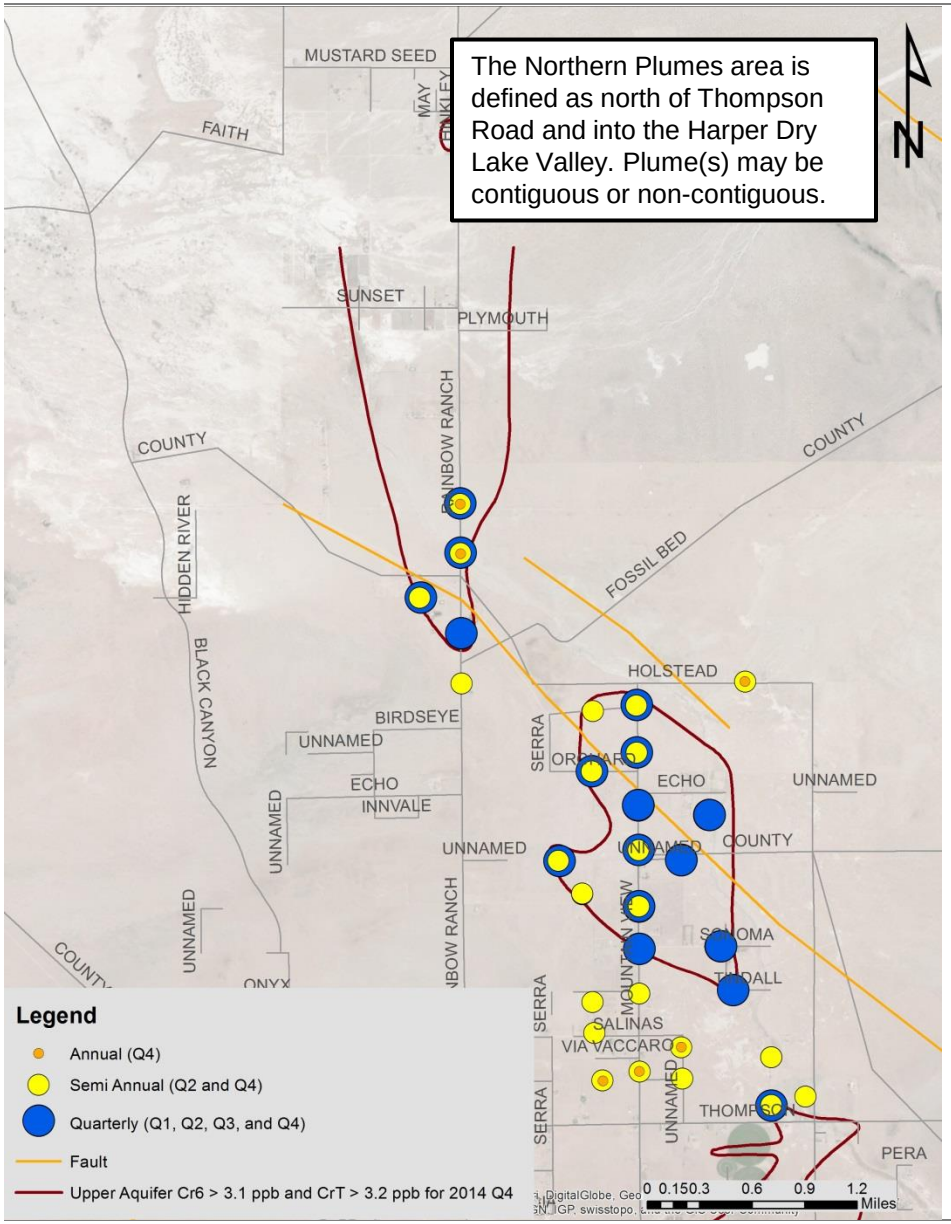
If four consecutive or four out of five samples in different sampling periods detect chromium in monitoring wells at increasing or decreasing concentrations that puts the well into one of the above categories, the Discharger shall increase or decrease, respectively, the sampling frequency accordingly.

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 for Outside Plume Boundaries.

Monitoring Wells	
Total	13
Quarterly	10
Semi Annually	3
Annually	0

FIGURE 7

Proposed CAO Groundwater Monitoring and Reporting Program Section ID: Northern Plumes Area



Quarterly Sampling within the Plume

All **single** monitoring wells and at **multi-depth** monitoring wells showing the **highest** hexavalent or total chromium detections greater than the maximum background levels as of 4th Q 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 maximum background levels is then moved to a quarterly sampling frequency.

Semi-annual Sampling outside the Plume (2nd & 4th Qtr)

Multi-depth monitoring wells showing the **second highest** hexavalent or total chromium detections as of 4th Q 2014.

Annual Sampling (4th Qtr)

All multi-depth monitoring wells showing the third highest hexavalent or total chromium detections as of 4th Q 2014.

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.

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.

Monitoring Wells	
Total	74
Quarterly	25
Semi Annually	30
Annually	19

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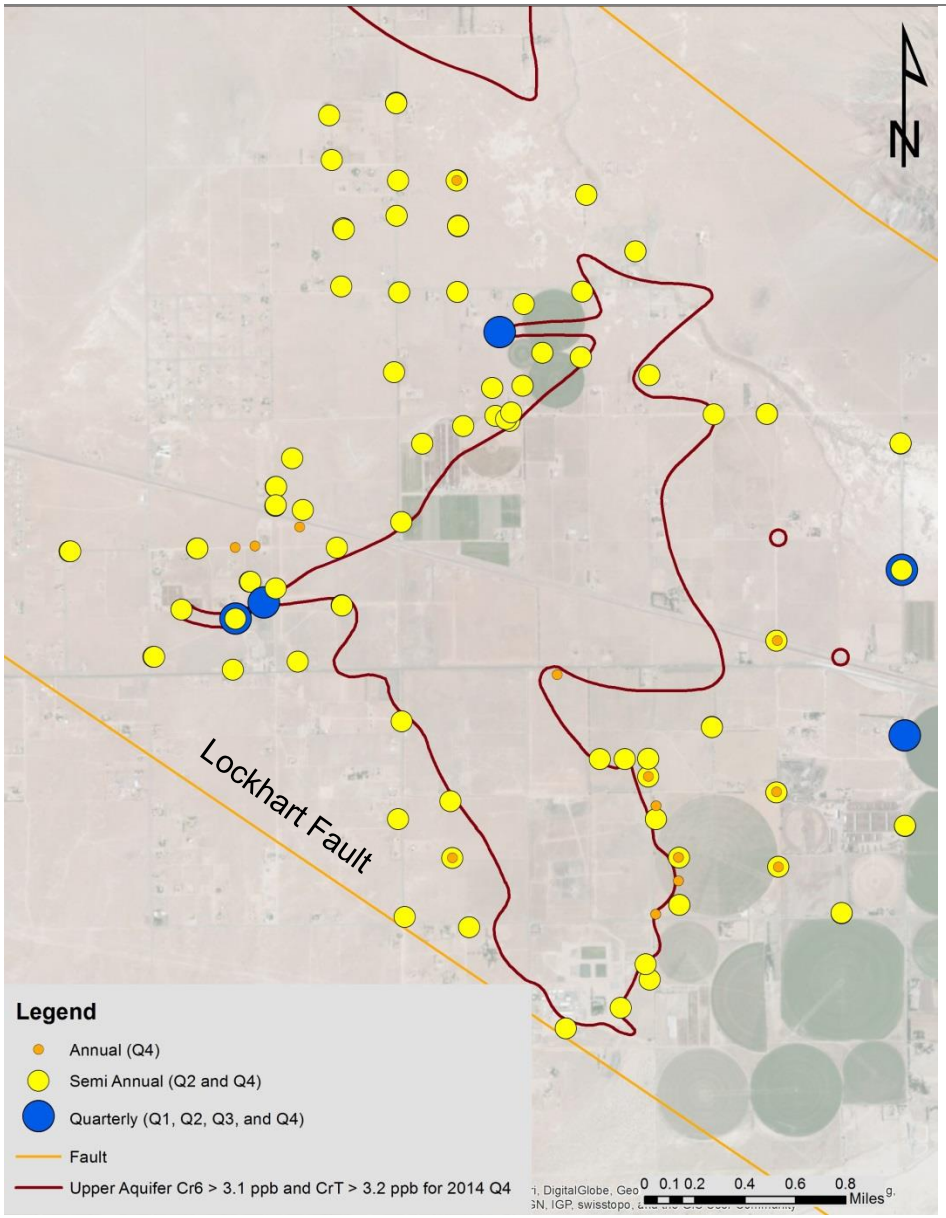
FIGURE 8

Proposed CAO Groundwater Monitoring and Reporting Program Section IE: Outside Plume Boundaries (Site-wide), Upper Aquifer



Quarterly Sampling

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 4th Q 2014.

Semi-annual Sampling (2nd & 4th Qtr)

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 4th Q 2014.

Annual Sampling (4th Qtr)

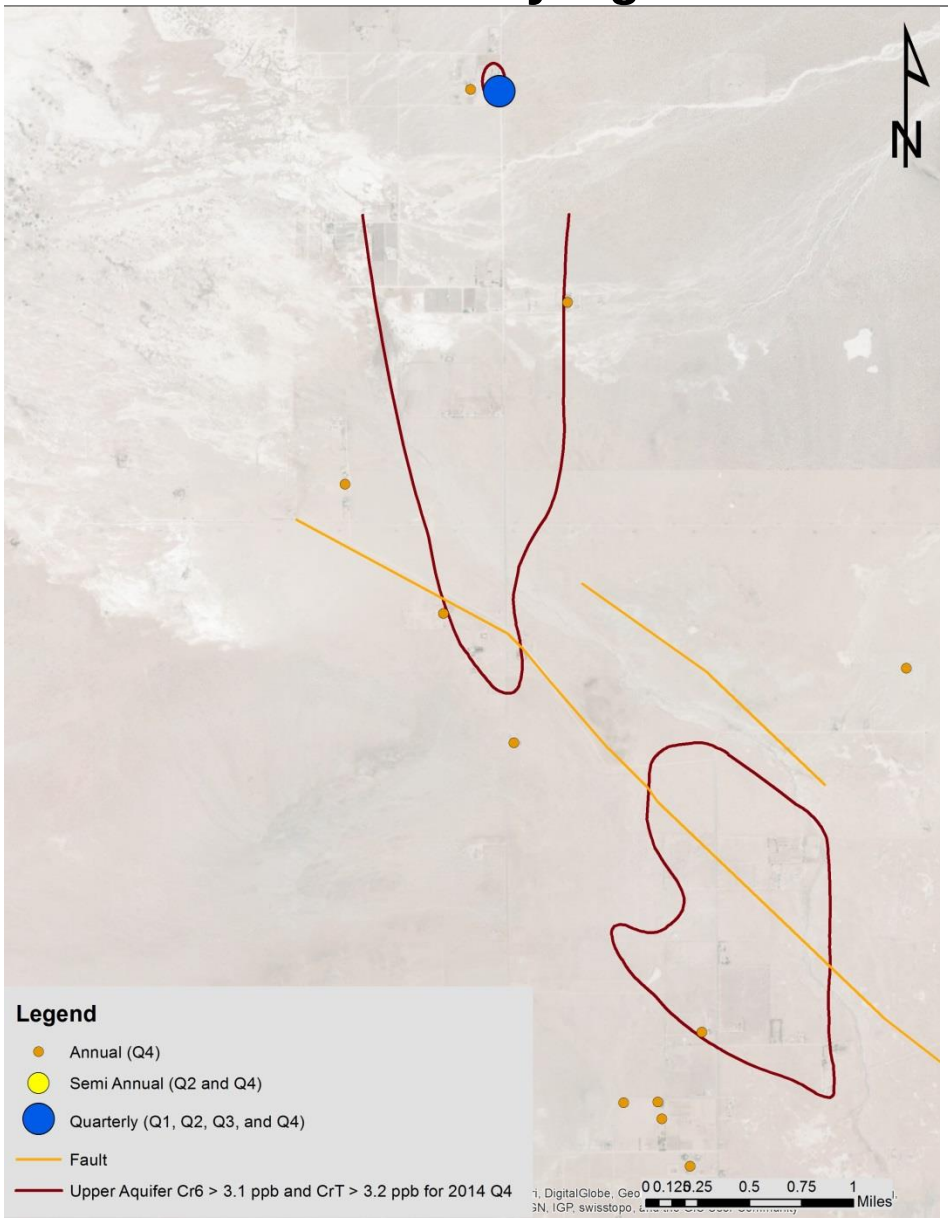
All monitoring wells showing hexavalent or total chromium detections less than 2.5 ppb Cr(VI) or 2.6 ppb CrT in four or more consecutive sampling events with a stable or decreasing trend.

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.

Monitoring Wells	
Total	161
Quarterly	5
Semi Annually	128
Annually	28

FIGURE 9

Proposed CAO Groundwater Monitoring and Reporting Program Section IF: Domestic/Community/Agricultural Water Supply Wells, Northern Plumes



For the northern plume area, the following sampling requirements apply to all water supply wells one-half mile down gradient and cross gradient of any northern plume area monitoring well showing detections of total or hexavalent chromium above maximum levels.

Quarterly Sampling

All domestic and community wells having hexavalent or total chromium detections at or above drinking water standards following any sampling event.

Semi-annual Sampling (2nd & 4th Qtr)

All domestic and community wells having hexavalent or total chromium detections at or above the maximum background levels.

Annual Sampling (4th Qtr)

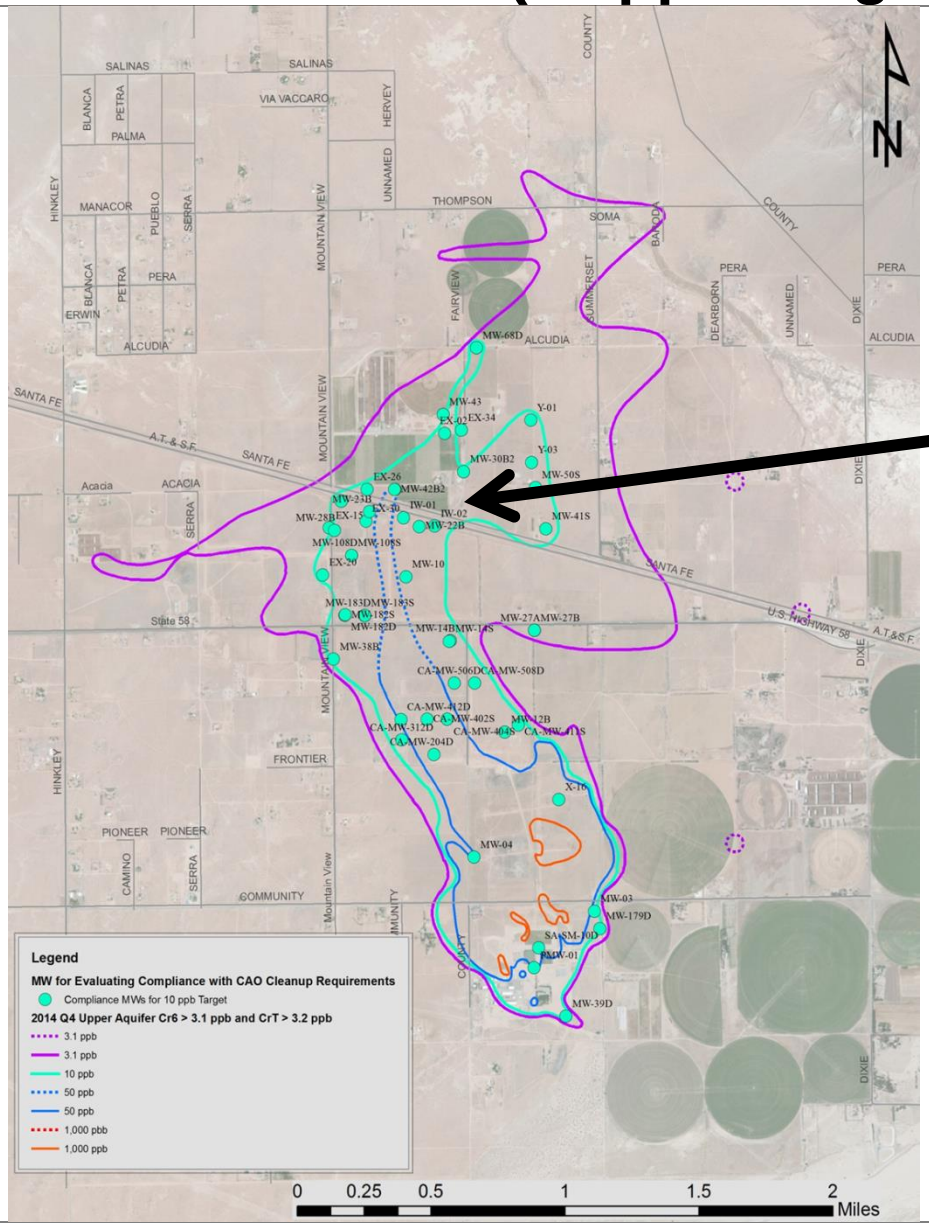
All domestic and community wells having hexavalent or total chromium detections below the maximum background levels.

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.

Monitoring Wells	
Total	13
Quarterly	2
Semi Annually	0
Annually	11

FIGURE 10

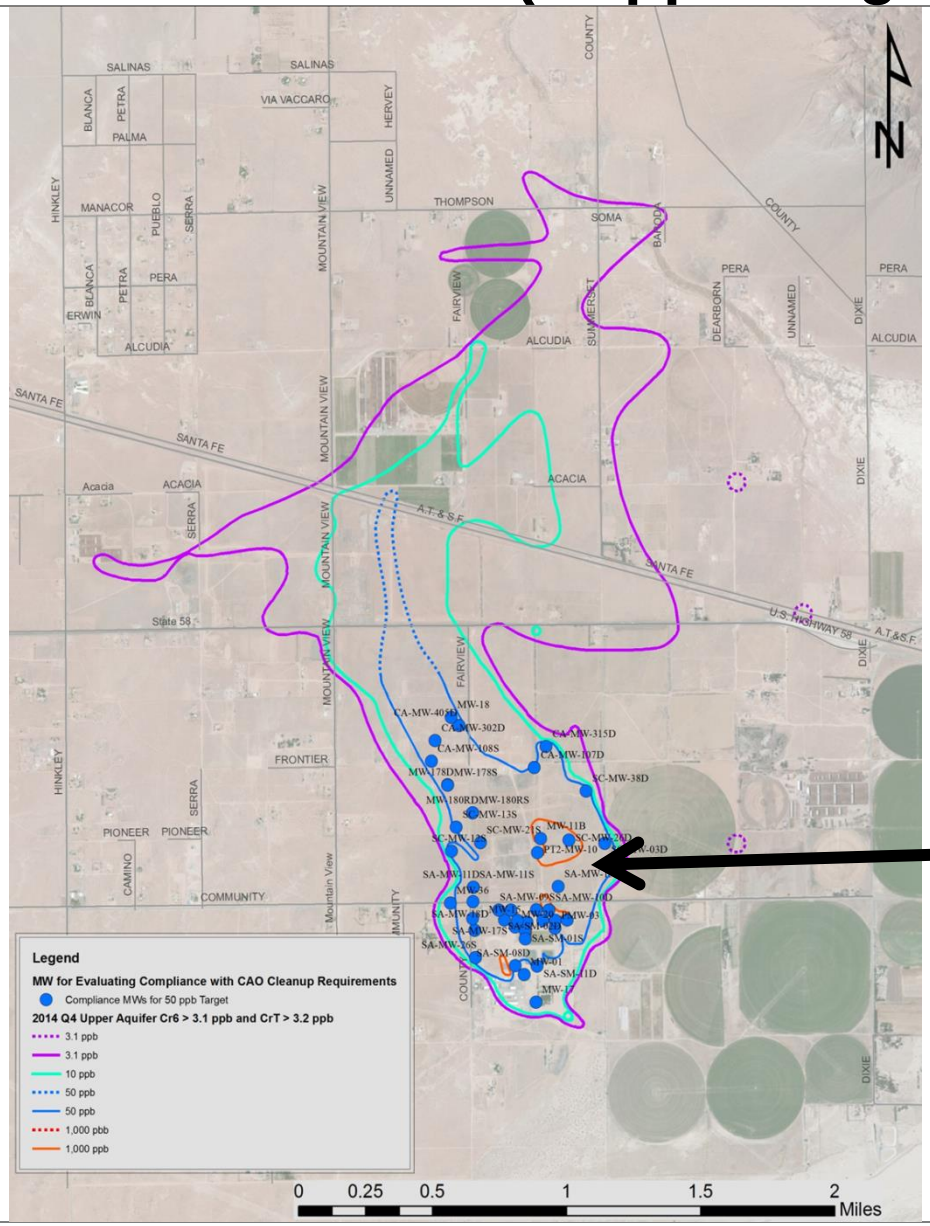
Monitoring Wells For Evaluating Compliance with CAO Cleanup Requirements for Southern Plume (10 ppb Target)



In the northern part of the Southern Plume, the dominating concentration is 10 ppb. These wells are compliance wells and they monitor the 10 ppb and 50 ppb boundary.

FIGURE 11

Monitoring Wells For Evaluating Compliance with CAO Cleanup Requirements for Southern Plume (50 ppb Target)



In the southern part of the Southern Plume, the dominating concentration is 50 ppb. These wells are monitoring the 50 ppb boundary.