

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

**MEETING OF SEPTEMBER 16-17, 2015
BARSTOW**

ITEM: 2

SUBJECT: **PACIFIC GAS AND ELECTRIC COMPANY (PG&E), HINKLEY COMPRESSOR STATION, SAN BERNARDINO COUNTY – STATUS REPORT ON ACTIVITIES CONCERNING CHROMIUM CONTAMINATION FROM PACIFIC GAS AND ELECTRIC COMPANY’S HINKLEY COMPRESSOR STATION**

CHRONOLOGY: This chronology lists Water Board actions related to the cleanup of chromium in groundwater.

- | | |
|---------------|--|
| Aug. 6, 2008 | Cleanup and Abatement Order (CAO) No. R6V-2008-0002 directed PG&E, among other things, to continue interim remedial actions and to develop and implement a comprehensive cleanup strategy for chromium in groundwater. |
| Jan. 7, 2011 | CAO No. R6V-2011-0005 and amendments directed PG&E to conduct quarterly domestic well sampling and provide alternate water supply to Hinkley residents having chromium in domestic wells within the affected area. |
| July 17, 2013 | Adopted final EIR for comprehensive cleanup of chromium in groundwater. |
| Mar. 12, 2014 | Adopted Site-wide Agricultural Treatment Unit Waste Discharge Requirements |
| July 1, 2014 | Effective date of hexavalent chromium drinking water standard of 10 parts per billion |
| July 13, 2015 | Circulate draft updated Notice of Applicability for In-situ Remediation activities |

STATUS: This is a routine standing item for southern board meetings.

The July Status of Actions sheet distributed to the Hinkley Community Advisory Committee is enclosed (Enclosure 1) describing Water Board activities during the spring.

Water Board staff will also provide an update on the following topics (Enclosure 2):

- Chromium plume map in the Second Quarter 2015 Groundwater Monitoring Report
- Domestic well sampling program status
- Draft updated Notice of Applicability for In-situ Remediation activities status
- Supplemental Environmental Project completion
- Next actions

PG&E and the Community Advisor, Project Navigator, will provide an update to these topics (Enclosures 3 and 4):

- Technical Working Group meetings
- Community Advisory Committee
- Background Study review/discussions/meetings
- Comments on PG&E technical reports

RECOMMENDATIONS: This is an information item only. The Water Board may provide direction to staff as appropriate

ENCLOSURE	Item	Bates Number
1	July 2015 Status of Actions Sheet	2-5
2	Water Board staff presentation	2-9
3	PG&E presentation	2-21
4	Community Advisory Committee presentation by Project Navigator	2-29

ENCLOSURE 1

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Lahontan Regional Water Quality Control Board

Status of Actions for PG&E Hinkley Chromium Contamination July 2015

Enforcement

Supplemental Environmental Project (SEP): The ACL settlement adopted by the Board on March 14, 2012 requires PG&E to spend at least \$1.8 million to update the drinking water system at the Hinkley School. PG&E gave a tour of the completed project to Water Board staff in February 2015. A final project report, including project costs, is expected soon.

Proposed Cleanup and Abatement Order: On January 21, 2015, Water Board released for public comment a proposed Cleanup and Abatement Order (CAO). On February 25, 2015, a workshop was held at the Water Board's regular meeting in Barstow to discuss the proposed CAO and take written comments. The comment period ended on March 13, 2015, and in response to comments received, the Water Board held a second public workshop in May to brainstorm ideas on potential areas of consensus on issues raised during the comment period. On July 8, the Water Board's Prosecution Team and PG&E released a redline-strikeout version of the CAO showing items where consensus on certain issues was reached.

The Water Board's advisors will review the proposed consensus language and provide a revised proposed CAO for the public's review in August, which may incorporate all or some of the proposed consensus language and other changes based upon comments previously received and ideas generated at the May workshop. A workshop on the new proposed CAO will be held **September 16, 2015** in Barstow. After a public comment period on the new draft CAO, the Water Board will plan to consider adoption of a final CAO at its **November 4-5, 2015** Board meeting, which will also be held in Barstow. A final schedule, including the comment period, will be released with the revised proposed CAO in August.

The July 8, 2015 redline-strikeout version of the CAO discussed above is available at http://www.waterboards.ca.gov/lahontan/water_issues/projects/pge/caol/.

Investigative and Reporting Orders

- 1. Chromium Plume Boundary:** The 1st quarter 2015 chromium plume map is posted on the Water Board website at: www.waterboards.ca.gov/lahontan, on the "PG&E Hinkley Chromium Cleanup" page, at the bottom of page. The 2nd quarter 2015 plume map is due at the end of July.
- 2. Chromium Plume Containment:** In June, PG&E submitted a report discussing the results of hydraulic testing activities in the north area of the southern chromium plume. The purpose of the testing was to evaluate an alternate capture zone configuration south

of the Desert View Dairy for the chromium plume. The hydraulic test, conducted this past winter, involved shutting down or reducing groundwater extraction north of the DVD and increased extraction south of the DVD to the railroad tracks. Water Board staff is evaluating the results report and will follow up with a comment letter to PG&E.

- 3. Updated Draft Requirements for IRZs and Freshwater Injection System:**
Water Board staff have written new draft requirements for PG&E's in-situ remediation zones (IRZs) and freshwater injection system. The new draft requirements set forth updated monitoring for these activities to incorporate the 2013 Environmental Impact Report monitoring and mitigation requirements, revise groundwater monitoring for IRZs, set updated byproduct contingency thresholds, and remove redundant sampling. The draft requirements, including a monitoring and reporting program, are now available for a 30-day public review, and can be viewed at the Water Board's Hinkley project webpage at http://www.waterboards.ca.gov/lahontan/water_issues/projects/pge/index.shtml. Please provide your comments no later than **5 pm on August 17, 2015**; the webpage link in the previous sentence has information on how to submit comments.
- 4. Bioreactor Pilot Test:** PG&E's contractor continues to operate the bioreactor pilot test in the Central Area IRZ. The pilot test consists of two above-ground vessels (storage containers) in a fenced compound. Chromium contaminated groundwater is pumped into the first vessel where acetic acid (vinegar) and phosphoric acid are added to convert Cr6 to Cr3. Filters in the second vessel remove left over solid chromium, biomass, and byproducts, such as iron and manganese. Treated water is re-injected to groundwater in the IRZ area. Pilot test results are expected in 2016.

Status of Revised Chromium Background Study

US Geological Survey staff, led by Dr. Izbicki, completed the first round of groundwater sampling of forty wells during March 2015. Samples of Hinkley rock and soils were also collected and analysis for the source and elemental composition of the samples is ongoing. A short video discussing the project background and sampling procedures is posted at the IRP Manager's Hinkley website at <http://www.hinkleygroundwater.com/usgs-science-fieldwork-hinkley-2015/>. A Technical Working Group meeting was held in June 2015, and Dr. Izbicki summarized progress made and plans for upcoming work.

ENCLOSURE 2

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AGENDA ITEM ?

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

September 16-17, 2015



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

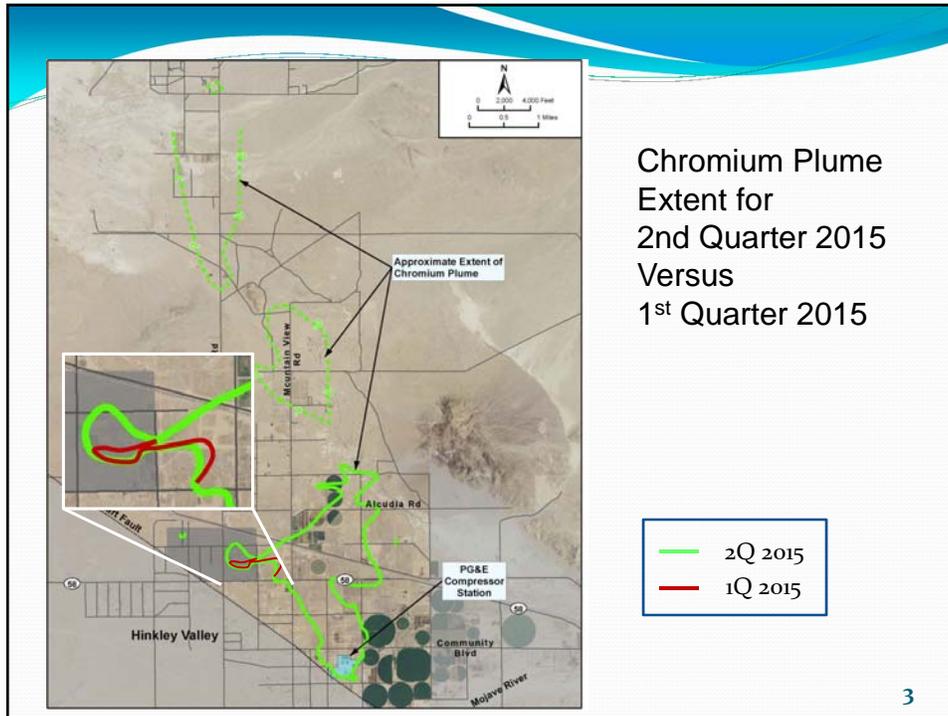
9/16/2015 Agenda Item # 1

Outline

1. Second quarter 2015 chromium plume map
2. Domestic well program status
3. Status of updated Notice of Applicability for in-situ remediation activities
4. Supplemental environmental program completion
5. Next actions



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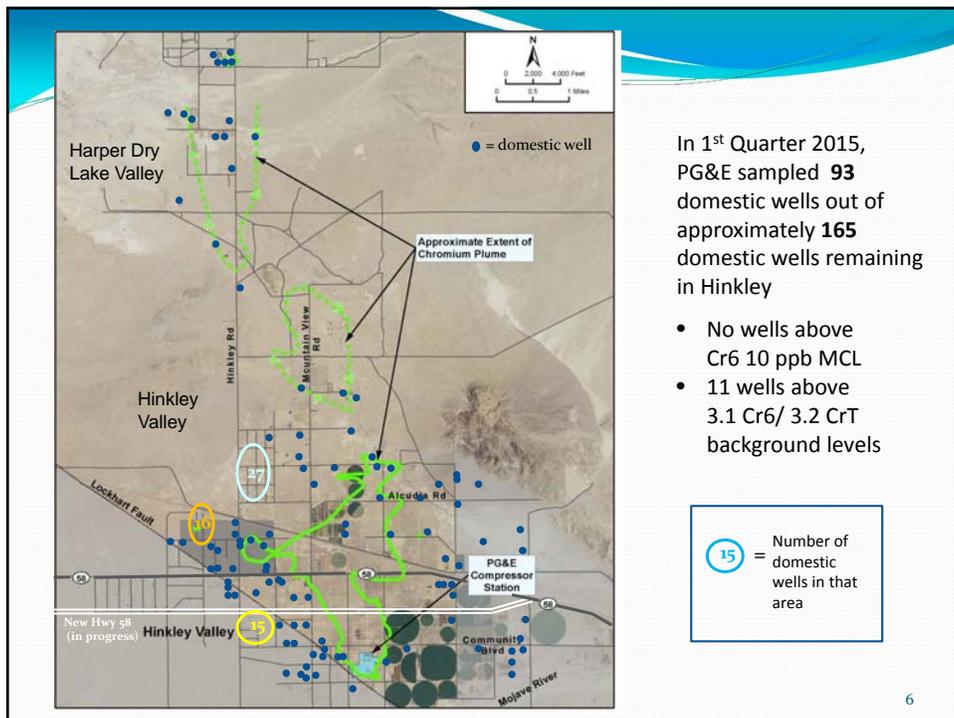
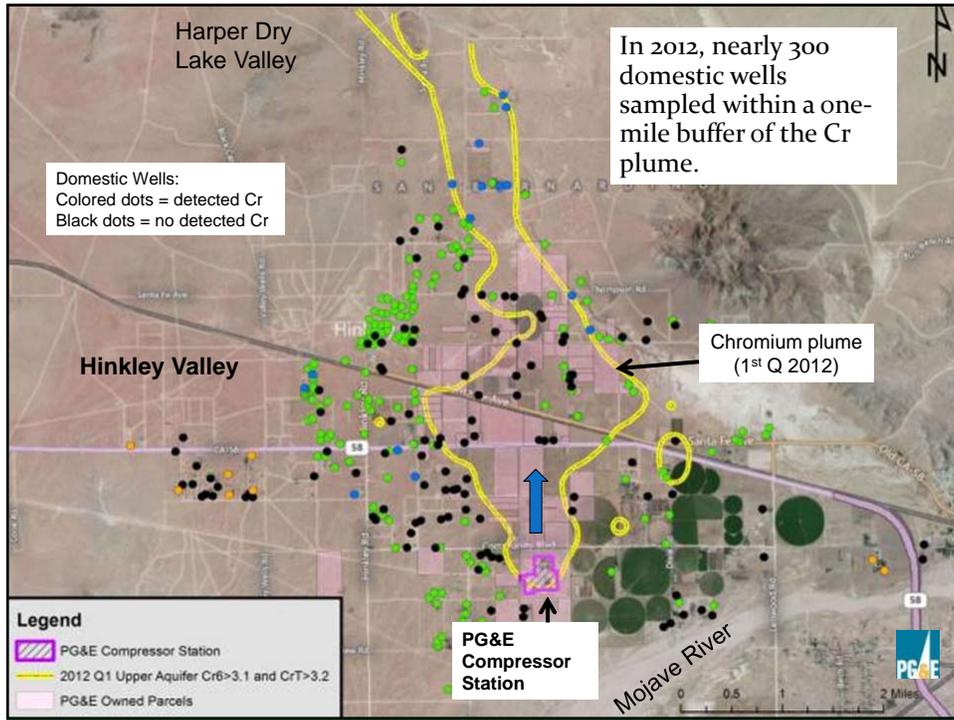


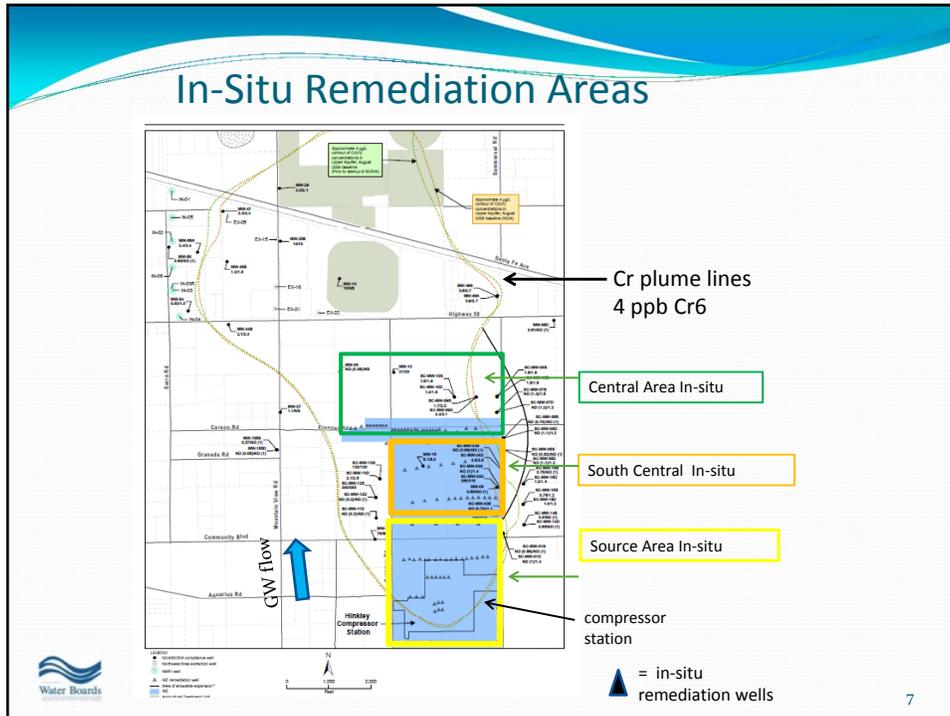
Domestic Well Sampling Program Status

CAO R6V-2011-0005 (and amendments) require PG&E to:

- Conduct quarterly sampling of domestic wells within 1-mile buffer of most recent chromium plume boundary
- Report findings
- Provide alternate water to affected well owners above Cr6 drinking water maximum contaminant level (MCL) of 10 ppb







In-situ Remediation Summary

- IRZ effective reducing Cr concentration to non-detect (<1 ppb) levels in groundwater using ethanol
- Design is key (e.g., tight spacing of injection/extraction wells, shallow & deep wells in upper aquifer)
- Type of operation affects effectiveness (active is better than passive)
- Requires intensive maintenance (well rehabilitation, etc.)
- Produces byproducts in groundwater
- Need extensive monitoring network and triggers for contingency actions




Water Boards 9/16/2015
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Byproducts

Other reduced metals in groundwater caused by in-situ remediation; pilot tests detected As, Fe, Mn.

Problem:
Mn byproduct plumes migrated further than expected and threatened beneficial uses (i.e., domestic wells)

PG&E Response:

- Reduced ethanol injections by half since 2011
- Installed two extraction wells piped to an infiltration gallery to control Mn migration

Map of Mn byproduct plume in shallow zone

The map displays a grid of monitoring wells. Two yellow callout boxes point to 'Contingency MWs' (green dots) and 'Sentry MWs' (red dots). Two orange shaded areas represent Mn plumes, with 'Mn' labels. A yellow callout box points to a specific area with the text 'Mn conc greater than background'. A blue box highlights a 'Mn mitigation system' consisting of two extraction wells and an infiltration gallery.

Water Bounds 9/16/2015 Agenda Item # 9

Updated Notice of Applicability for IRZs

- PG&E submitted information to support updated NOA during 2013-2015
- Update needed to:
 - ✓ Impose EIR monitoring and mitigation measures on IRZ and freshwater injection operations
 - ✓ Revise monitoring and reporting program
 - ✓ Revoke several now-outdated NOAs
- Draft NOA including new monitoring program released for 30-day comment period, ending August 17
- Comments received from IRP manager and PG&E
- Staff currently evaluating comments and preparing responses

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Updated IRZ NOA, cont.

- July 2013 EIR describes mitigation measures to allow additional byproduct migration under certain conditions:
 - ✓ Domestic well monitoring to set baseline levels of byproducts (As, Mn, Fe)
 - ✓ Continued monitoring during remediation in buffer zone around IRZs
 - ✓ Replacement water requirements if byproducts increase
 - ✓ Restoration of aquifer water quality to baseline after remediation
- Previous environmental documents did not contain these requirements
- Updated NOA now imposes these requirements

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Updated IRZ NOA, cont.

- Additional byproduct migration distance will allow PG&E to:
 - ✓ Resume ethanol injections to full-scale operations
 - ✓ Move extraction efforts at agricultural treatment units southward as needed to optimize cleanup/plume containment
- These actions should result in faster cleanup, while protecting domestic wells



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Supplemental Environmental Project

Project accepted in March 2012:

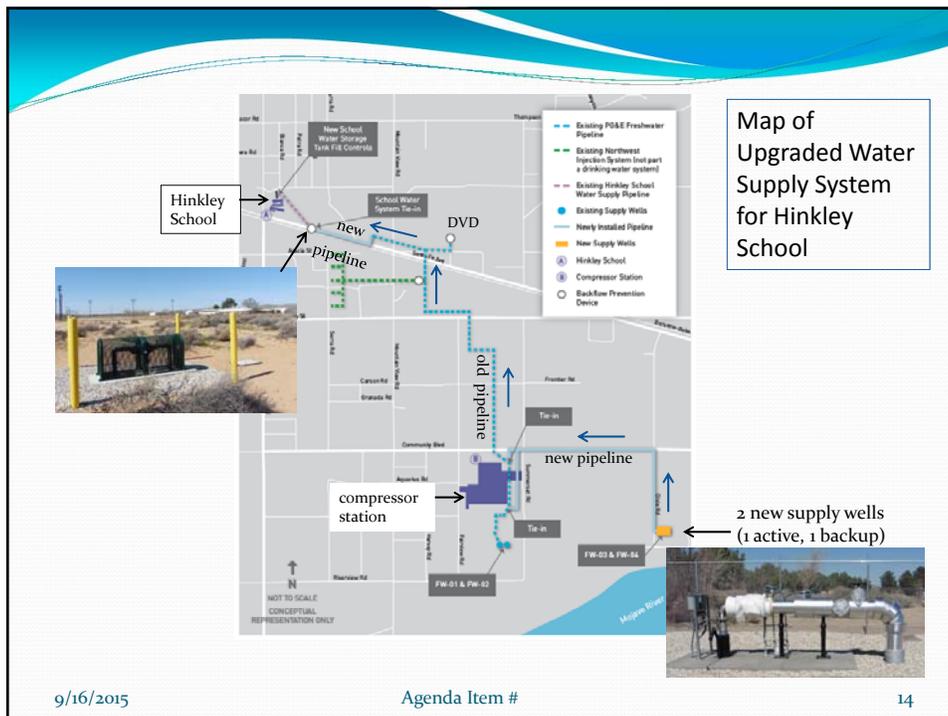
- Construction started in fall 2013
- New supply wells and water line completed in 2014
 - ✓ meets all drinking water MCLs (Cr6 = 0.1 ppb)
- Following testing, system turned over to Barstow USD in 2015
- Paperwork completed with County
- Pipeline providing water today for irrigating school fields
- Project completed 2 years ahead of schedule since County determined no CEQA required



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Supplemental Environmental Project Completed

1. PG&E submitted final SEP report in July 2015
2. Water Board staff to prepare SEP completion letter



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PG&E Planned Remedial Actions

Construct and operate ATUs (dark green):

- ~~1. Ranch Expansion~~
- ~~2. Community East~~
- ~~3. Fairview~~
4. DVD drag drip conversion

IRZ Improvements (yellow triangles):

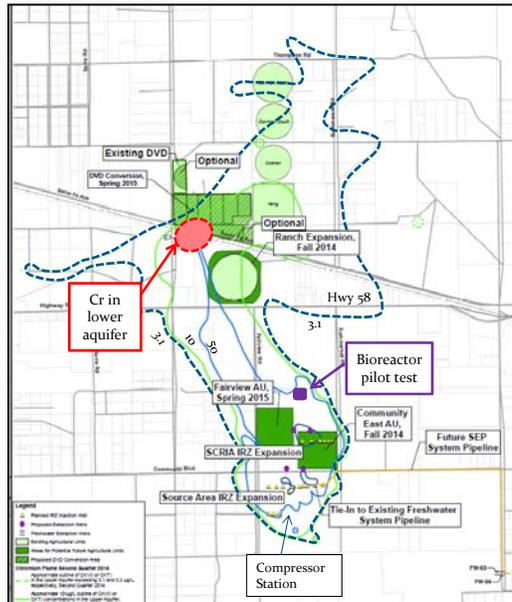
- ~~1. Install new ethanol injection wells~~
- ~~2. Source Area expansion~~
3. Addition expansion in SCRIA pending HCP approval (~2017)

Lower aquifer (red):

- ~~1. Install new extraction well~~

Bioreactor Pilot Test (purple box):

1. Continue to end of 2015



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Next Actions

Cleanup and Abatement Order	<ul style="list-style-type: none">• Provide comments on proposed CAO (if needed)
Technical Working Group	<ul style="list-style-type: none">• Continue to attend meetings and provide input on background study & other technical matters
Community Advisory Committee	<ul style="list-style-type: none">• Continue to attend meetings and keep public informed of corrective actions

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Questions?



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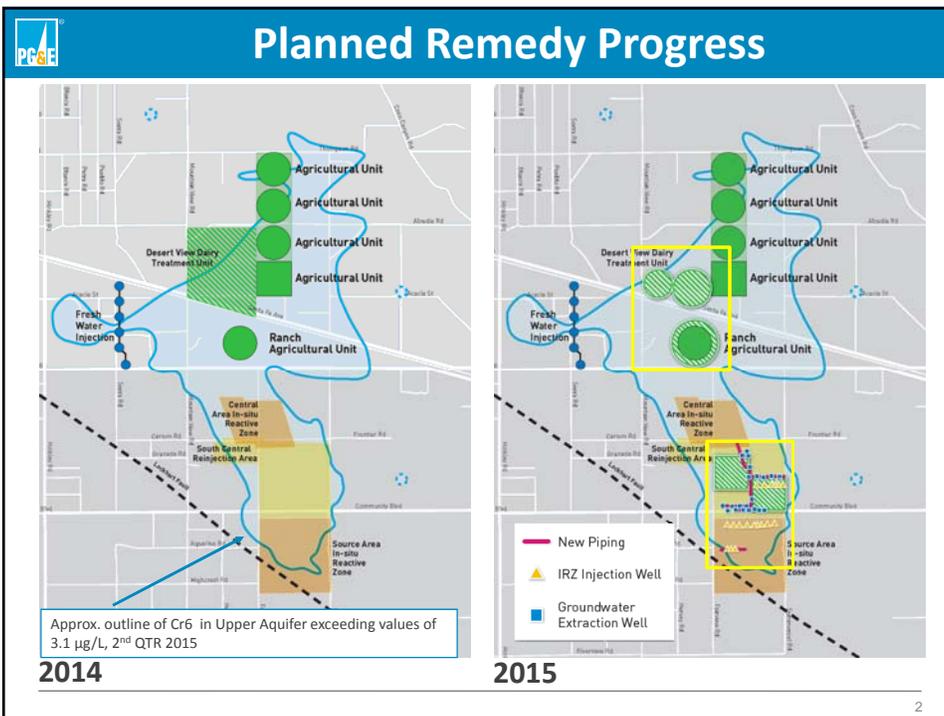
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ENCLOSURE 3

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Hinkley – Groundwater Remediation Program

Kevin Sullivan
 Director, Chromium Remediation Program



 **Agricultural Treatment Expanded**

84 acres of new agricultural treatment areas brought online this year.



New crops grow at the newly completed Community East Agricultural Treatment Unit

3

 **Treatment at Plume Core Improved**



Crews drilled new wells as IRZ treatment was improved and expanded.

4



Program Improvements

Since June 2014 –

- Completed over 20 new remedial construction or system improvement projects
- Installed more than 15,000 linear ft. pipelines
- Installed 45 new remedial and monitoring wells
- 40,000 man hours in labor on construction/optimization projects
- Site wide Supervisory Control and Data Acquisition (SCADA) system

Improved efficiency of water use for Cr6 mass removal by 18% in the first half of 2015

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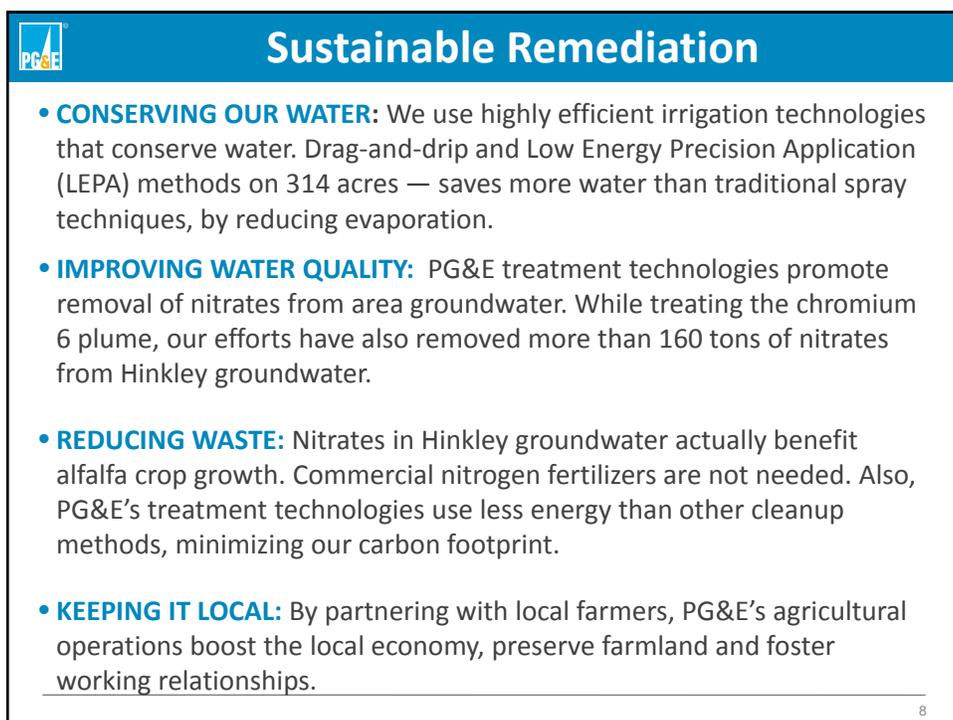
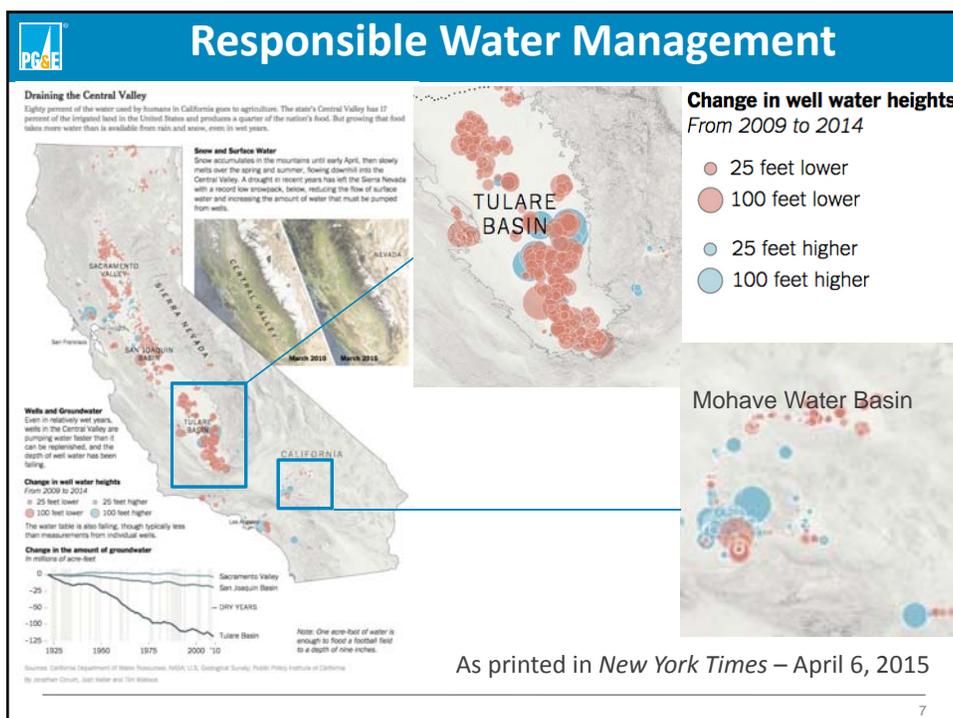
Supplemental Environmental Project (SEP)



- As part of a settlement agreement with Lahontan Water Board
- Completed 2 years ahead of schedule
- Included installation of wells and infrastructure from the Mojave River to the site
- Created reliable long term water source



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 **Upcoming Activities**


COMPLETION of DVD PIVOTS


Bioreactor Pilot Test


IMPLEMENTATION of HABITAT CONSERVATION AREAS

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ENCLOSURE 4

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PG&E'S HINKLEY GROUNDWATER REMEDIATION PROJECT

IRP Manager's Perspectives on Project Status from a Community Vantage Point

September 16, 2015
Barstow, CA

Prepared for
Lahontan Regional Water Quality Control Board

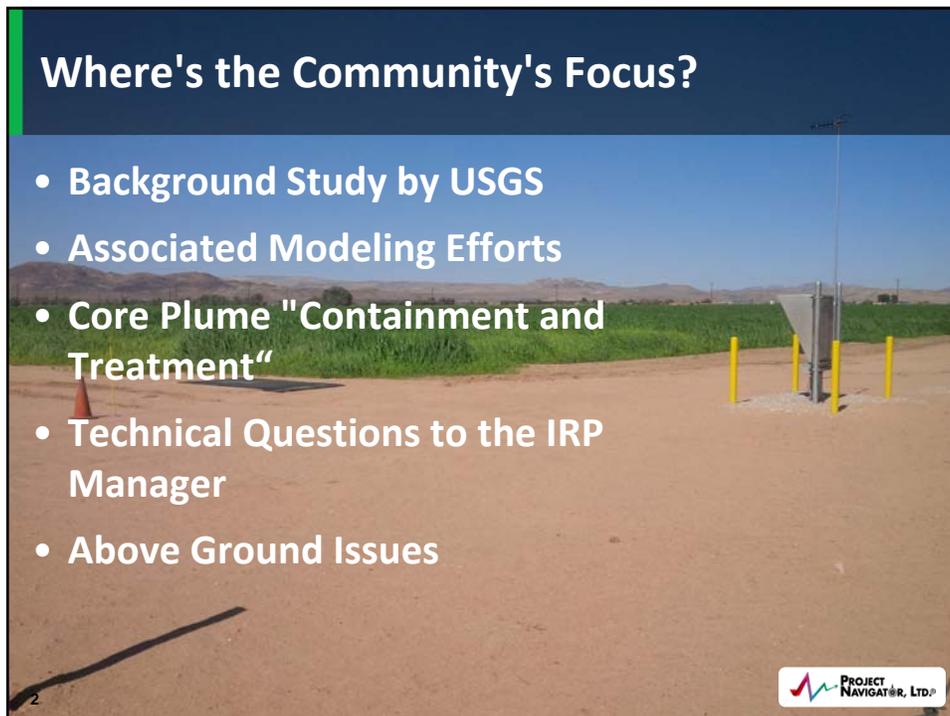
Prepared by IRP Manager & Team
**Dr. Raudel Sanchez and Dr. Halil Kavak
Dr. Ian A. Webster**

www.HinkleyGroundwater.com | www.ProjectNavigator.com

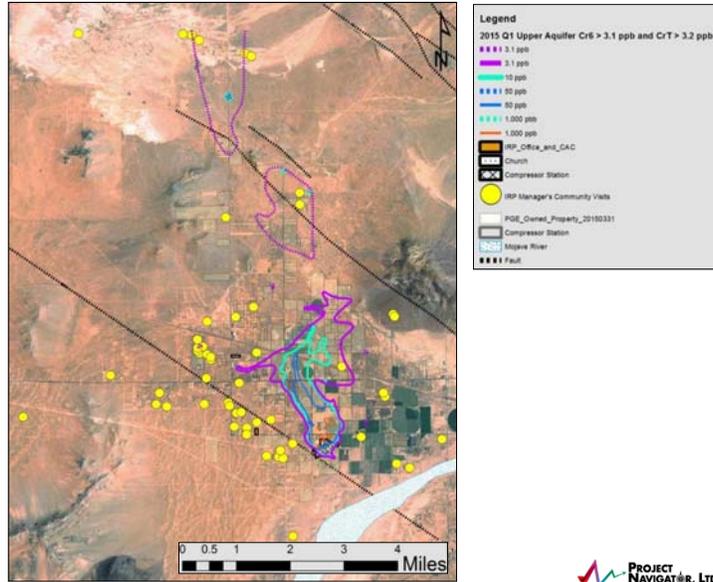


Where's the Community's Focus?

- Background Study by USGS
- Associated Modeling Efforts
- Core Plume "Containment and Treatment"
- Technical Questions to the IRP Manager
- Above Ground Issues

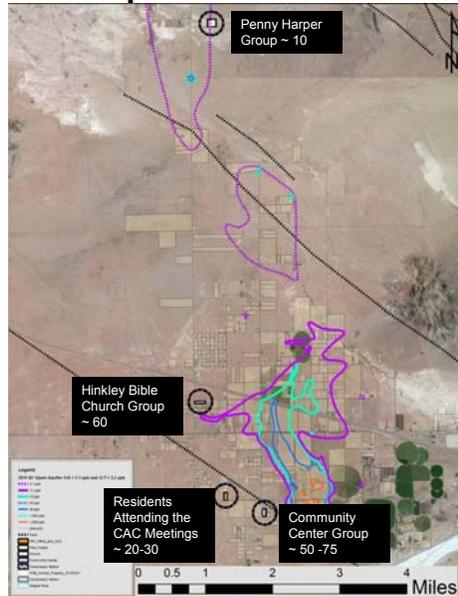


More Than "50 Home-Visits" Since 2012



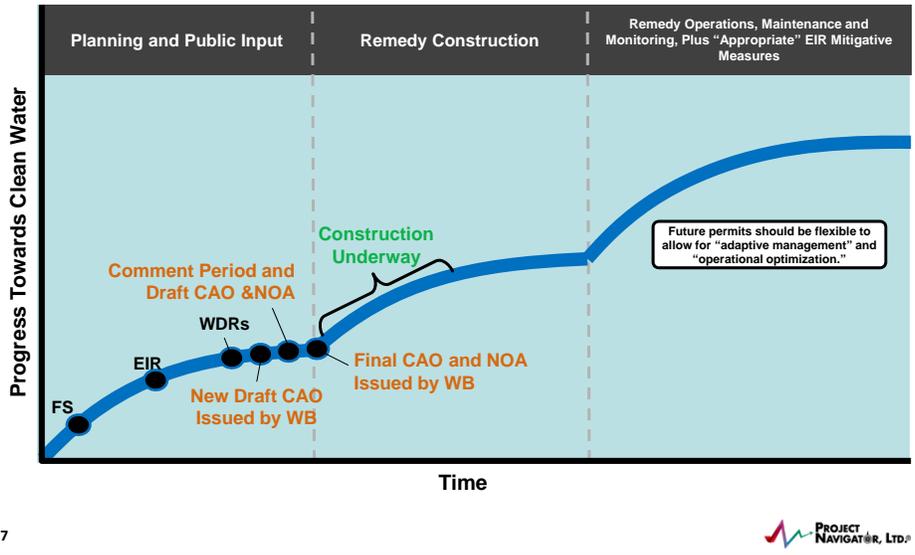
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A Conclusion: The Hinkley Community is Diverse with Many Different Groups Interested in Different Topics

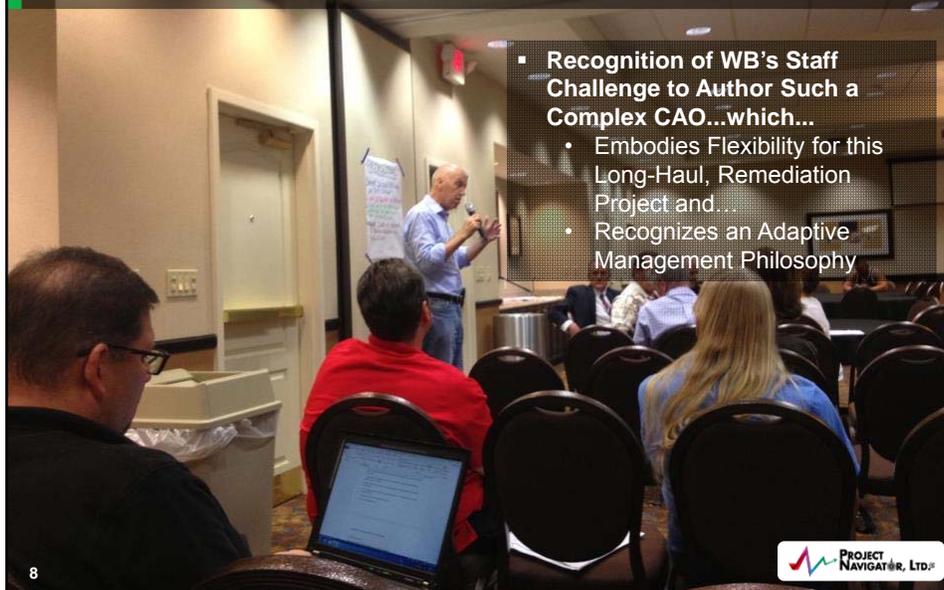


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The Community Realizes that Significant Progress Has Been Made Towards the Installation of Remedial Systems, which now, Require to Operate



The IRP Manager Delivered Remarks at the Water Board CAO Workshop on May 28, 2015 in Barstow



IRP Manager Provided Input to the Water Board on Six Key Policy Issues Regarding the Draft CAO

The image displays six slides, each addressing a key policy issue. Each slide includes a title, a question, a list of bullet points, and a diagram. The slides are:

- Key Policy Issue 1: Prescriptions vs. Performance Based Requirements**
Should the CAO be prescriptive in setting out requirements, rely on performance based requirements, provide both types of requirements, or transition from one to the other?
A diagram shows a spectrum from 'Prescriptive' to 'Performance Based' with a green arrow pointing right.
- Key Policy Issue 2: Northern and Western Areas, and USGS Background Study**
What should the CAO require of P&B in the future, and what should the USGS Background Study be doing?
A map of the region is shown.
- Key Issue 3: Specific Objectives versus Normalization Goals with Adaptive Management**
Should the CAO establish normalization goals that allow for an adaptive management strategy or specify quantitative objectives?
Or should objectives be set, but avoid relying to control the performance of the adaptive management?
A diagram shows a spectrum from 'Specific Objectives' to 'Adaptive Management' with a green arrow pointing right.
- Key Issue 4: Replacement Water Requirements**
With the CA 1603 act, should the historical one-to-one ratio be revised, modified, deleted, or replaced with a variable plan to cover from the historical ratio to a maximum of 1:1?
A map shows water sources and distribution.
- Key Issue 5: Monitoring and Reporting Program**
Should the monitoring and reporting program be prescriptive, performance based, a hybrid of prescriptive/performance, or transition to a different approach?
A flowchart shows the monitoring and reporting process.
- Key Issue 6: Community Involvement**
Should the CAO establish a community involvement program to be used in the CAO implementation?
Or should the community involvement program be established in the CAO, and then used to implement the CAO?
A photo shows a group of people at a meeting.

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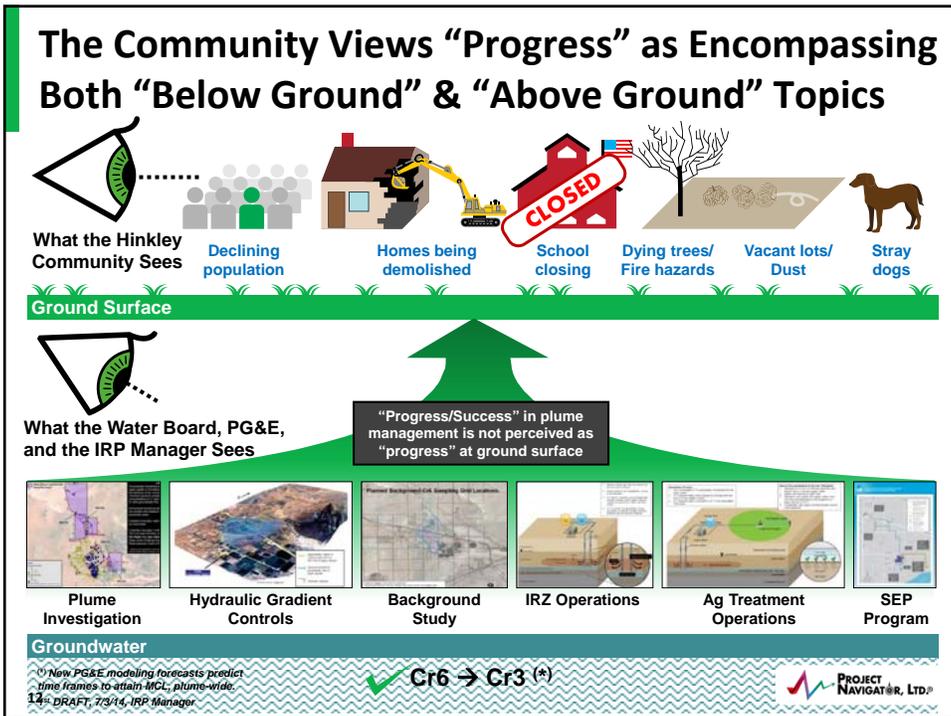


50 Folks Attended the IRP Manager's 3rd Annual BBQ on June 6, 2015



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Where I'd Like to Take the Outreach...

2014

- 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"

2015 Vision

- IRP Manager's "Independent" Perspective Emphasized
 - Focus on both below and above (as merited) ground issues
 - Participate in BGS
- Meetings
 - "One-on-Ones" with Community members
 - Workshop format
- Techniques
 - Table top models for workshops
 - Videos of similar work elsewhere
 - Office hours
 - Newsletter
 - Sponsor a monthly breakfast
 - Work with planning resources

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For Example, the Background Study: Key Community Folks are Now Fully Cognizant of the BGS (Its Importance, Complexities, Areal Extent and Duration)



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