

# AGENDA ITEM #3

## Status Report: Activities Concerning Chromium Contamination, PG&E Hinkley Compressor Station

September 10, 2014



Lisa Dernbach, PG, CEG, CHg  
Senior Engineering Geologist (Specialist)

# Outline

1. Second quarter 2014 chromium plume summary
2. Notice of Applicability for Agricultural Treatment Units (ATUs)
3. In-situ remediation
4. Pilot test for bioreactor
5. Supplemental Environmental Project
6. USGS Chromium Background Study contract status
7. Next actions



# Chromium Plume Summary

## 2<sup>nd</sup> Quarter 2014

### 1. Plume Geometry:

- a) Generally, plume is depicted as **slightly smaller** in size compared to first quarter, with small areas in the plume core south of Thompson Road showing minor reductions in size.
- b) Plume through the Hinkley Gap around Red Hill is shown as separated for 2<sup>nd</sup> Q (decrease in Cr concentrations in MW-131S1 to below background in 2<sup>nd</sup> Q).
- c) Exception is “plumelet” in Water Valley around MW-184 near Grasshopper Road, now drawn bigger based on domestic well (DW) data. Concentrations in MW-184 and the DWs are similar, around 3-4 ppb Cr6.

# Chromium Plume Summary

## 2<sup>nd</sup> Quarter 2014

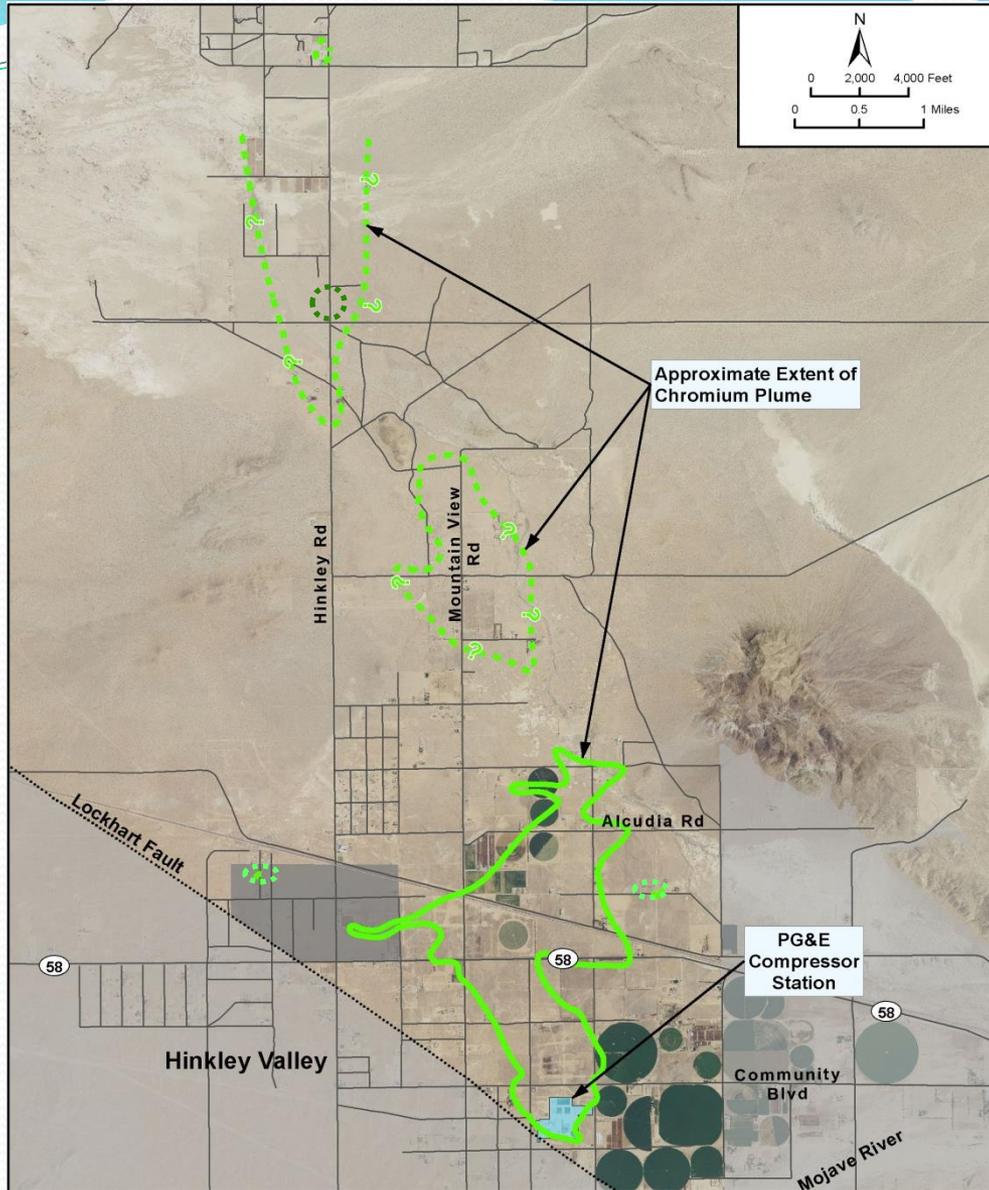
### **2. Notable Monitoring Well (MW) info:**

- a) MW 193-S3, in the Harper Dry Lake Valley, shows a 20% Cr6 decrease in 2<sup>nd</sup> Q to 220 ppb
- b) The highest Source Area point is SA-MW-05D, at 7,200 ppb Cr6, up from 4,600 Cr6 in 1<sup>st</sup> Q (56% increase)

### **3. Domestic Well (DW) info:**

- a) Nine DWs above maximum background values (3.1 ppb Cr6/3.2 ppb CrT)
- b) Maximum Cr6 in a DW is 4.8 ppb, near Mulberry Road west of the plume
- c) Most DWs concentrations around 3 to 4 ppb Cr6

**4. Water Board staff mailed 10 letters** to property owners in the north to allow PG&E access for better plume delineation.



# Chromium Plume Extent for 2nd Quarter 2014

# Notice of Applicability for ATU WDRs

- PG&E submitted Report of Waste Discharge and addenda in April through July 2014
- ROWD deemed complete; Notice of Applicability (i.e., permission to construct and operate ATUs) issued August 1, 2014 by Executive Officer
  - Clarifying comments and one minor change to monitoring program
  - Monitoring for southern ATUs must be submitted and approved prior to discharge



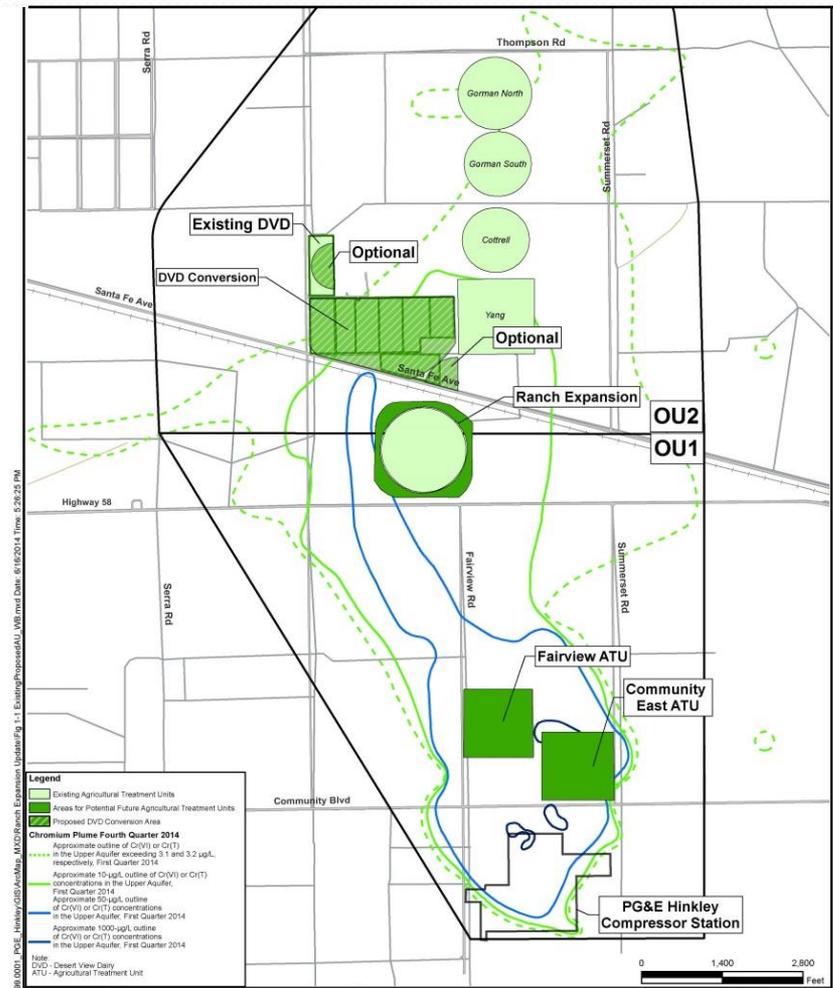
# Notice of Applicability for ATU WDRs

- Authorizes 321 acres of ATUs (WDRs allows 500 acres maximum)
- Construction of new ATUs to start fall 2014; discharge in spring 2015
- EIR monitoring for domestic wells has started
  - ✓ Cr, TDS, nitrate, uranium, water levels



# ATUs covered under WDRs

- New (dark green):  
**Fairview**  
**Community East**
- Expanded (dark green):  
**Ranch**
- Existing (light green):  
**Desert View Dairy**  
**Gorman North & South**  
**Cottrell**  
**Yang**



# In-Situ Remediation

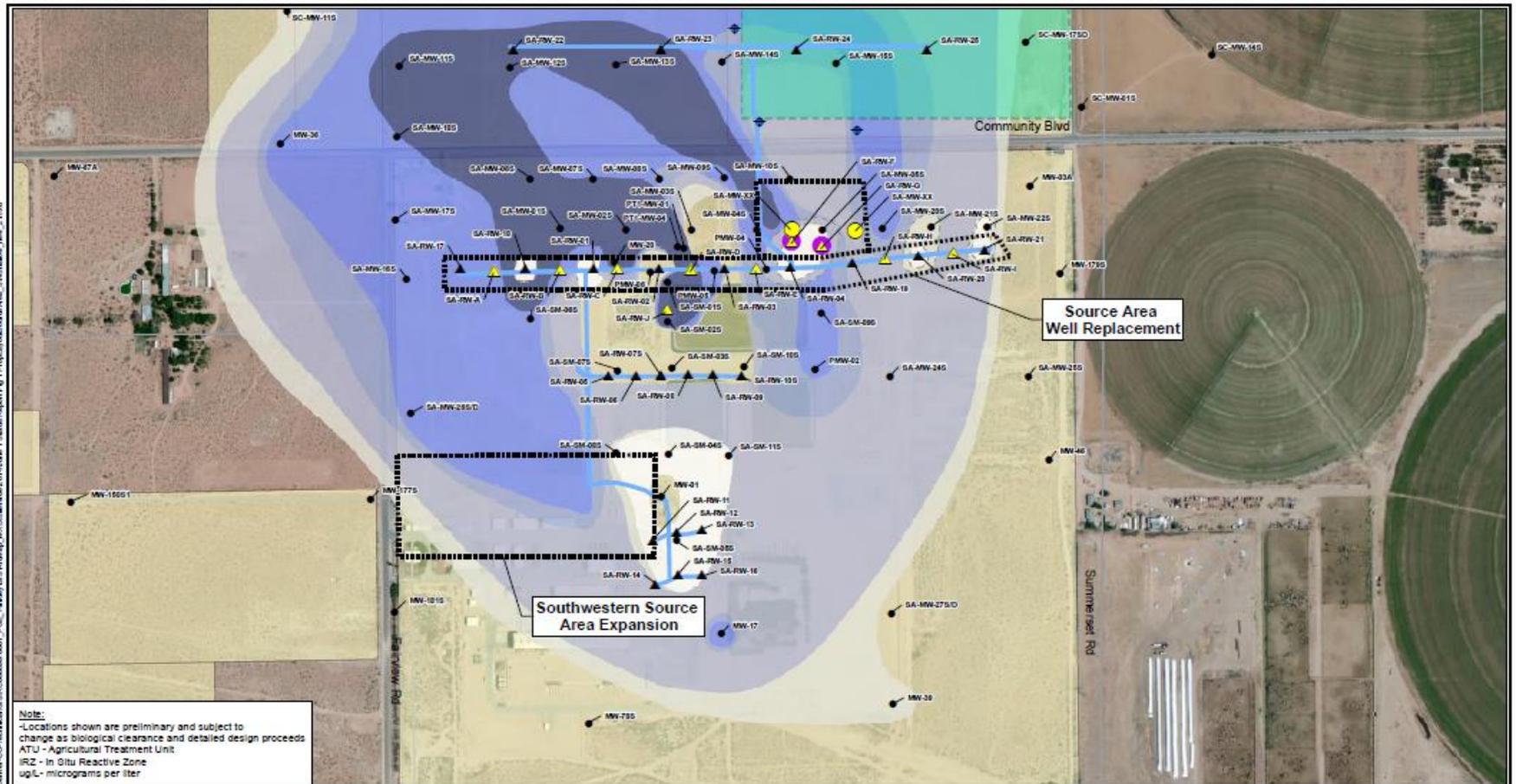
## May 2014 Status Report:

- Clogged injection wells limiting in-situ reactive zone (IRZ) treatment
- Tighter soils limiting IRZ treatment

## Enhancements proposed:

- Install wells to investigate extent of remaining chromium in Source Area
- Install new injection wells to replace clogged wells
- Install new injection wells at closer spacing (150 feet apart vs 300 feet)
- Expand IRZ treatment to southwest area of Source Area

# Map of IRZ Area (Source Area—Compressor Station)



**Note:**  
 -Locations shown are preliminary and subject to change as biological clearance and detailed design proceeds  
 ATU - Agricultural Treatment Unit  
 IRZ - In Situ Reactive Zone  
 ug/L - micrograms per liter

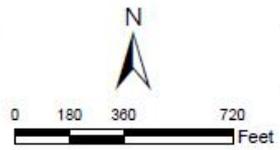
**Legend**

- ◆ Tier I ATU Extraction Wells (existing)
- ▲ Preliminary IRZ Recirculation Well Location, Subject to Final Biological Clearance
- Preliminary Investigation Location, Subject to Final Biological Clearance
- Location presented herein is approximate and may be altered pending the results of investigations
- Existing Monitoring Well
- ▲ Existing IRZ Well Locations

- ▭ Requested Areas for more detailed Biological Screening
- ▭ Areas for Potential Future Agricultural Treatment Units
- ▭ PG&E Owned Properties as of December 31, 2013
- Existing Piping

**First Quarter 2014 Contours Shallow Unit of the Upper Aquifer**

- ▭ Chromium Concentrations Less Than 3.1 ug/L
- ▭ Chromium Concentrations Between 3.1 and 10 ug/L
- ▭ Chromium Concentrations Between 10 and 50 ug/L
- ▭ Chromium Concentrations Between 50 and 100 ug/L
- ▭ Chromium Concentrations Between 100 and 500 ug/L
- ▭ Chromium Concentrations Greater Than 500 ug/L



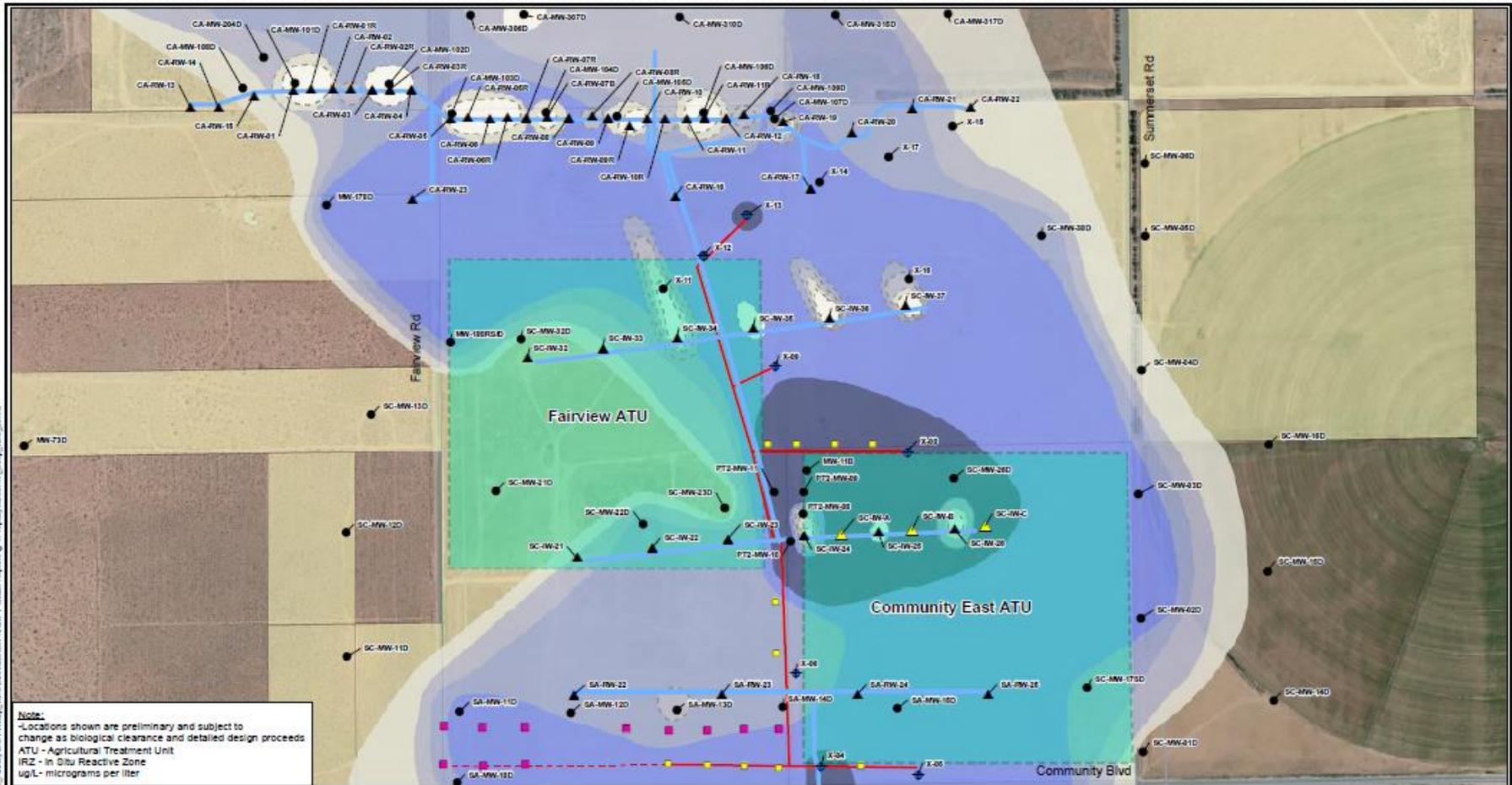
PACIFIC GAS AND ELECTRIC COMPANY  
 HINKLEY, CALIFORNIA

**PROPOSED LAYOUT FOR SOURCE AREA WELL REPLACEMENT AND SOUTHWESTERN EXPANSION, SHALLOW UNIT OF UPPER AQUIFER**

ARCADIS

FIGURE 1

# Map of IRZ Area (SCRIA Area--North of Source Area)



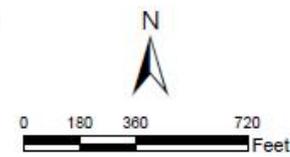
Note:  
 \*Locations shown are preliminary and subject to change as biological clearance and detailed design proceeds  
 ATU - Agricultural Treatment Unit  
 IRZ - In Situ Reactive Zone  
 ug/L - micrograms per liter

### Legend

- ◆ Tier I ATU Extraction Wells (existing)
- Tier II ATU Extraction Wells
- Tier III ATU Extraction Wells
- ▲ Preliminary IRZ Recirculation Well Location, Subject to Final Biological Clearance
- Preliminary Investigation Location, Subject to Final Biological Clearance
- Existing Monitoring Well
- ▲ Existing IRZ Well Locations
- Location presented herein is approximate and may be altered pending the results of investigations
- Requested Areas for more detailed Biological Screening Areas for Potential Future Agricultural Treatment Units
- PG&E Owned Properties as of December 31, 2013
- Existing Piping
- - - Potential ATU Pipeline Expansion
- Tier I and II ATU Extraction Piping

### First Quarter 2014 Contours Shallow Unit of the Upper Aquifer

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PACIFIC GAS AND ELECTRIC COMPANY  
 HINKLEY, CALIFORNIA

**PROPOSED LAYOUT FOR SCRIA EXPANSION,  
 DEEP UNIT OF UPPER AQUIFER**

**ARCADIS**

FIGURE 4

# Pilot Test for Bioreactor

PG&E submitted proposal to conduct a pilot test for an above-ground bioreactor in the In-situ Reactive Zone (IRZ):

- 5 to 20 gpm extracted groundwater
- First stage: acetic acid (vinegar) and phosphoric acid added to reduce Cr6 to Cr3
- Second stage: aeration through rock layer and filtration of byproducts (iron & manganese) through sand filter
- Monitoring to be at all stages
- Treated water returned to aquifer upgradient of Central Area IRZ
- Duration of testing: 6 months



# Supplemental Environmental Project

Project accepted in March 2012:

- Planning and designs completed
- Construction started in fall 2013
- New supply wells and water line completed
- Following testing and shake down, system should be turned over to School District by **end 2014/early 2015**



# USGS Chromium Background Study Contract Status

- Contract request package submitted to State Board in late March 2014
- Waiting for State Board to complete review and forward to USGS for signing



# Next Actions



## Background Study

- Continue Technical Working Group meetings
- Contract executed fall 2014

## Cleanup and Abatement Order

- Prepare draft CAO with deadlines and directives for chromium cleanup
- Distribute for public comment early 2015

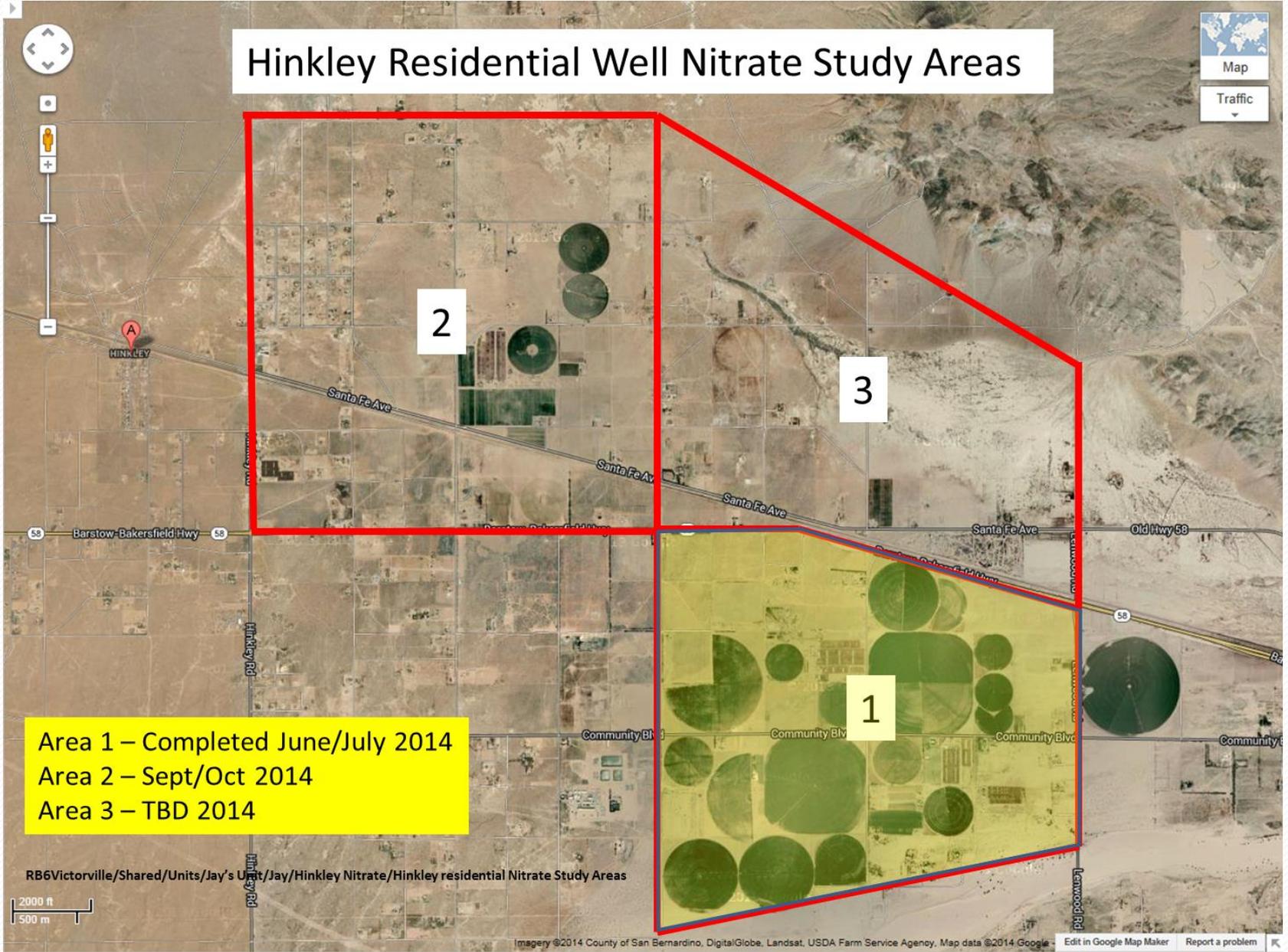
## Waste Discharge Requirements

- For future expanded IRZ areas (if needed)

# Questions?



# Hinkley Residential Well Nitrate Study Areas



Area 1 – Completed June/July 2014  
Area 2 – Sept/Oct 2014  
Area 3 – TBD 2014

RB6Victorville/Shared/Units/Jay's Unit/Jay/Hinkley Nitrate/Hinkley residential Nitrate Study Areas

2000 ft  
500 m

# Cr6 MCL Regulation Development

Sean McCarthy, PE

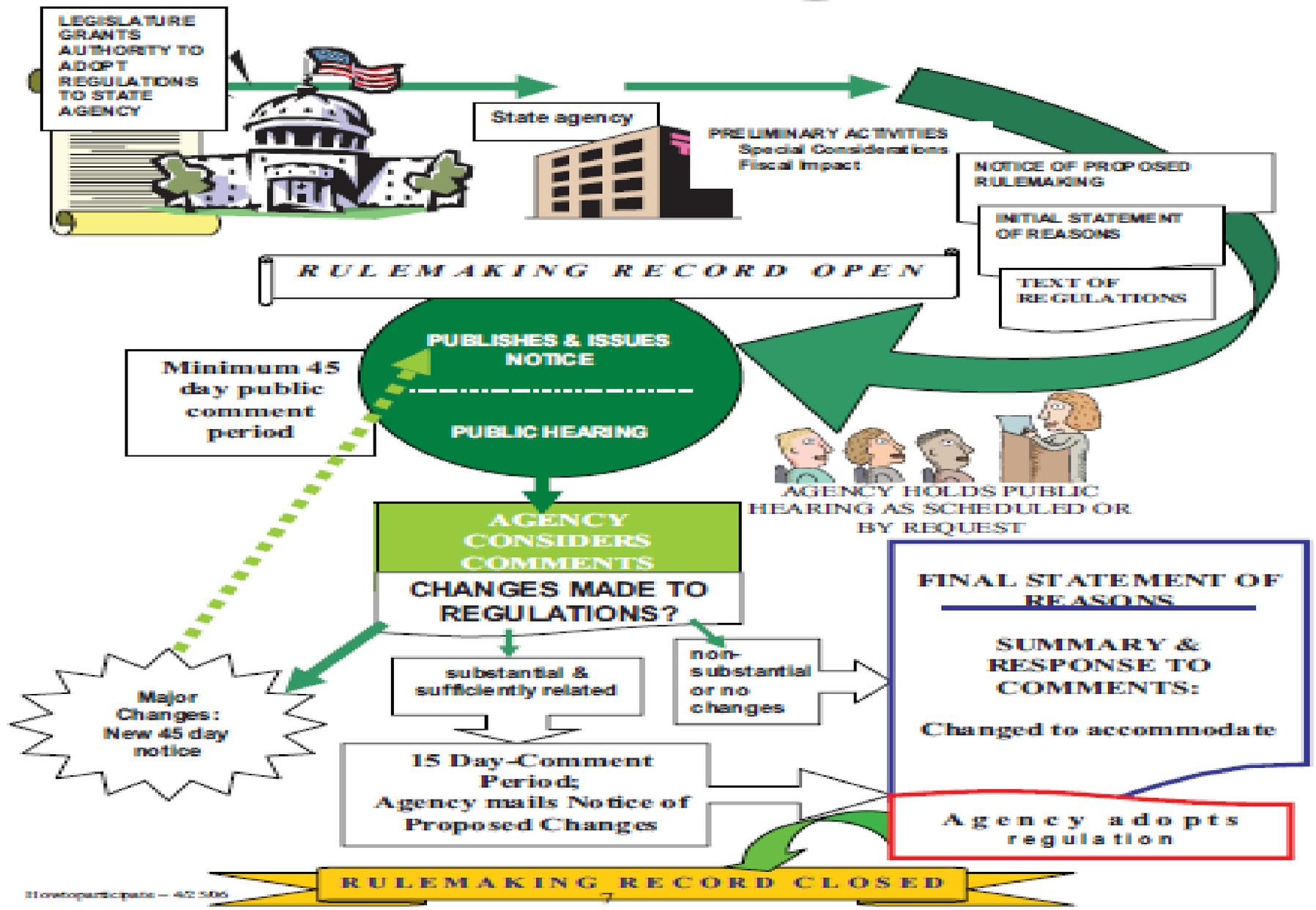
District Engineer

San Bernardino District

SWRCB – DDW

[Sean.McCarthy@waterboards.ca.gov](mailto:Sean.McCarthy@waterboards.ca.gov)

# The Rulemaking Process



# **Cr6 MCL package development...**

## **Statutory Mandates**

- Section 116365(a) of the Health & Safety Code requires each primary drinking water standard to be set *“at a level that is as close as feasible to the corresponding public health goal placing primary emphasis on the protection of public health...to the extent technologically and economically feasible...”*
- As a result, the Public Health Goal (PHG) - along with technological and economic considerations – is an important factor when establishing an MCL.

# ***MCL package development...***

## ***PHGs***

- For regulations setting MCLs, the Office of Environmental Health Hazard Assessment (OEHHA) plays a critical role because OEHHA establishes Public Health Goals (PHGs).
- OEHHA performs a risk assessment to establish PHGs at negligible risk levels, considering cancer and non-cancer health effects. For hexavalent chromium, the final PHG of 0.02 ppb was based on *no more* than 1 person in a population of 1,000,000 developing cancer if they drank 2 liters of water every day for 70 years.

# *MCL package development...*

## *PHGs*

- OEHHA's guide to PHGs states: "However, a PHG is **not** a boundary line between a 'safe' and 'dangerous' level of a contaminant, and drinking water can still be considered acceptable for public consumption even if it contains contaminants at levels exceeding the PHG."

# ***Cr6 MCL package development...***

## ***Statutory Mandates***

- As previously mentioned, Section 116365 of California's Safe Drinking Water Act requires an MCL to be set as close to its PHG as technically and economically feasible.
- As a result, this led to an extensive cost-benefit analysis at various "candidate" MCLs, which took into consideration a number of factors, including but not limited to:
  - Occurrence data (Cr6 occurs naturally and is also man-made)
  - Treatment feasibility and costs
  - Costs of monitoring, analyses, and contaminant removal
  - Potential population exposed/affected

# ***Cr6 MCL package development...***

## ***Statutory Mandates - Results***

- On August 23, 2013, the Drinking Water Program proposed an MCL for hexavalent chromium of 0.010 mg/L (or 0.010 ppm or 10 ppb).
- The proposed MCL was open for public comment from August 23<sup>rd</sup> to October 11<sup>th</sup>, 2013. Two public hearings were conducted – one in Sacramento, one in Los Angeles.
- About 18,000 comments were received, which were summarized and responded to, as required by law. Those comment summaries and responses are available for review on-line at...

<http://www.cdph.ca.gov/services/DPOPP/regs/Pages/DPH-11-005HexavalentChromiumMCL.aspx>

# ***Cr6 MCL package development...***

## ***Statutory Mandates - Results***

- On July 1<sup>st</sup>, 2014 - in accordance with California's statutory requirements - an MCL of 10 ppb for hexavalent chromium became effective. The MCL applies to applicable public water systems.
- The MCL was the first in the country specific to hexavalent chromium.
- The new MCL lowered California's *previous* limit, which was *already* half of federal limit and the most stringent in the country.
- The new MCL *further* lowered the previous California limit for hexavalent chromium in drinking water by 80% and is 1/10<sup>th</sup> of the current federal limit.

# ***Cr6 MCL package development... On the Horizon***

- The State Board's Division of Drinking Water (DDW), as well as OEHHA, will continue to follow new scientific evidence pertaining to health effects from hexavalent chromium exposure.
- The DDW will continue to follow treatment technologies, and their associated costs, for hexavalent chromium. Changes in treatment costs or the PHG can lead to revisions in the MCL.
- U.S. EPA is currently gathering information in consideration of establishing a hexavalent chromium-specific MCL. If U.S. EPA establishes a lower MCL than California's, California will adopt a standard at that standard or one that is lower.



PG&E Update  
to the  
Lahontan RWQCB

September 2014 Meeting  
Barstow, CA

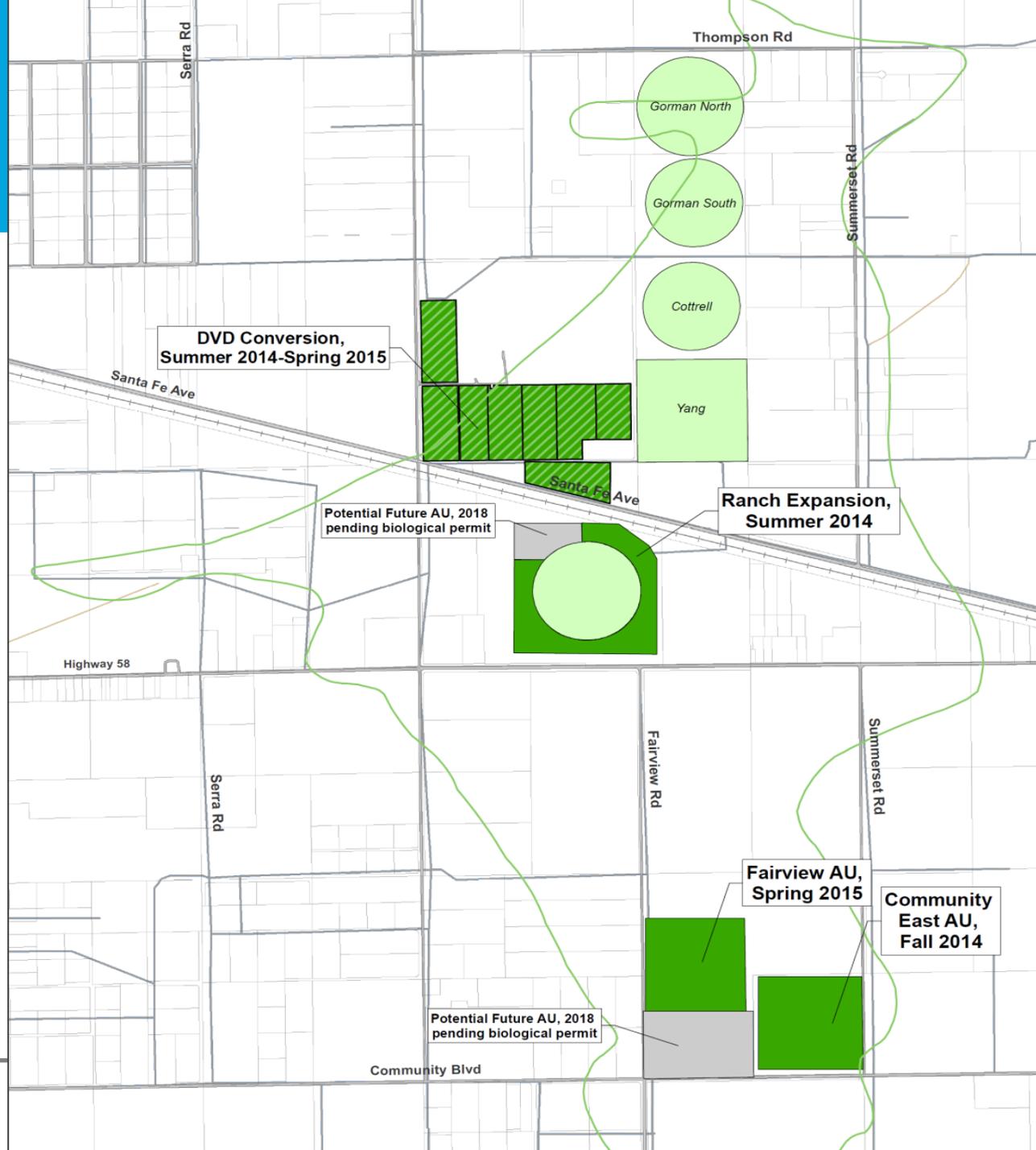


# Planned AU Expansion 2014-2015

NOA issued August 4 2014

**Legend**

- Existing Agricultural Units
- Areas for Potential Future Agricultural Units
- Approximate outline of Cr(VI) and Cr(T) in the Upper Aquifer exceeding 3.1 and 3.2 micrograms per liter, respectively, Third Quarter 2013
- Dashed where inferred

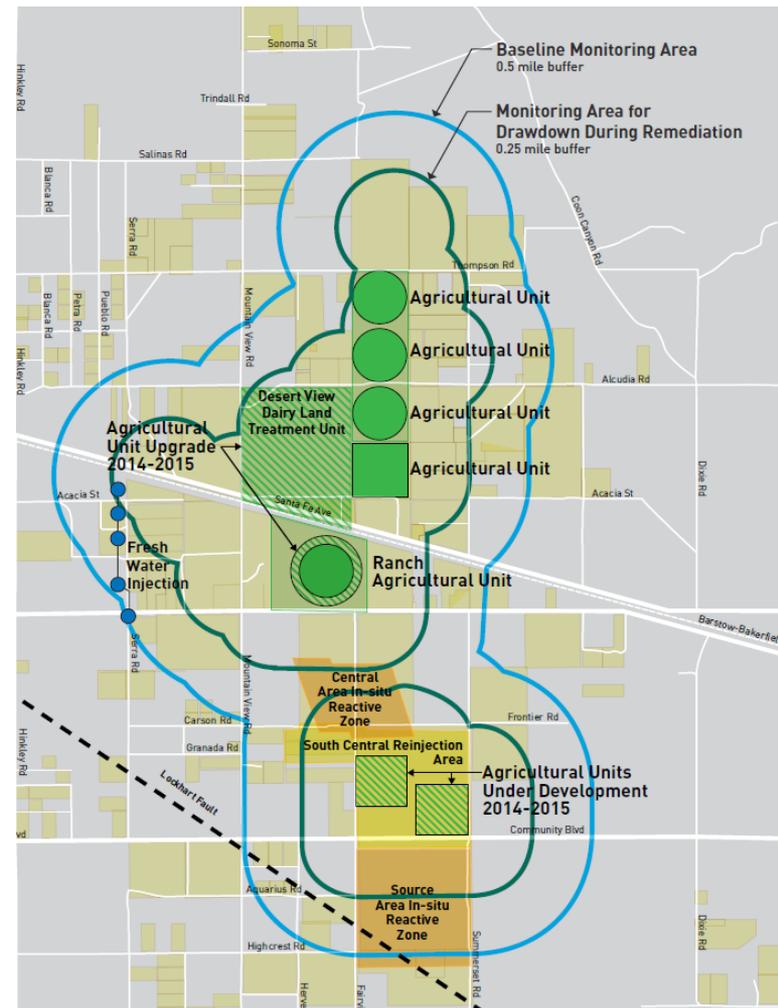




# Baseline Sampling and Monitoring

PG&E is working with residents in proximity to remediation activities to:

- Gather baseline data
- Closely monitor for potential by-products of remediation and drawdown of the aquifer





# Other Site Field Activities

- SEP project – Wells & Freshwater Line
- Agricultural Units
  - Mitigation Tasks
- Western Area – Testing & System Install
- IRZ Area
- Lower Aquifer – Testing & Install
- Other activities

# IRP Manager Remarks at the Lahontan Regional Water Quality Control Board Meeting

## *Community Outreach*

September 10, 2014  
Barstow, California

*Prepared for*

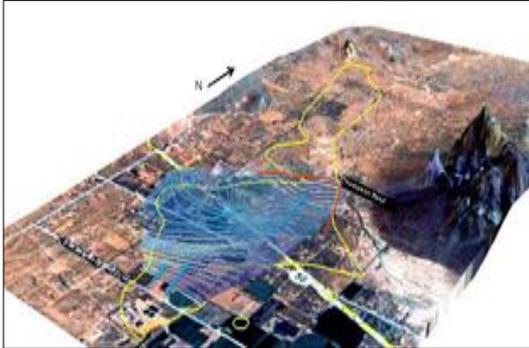
**Lahontan Regional Water Quality  
Control Board**

*Prepared by*

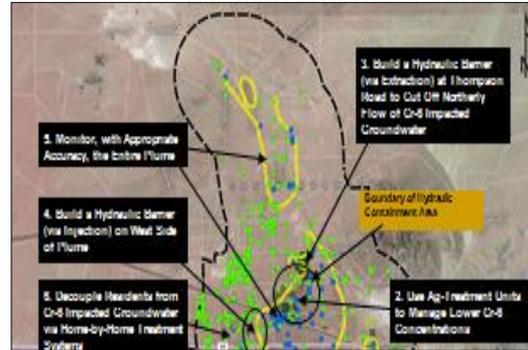
**Dr. Ian A. Webster**  
**Project Navigator, Ltd.**  
**[iwebster@projectnavigator.com](mailto:iwebster@projectnavigator.com)**

# Community's Technical Appreciation has Grown Across Many Fronts

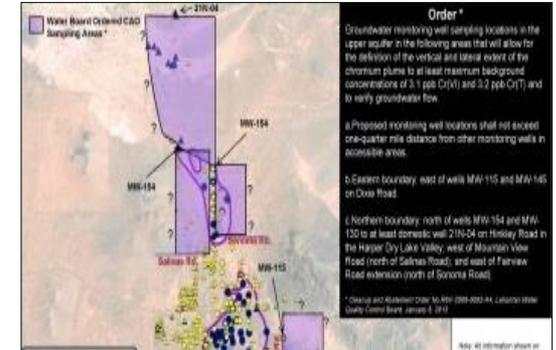
## Plume Hydraulic Control



## Cr6 Treatment by IRZ & ATU's



## Plume Definition



## Supplementary Environmental Program

**Pacific Gas and Electric Company**  
 Jeff McCarthy  
 Special Services  
 2200N Concomino Blvd.,  
 Redwood City, CA 94061  
 Phone: 650.251.3933  
 E-mail: jmc@pge.com

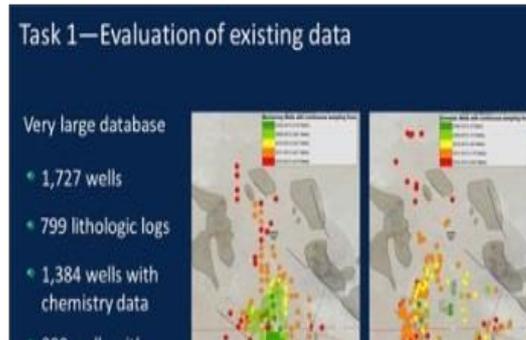
October 31, 2012

Ms. Patty Kouyoumdjian  
 Executive Officer  
 California Regional Water Control Board, Lahontan Region  
 2401 Lake Tahoe Blvd.  
 South Lake Tahoe, CA 96150

Subject: Pacific Gas and Electric Company Report on the Supplementary Environmental Project (SEP) in accordance with Board Order No. R6V-2012-0913

Dear Ms. Kouyoumdjian:

## Background Study (BGS) by USGS

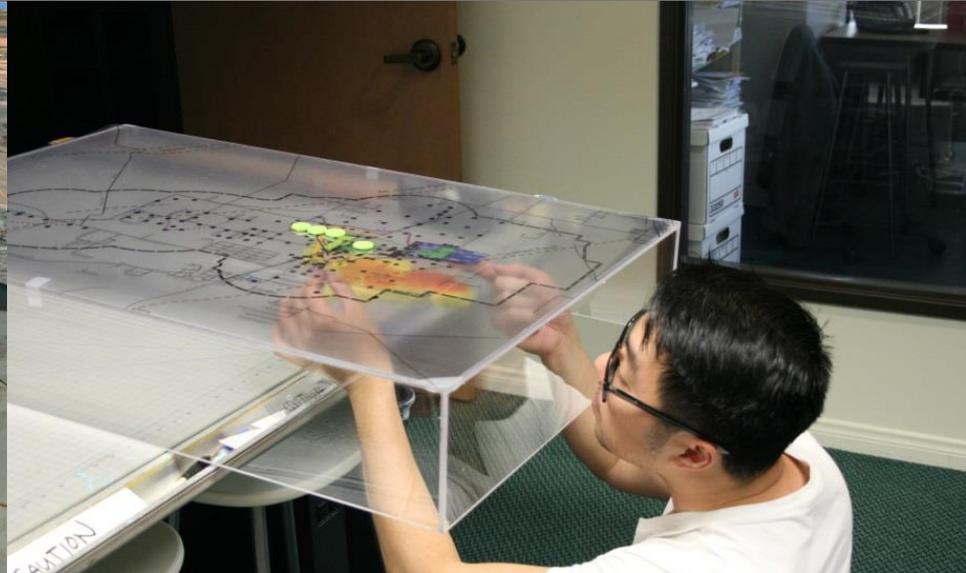
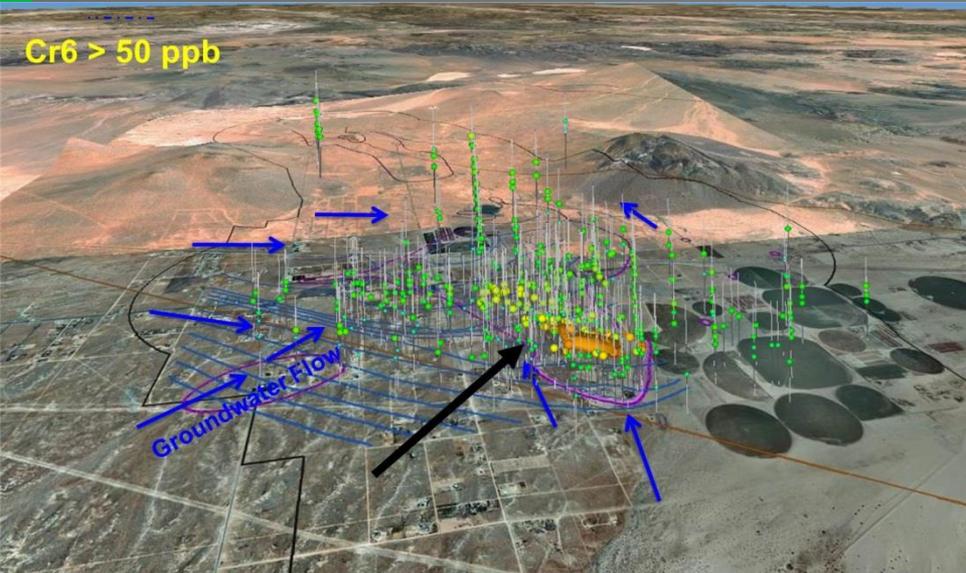


## Whole House Replacement Water

**Pilot Testing Location**

**The Treatment System for Each Home**

# An IRP Manager Dedicated Focus on Learning and Technical Understanding via Crystal Clear Visuals and Models.



**"Expanded Outreach to Other Stakeholder Groups:  
"Invest Where You Can Make the Biggest  
Difference and Add Value.""**

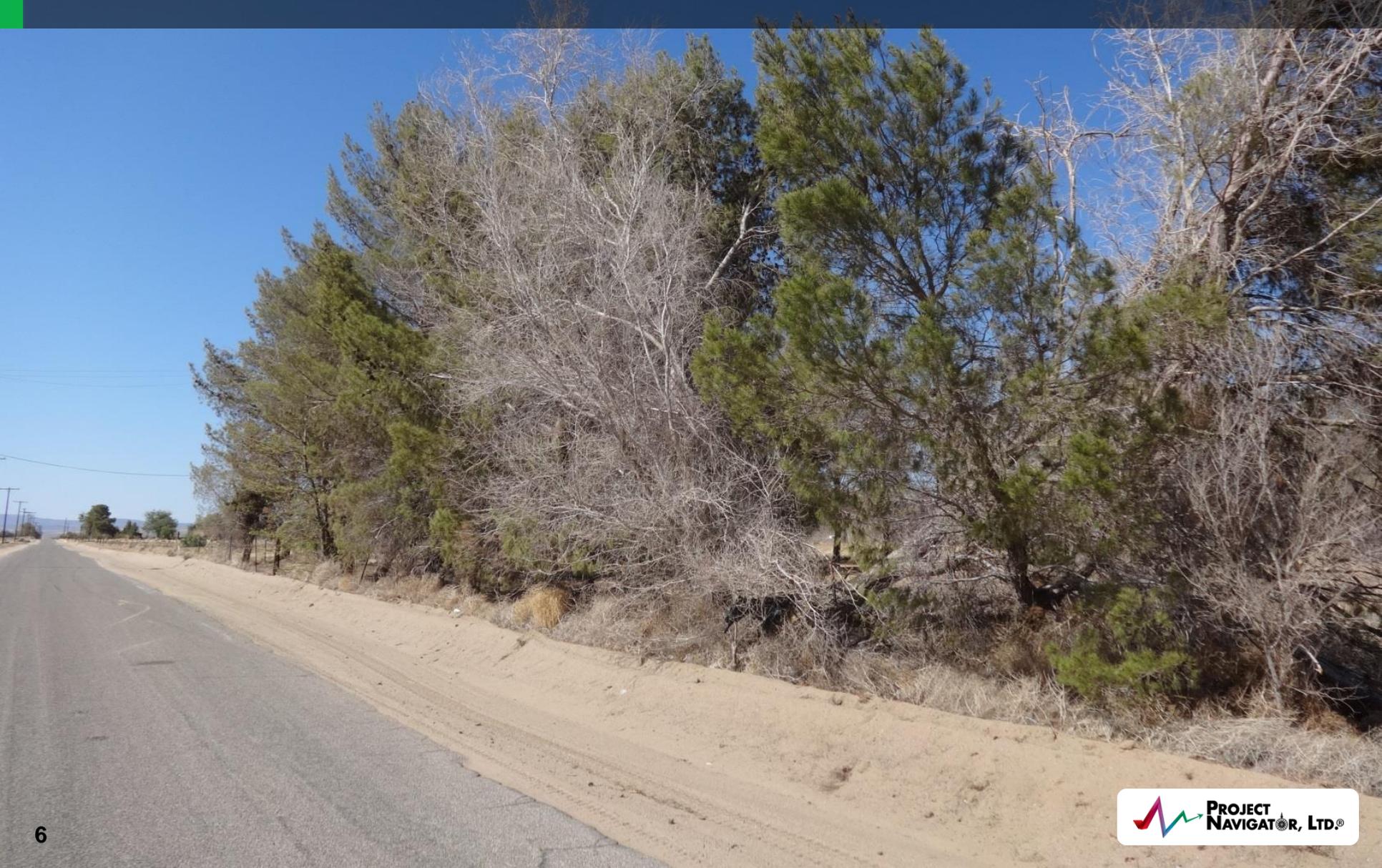


# There was a Good Turnout over the 3 Hours during the Community BBQ at the Community Center, with Folks Enjoying Each Others' Company throughout Two Rooms

CAC Member Betty Hernandez and IRP Manager, Dr. Ian Webster made some remarks to clear confusion about the CAC Request to Residents to allow their private well data to be reviewed by USGS's Dr. John Izbicki in his Cr6 Background Study.



# Fostering the Establishment of a Few “Issue Specific Sub-groups” Where Community Stakeholders Can Invest Their Time (and Passion) such as Penny Harper and the Watering of Trees on PG&E Owned Property



# Continuing Expansion of One-on-One Outreach to Community Members Who Have Unique Specific Problems and Seek Tech Advice



# CAC has Retained Annie Cwieka as the CAC Community Meeting Facilitator





# CAC/IRP/PG&E/WB Continue to Work Together to Plan the New Cr6 BGS



04/17/2014 08:34

# John Fitzpatrick of USGS Discussing How Cr6 Isotopes will be Measured at the USGS Menlo Park Laboratory for the BGS



# Advice to Stakeholders re WHW Program, and Its Pending Termination

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**WATER QUALITY**

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## PG&E to end bottled water delivery for Hinkley residents



Bottled water provided by PG&E is used as the Banks family's primary source of drinking water at their home in Hinkley on Thursday, March 7, 2013. Many residents participate PG&E's water program that provides Culligan and Sparkletts bottled water for cooking and drinking as an alternative to contaminated ground water.

File photo by Rachel Luna — Staff Photographer

Comments

Print

Email

Recommended

By **Jim Steinberg**, *The Sun*

POSTED: 07/30/14, 5:32 PM PDT | UPDATED: 2 WEEKS AGO | 1 COMMENT

HINKLEY >> Pacific Gas & Electric Co. officials have notified residents here that their programs

[READ MORE](#)



### MOST POPULAR

DAY WEEK NEWS SPORTS BIZ A&E EMAIL LIFE

Amazon taps Redlands for its fifth California fulfillment center

“Cajon Crawls” dropping part of northbound 15 Freeway to 2 lanes this weekend

High winds, hail bash Needles, snap power poles

Drive-by shooting seriously wounds one man in San Bernardino

San Bernardino crash kills Riverside man, injures 6 others

Amazon plans 700,000 sq.ft. warehouse for Redlands

San Bernardino police seize 10,000 pounds of marijuana

Fontana man arrested after 529 roosters found on the property

Source: <http://www.sbsun.com/environment-and-nature/20140730/pge-to-end-bottled-water-delivery-for-hinkley-residents>

# CAC/IRP Involvement /Feedback on the Upcoming CAO



# Technical Outreach: Mid-Course Adjustment

2012 / 2013

- Outreach and Teaching
  - Via CAC
  - Monthly Community Meetings
- Style
  - Tough to separate technical from politics
- Techniques
  - Slide decks
  - Some models
  - Web site (suffers from “content overload”)
- Use of External Expertise
  - Two entities
    - ◆ One for toxicology/risk
    - ◆ One for EIR review and comment

2014 Vision

- IRP Manager’s “Independent” Perspective Emphasized
  - Refocus on technical education
- Meetings
  - Many, many more “one-on-ones”
  - Workshop format to replace lecture style Community meetings
- Techniques
  - Table top models for workshops
  - Videos of similar work elsewhere
  - Back to basics style
  - Mail delivered newsletter
  - Top 4 things (in simple bullets) as website entry splash page
- Improved Use of External Experts
  - As simple as introducing a “new technical face”
  - “Guest speaker concept”