

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

**MEETING OF NOVEMBER 12-13, 2014
BARSTOW**

ITEM: 9

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

CHRONOLOGY: This chronology lists key 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.

July 17, 2013 Certification of final Environmental Impact Report
(EIR) for comprehensive cleanup of chromium in
groundwater.

Mar 12, 2014 Adoption of Board Order No. R6V-2014-0023,
Waste Discharge Requirements (WDRs) for
PG&E's Agricultural Treatment Units.

Aug 1, 2014 Notice of Applicability for coverage under Board
Order No. R6V-2014-0023 issued to PG&E for
new, expanded and existing ATUs.

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

Order of Speakers:

1. Lisa Dernbach, Lahontan Water Board
2. Kevin Sullivan, Pacific Gas & Electric Company
3. Ian Webster, Project Navigator, Hinkley Community Advisory
Committee's Independent Review Panel (Irp) Manager

The September 2014 Status of Actions sheet distributed to the
Hinkley Community Advisory Committee is enclosed (Enclosure 1)
describing Water Board activities in that month.

Water Board staff will also provide an update on the following topics:

- Chromium mass remediation
- Third Quarter 2014 chromium plume map summary
- Summary of future remedial actions
- USGS chromium background study contract status
- Next actions

PG&E staff will briefly provide the Board a status update on the replacement water program and remedial build-out.

The Community Advisory Committee Independent Review Panel (IRP) Manager will provide an update of:

- Outreach methods (IRP Manager's perspectives)
- Newsletter
- Community survey
- Former waste pit
- Community outreach

RECOMMENDATION:

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

ENCLOSURES:

ENCLOSURE	ITEM	BATES NUMBER
1	September 2014 Status of Actions Sheet	9-5
2	Water Board Staff Presentation	9-7
3	PG&E Presentation	9-25
4	CAC IRP Presentation	9-29

ENCLOSURE 1

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Lahontan Regional Water Quality Control Board

Status of Actions for PG&E Hinkley Chromium Contamination September 2014

Enforcement

- 1. Supplemental Environmental Project (SEP):** The ACL settlement adopted by the Board on March 14, 2012 allows PG&E to spend at least \$1.8 million to update the drinking water system at the Hinkley School. PG&E is conducting testing and shakedown of new equipment, supply wells, and pipelines during fall 2014. The project anticipated to be completed early 2015.
- 2. Cleanup and Abatement Order for Whole House Water (WHW) Supply:** Order R6V-2011-0005A2 directs PG&E to provide whole house replacement water to residences in the affected area. WHW systems are in operation at 31 residences. In late July, PG&E announced that it will cease operation of these systems and cease the bottled water program on October 31, 2014, where domestic wells currently meeting the new drinking water standard for hexavalent chromium of 10 ppb.
- 3. Cleanup and Abatement Order for Plume Definition:** Amended Order (R6V-2008-0002A4) issued on January 8, 2013 requires PG&E to delineate the extent of the chromium plume in groundwater and determine threats to domestic wells. The 2nd Quarter 2014 Groundwater Monitoring Report states that PG&E has not been able to conduct additional plume delineation due to inability to access private properties and desert tortoise habitat. In July, Water Board staff sent letters to residents in the northern area requesting their assistance in allowing PG&E to access their property for groundwater sampling. Without this public assistance, plume delineation actions will halt.

Investigative and Reporting Orders

- 1. Chromium Plume Boundary:** The 2nd quarter 2014 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 3rd quarter 2014 plume map is due at the end of October.
- 2. Chromium Detections in the West:** PG&E is continuing to extract groundwater from a well in the area west of the freshwater injection system and disposing of it to land at the former Heifer Ranch or used for dust control on PG&E projects. Extracted water exceeding 3.1 ppb Cr6 or 3.2 ppb CrT must be treated, such as with ion exchange, prior to disposal to land or used as dust control.
- 3. Chromium Plume Containment:** Pursuant to the amended March 2012 CAO, PG&E submitted the monthly Plume Capture Report by September 15, 2014 evaluating chromium capture south of Thompson Road. The report states that overall data indicates

the chromium plume capture was maintained at all monitoring points during the reporting period. This means that the main chromium plume associated with groundwater from beneath the Compressor Station is being contained from further migration at Thompson Road.

- 4. IRZ Well Replacement, Investigation, and Expansion:** To improve Cr6 conversion to Cr3 by IRZ treatment, PG&E submitted a document proposing to replace ten ethanol injection wells in the Source Area where treatment effectiveness has been reduced due to biological fouling of wells. Wells are proposed for installation at up to five locations to better evaluate chromium treatment effectiveness where information is lacking. Lastly, PG&E also proposes to add wells at three locations to improve treatment in other areas of the chromium plume between the compressor station and Highway 58. On Sept. 17, Water Board staff requested comments on a draft letter addressing PG&E's proposals and IRZ expansion area.

Comprehensive Cleanup

- 1. March 12, 2014:** New Waste Discharge Requirements for PG&E's Agricultural Treatment Units (ATUs) adopted at Water Board meeting in Barstow.
- 2. August 1, 2014:** The Water Board's Executive Officer issued a "Notice of Applicability" to PG&E. This means that all Report of Waste Discharge submittals from PG&E were deemed complete and PG&E may begin operating ATUs under the new Waste Discharge Requirements.
- 3. Summer 2014:** Baseline monitoring in water supply wells, construction of new ATUs. Planting and irrigation to begin at new ATUs in fall.
- 4. September 10, 2014:** Water Board meeting in Barstow discussing remediation timeframes based on PG&E's modeling. Timeframes will be included in an upcoming draft Cleanup and Abatement Order.
- 5. November 12, 2014:** Water Board meeting in Barstow to discuss plume containment and monitoring requirements for draft Cleanup and Abatement Order.
- 6. Winter 2014-15:** Water Board staff will develop a new draft Cleanup and Abatement Order that will set dates to achieve interim cleanup such as dates to achieve less than 50 ppb Cr6, and 10 ppb Cr6 as well as dates to complete construction of expanded remediation efforts. The Order will also include a revised monitoring program.

Status of Revised Chromium Background Study

Dr. Izbicki of the US Geological Survey is leading a revised background study. A new contract for the full 3 to 5 year study is anticipated to be in place by the end of 2014.

Hexavalent Chromium Drinking Water Standard

On July 1, the final drinking water standard of 10 ppb for hexavalent chromium became effective throughout California. The number refers to water used for drinking and consumption and does not apply to the Water Board's cleanup requirements for the groundwater aquifer below Hinkley.

ENCLOSURE 2

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AGENDA ITEM #9

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

November 12, 2014



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

Outline

1. Semiannual Remediation Status Report
 - Chromium mass remediated to date
2. Third quarter 2014 chromium plume summary
3. Summary of future remedial actions
4. USGS Chromium Background Study contract status
5. Next actions

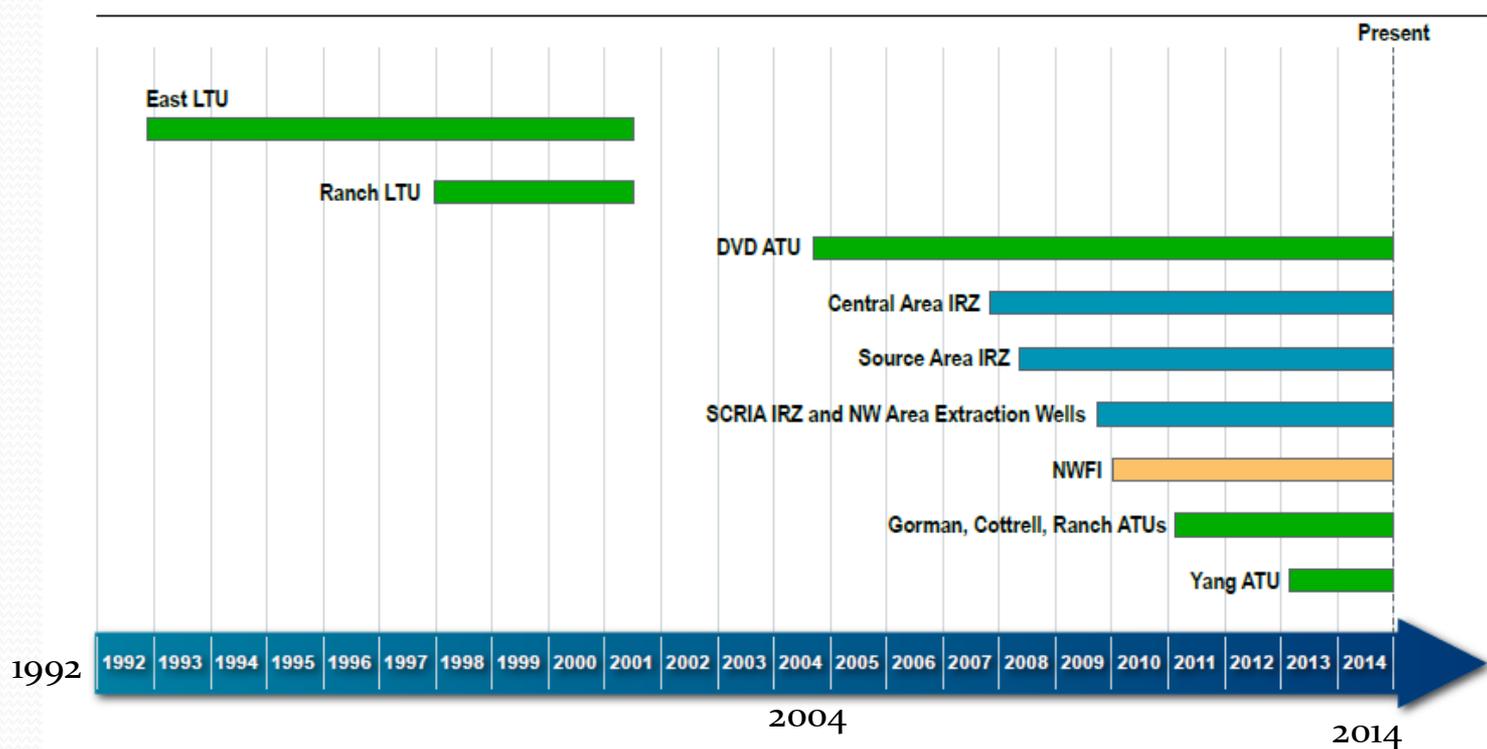


Cleanup and Abatement Order No. R6V-2008-0002

Requires submittal of semiannual status reports to remediate chromium:

- Describe remedial actions
- Report violations
- Discuss effectiveness of remedial actions
- Recommendations to increase effectiveness if not achieving expected Cr reductions





LEGEND

- Hydraulic containment (extraction) and agricultural remediation
- In situ remediation
- Hydraulic control (localized injection)

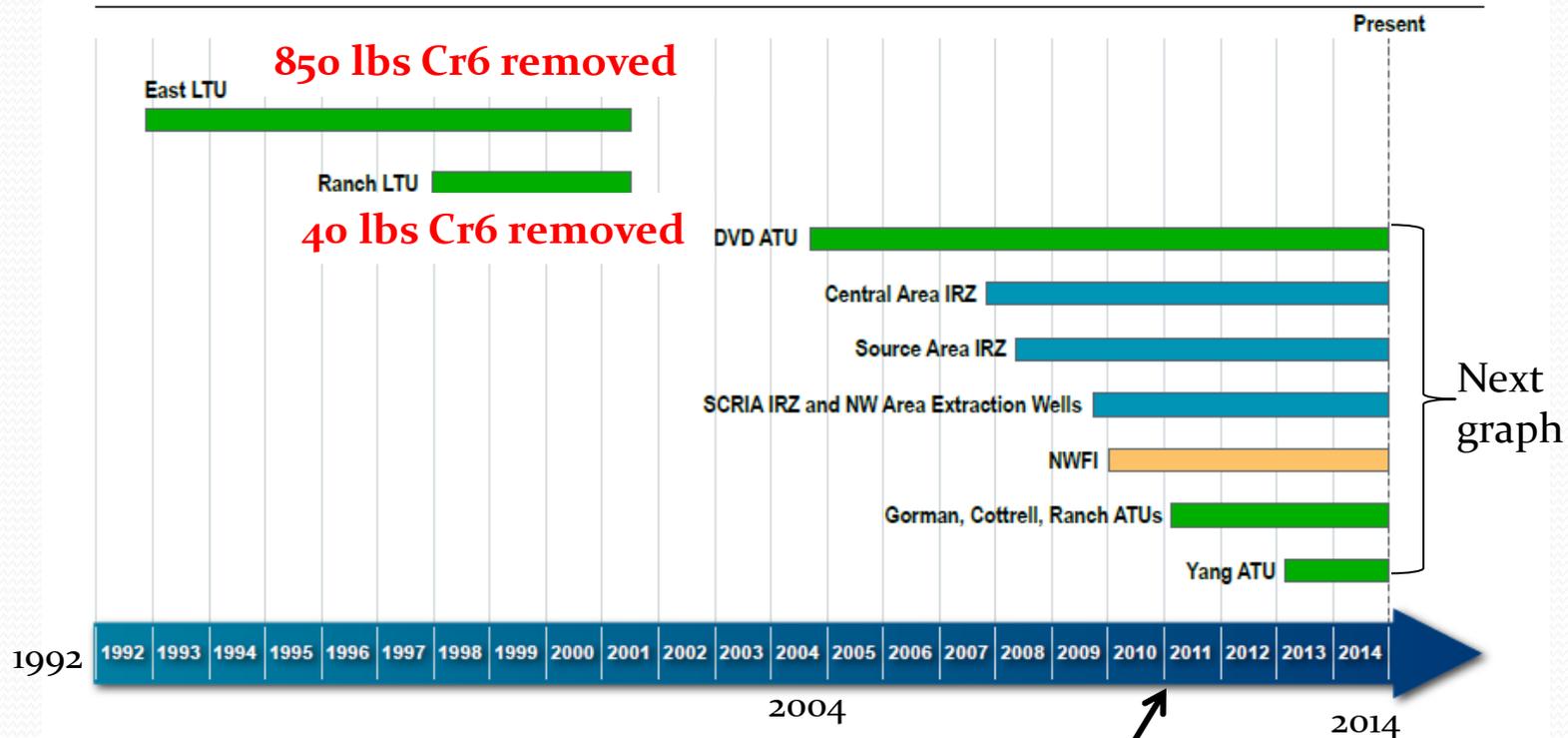
NOTES:

- ATUs = Agricultural Treatment Units
- IRZ = In Situ Reactive Zone
- LTUs = Land Treatment Units
- NWFI = Northwest Freshwater Injection System
- SCRIA = South Central Reinjection Area

**FIGURE 2-2
TIMELINE FOR KEY
REMEDIAL ACTIONS**
SEMIANNUAL REMEDIATION STATUS AND
FINAL CLEANUP EFFECTIVENESS REPORT
(JANUARY THROUGH JUNE 2014)
PACIFIC GAS AND ELECTRIC COMPANY
HINKLEY COMPRESSOR STATION
HINKLEY, CALIFORNIA

CH2MHILL.

Source: First Semiannual Remediation Status Report, 2014



- LEGEND**
- Hydraulic containment (extraction) and agricultural remediation
 - In situ remediation
 - Hydraulic control (localized injection)

NOTES:

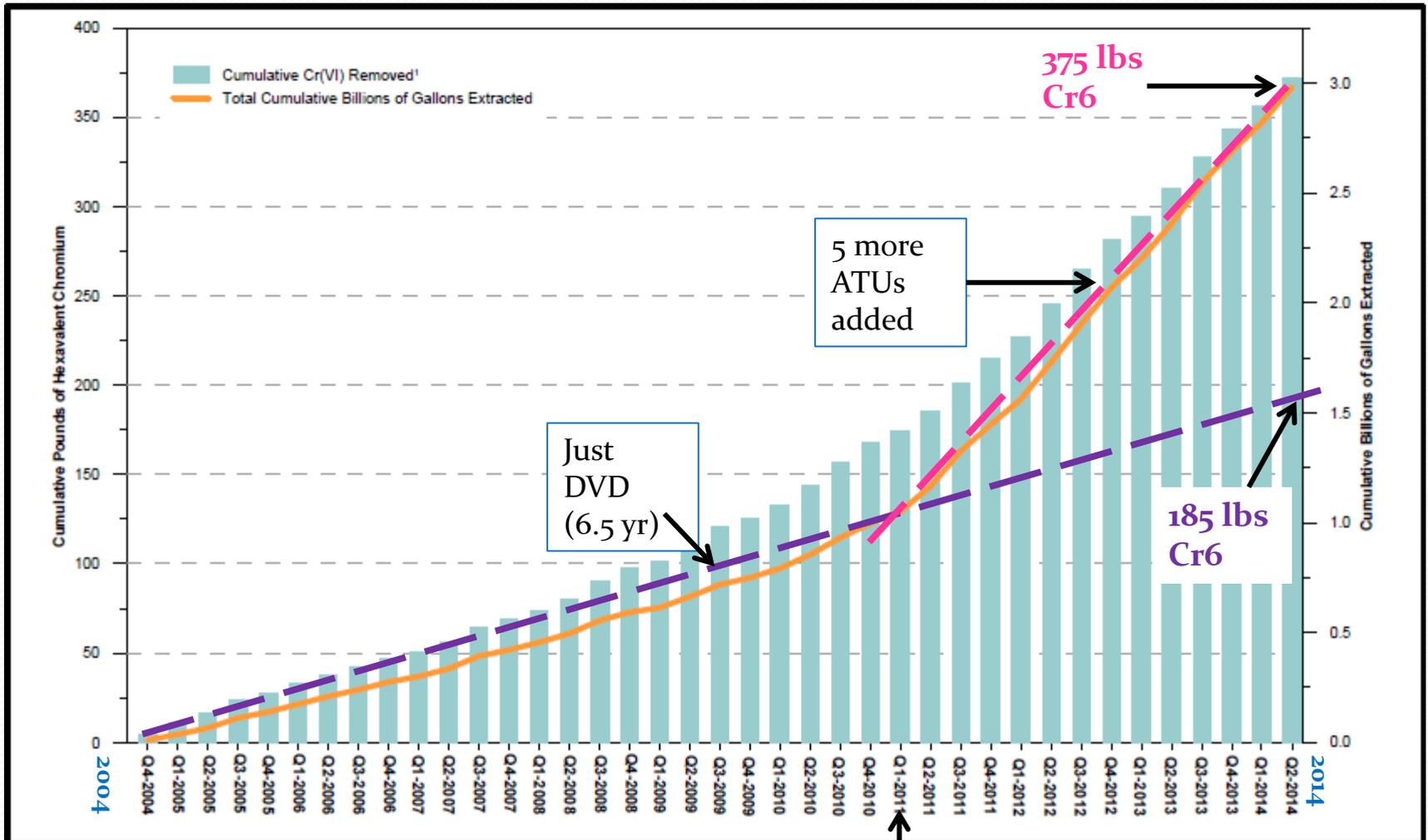
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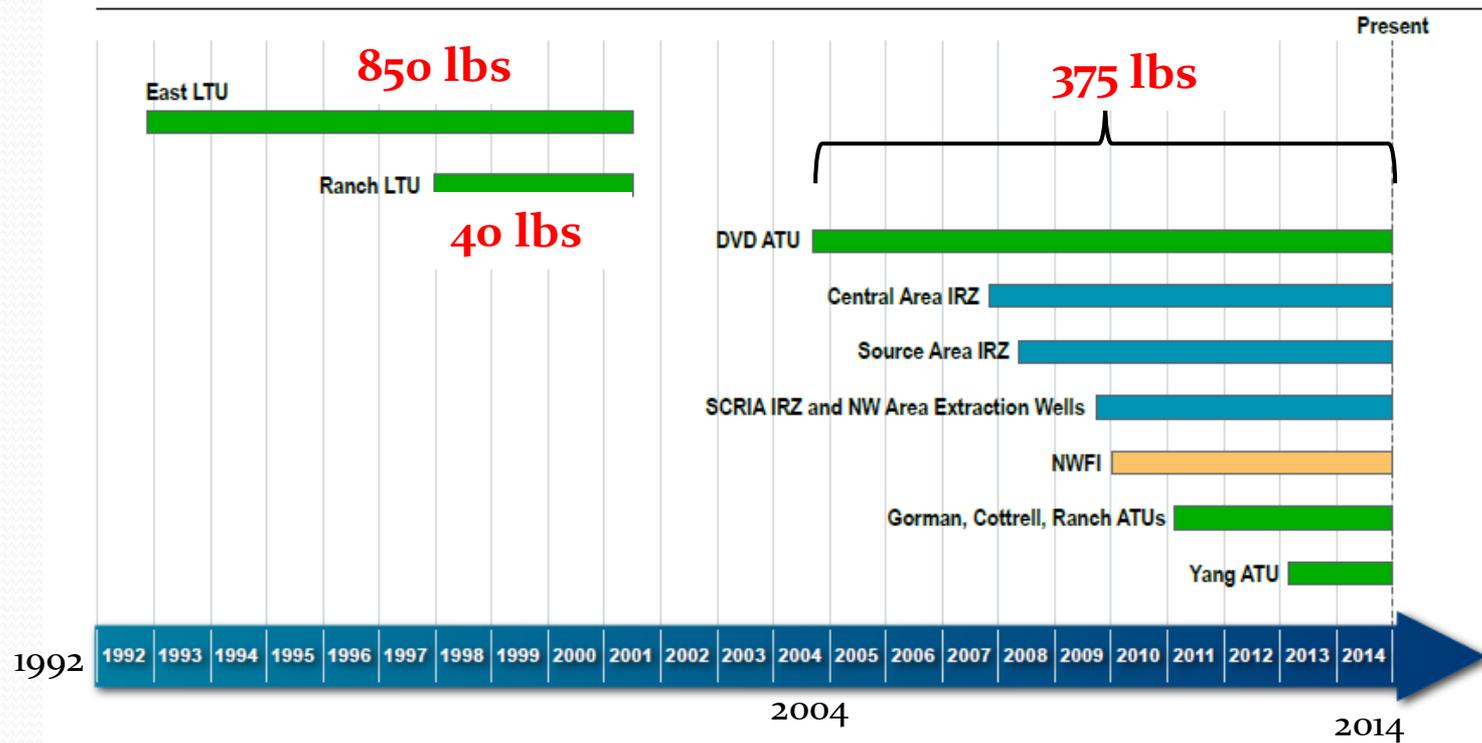
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CH2MHILL.

Source: First Semiannual Remediation Status Report, 2014

Cumulative Pounds of Cr6 Removed Versus Cumulative ATU Gallons Extracted, 2004 to 2014





LEGEND
█ Hydraulic containment (extraction) and agricultural remediation
█ In situ remediation
█ Hydraulic control (localized injection)

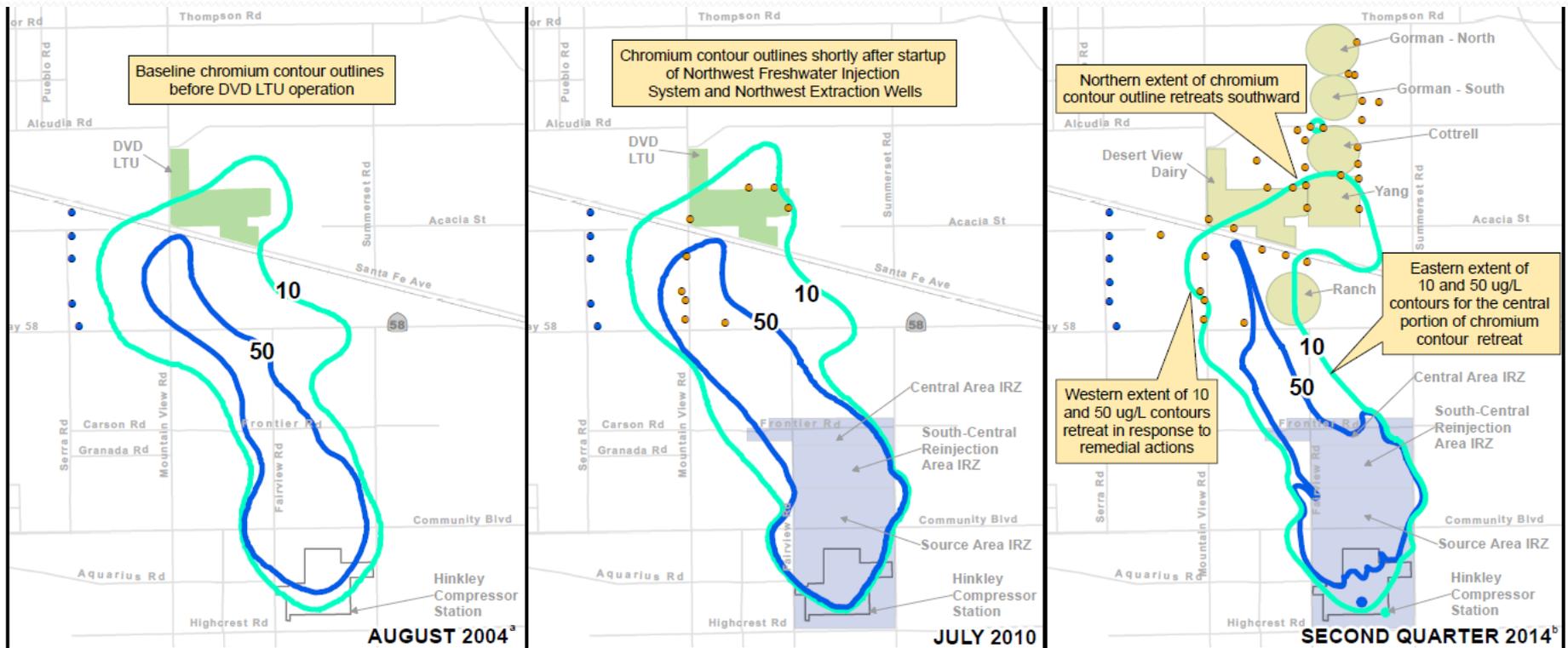
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 PACIFIC GAS AND ELECTRIC COMPANY
 HINKLEY COMPRESSOR STATION
 HINKLEY, CALIFORNIA

CH2MHILL.

Source: First Semiannual Remediation Status Report, 2014

Changes in Chromium Maximum Concentration Contours 2004 to 2014



How Much Chromium 6 Removed To Date From ATUs?

Field	Cr 6 removal (lbs)	Cr 6 removed per yr (lbs)
East	850*	85
Ranch	40*	13
DVD	185	29
5 added ATUs	190	62 (12 per ATU)

Total = 1,265 lbs

*2013 Final EIR

Comparison with Total Mass of Chromium 6 Released

Total Cr6 mass* released in waste water:	4,700 lbs
Cr6 mass removed by ag fields:	1,265 lbs (27%)
<hr/>	
Difference (Cr6 remaining in environment):	3,435 lbs (73%)

*2010 PG&E Feasibility Study



(To be inserted after Oct. 31)

Chromium Plume Extent for 3rd Quarter 2014

Chromium Plume Summary

3rd Quarter 2014

(To be inserted after Oct. 31)

PG&E Planned Remedial Actions 2014 to 2015

Complete and operate ATUs (dark green):

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

IRZ Improvements (yellow triangles):

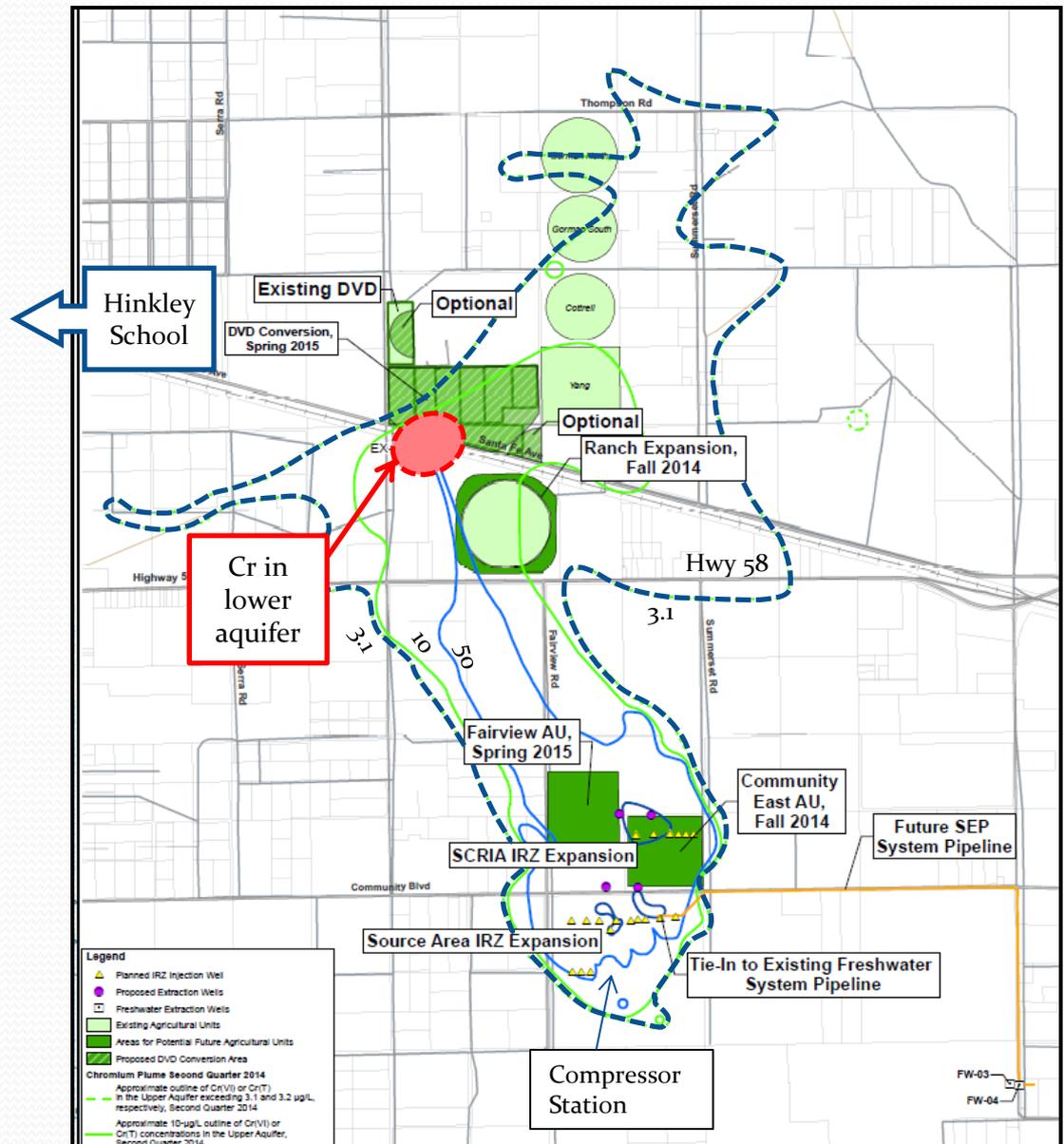
1. Install new ethanol injection wells
2. Source Area expansion

Lower aquifer (red):

1. Install new extraction well

SEP:

1. Finish upgrade and test school water system improvements
2. Hand over to Barstow USD



USGS Chromium Background Study

Contract Status

- Contract request package submitted to State Board in late March 2014
- USGS reviewed and signed (October 16) --now at Department of General Services for review and signatures



Next Actions



Background Study

- Contract moving through “signatures phase” as of fall 2014

Cleanup and Abatement Order

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

General Waste Discharge Requirements

- Plan to update and combine all IRZ actions under one NOA in 2015

Questions?



ENCLOSURE 3

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PG&E Update – November 2014

- ATU Construction
- IRZ Investigation and Construction
- SEP Construction
- WHW Transition

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ENCLOSURE 4

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IRP Manager's Perspectives on the Future of the Project

The Groundwater Remedy's "Omnipresence" within the Hinkley Community

November 12, 2014
Barstow, California

Prepared for

Lahontan Regional Water Quality Control Board
Board Members' Meeting

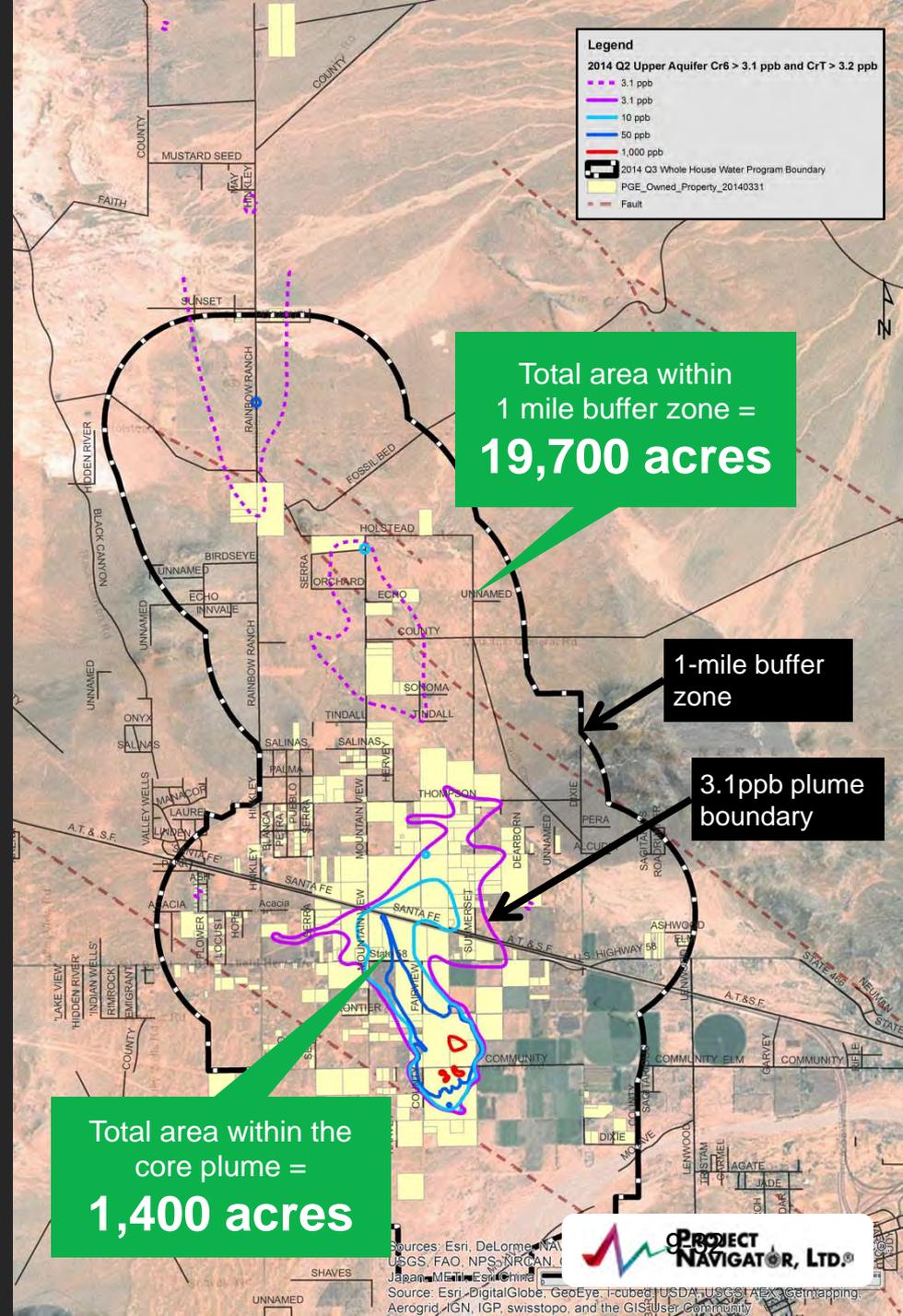
Prepared by

Dr. Ian A. Webster, as IRP Manager
Project Navigator, Ltd.
iwebster@projectnavigator.com

“Omnipresence”

Present in all places
at all times.

- Merriam-Webster Dictionary, 2014



The Flow of My Remarks

■ Technical Outreach Has Been Significant

- Now driving towards a final, integrated CAO

■ It's Challenging to Maintain a Focus on the Final Objective

- i.e. Cr6 impacts, protectively remediated to background conditions

■ “Above Ground Topics” Now Dominate over “Below Ground Topics”

- The Results of an Informal Poll on the Community's Focus

■ Can a Sustainable Remedy be the End Result?

Massive Improved Community Understanding of the Program's "Building Blocks" ...



From June 27, 2013
Community Meeting

...to the Extent that, on Technical Issues, Few Stones Remain Unturned.

Implement
Final Solution

Planning and Final
Remedy Selection

Assessment and Interim
Treatment



Today's Technical Focus is on Cleanup Speed, Effectiveness and Protectiveness of the Final Remedy.

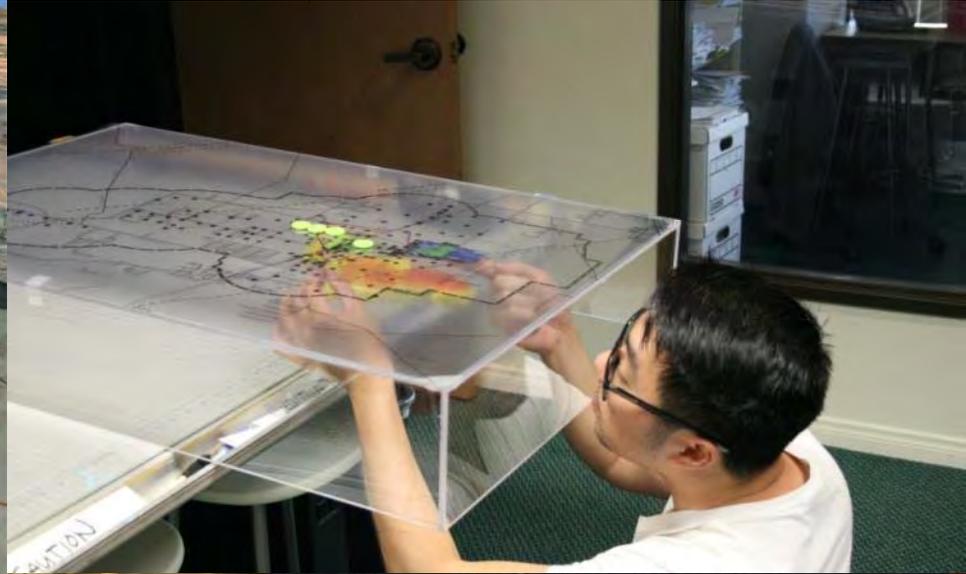
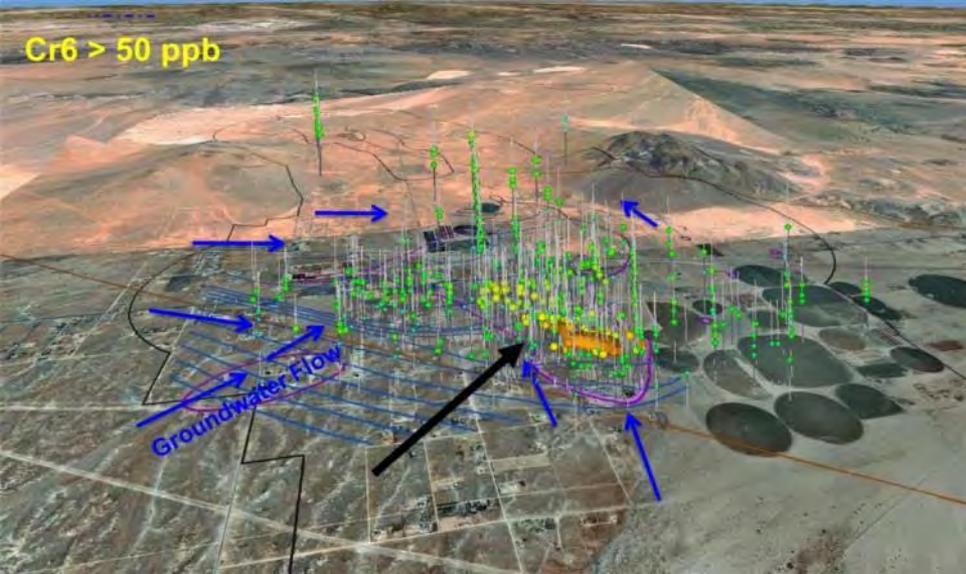


PG&E's Kevin Sullivan explains the future of the cleanup at September 2014 Water Board Meeting

Soon After, 50 Community Members Attended the September Community Meeting, Where...



...Continuing with the IRP Manager's Outreach Plan, Models and Visuals Were Used to Aid Communications...



...However, Maintaining a Technical Focus is Continually Challenging.

Final Remedy

Plume's Western Finger

Perceptions of Impacts Which are Clearly Upgradient

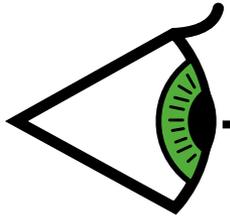
Perceptions of "Black Water" Releases from the IRZ

Western Waste Pit



For Example, Significant Resources (CAC, WB, PG&E & IRP) Discussed the “Former Western Waste Pit” at the IRP Manager’s Office in September.

But What I've Come to Appreciate is that the Community Views "Grand Progress" Differently.



What the Hinkley Community Sees



Declining population

Homes being demolished

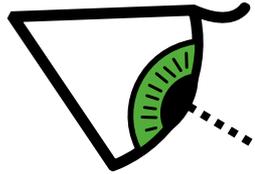
School closing

Dying trees/
Fire hazards

Vacant lots/
Dust

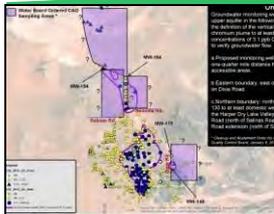
Stray dogs

Ground Surface



What the Water Board, PG&E, and the IRP Manager Sees

"Progress/Success" in plume management is not perceived as "progress" at ground surface



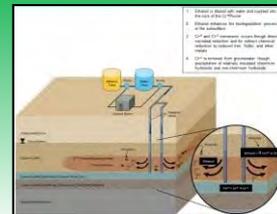
Plume Investigation



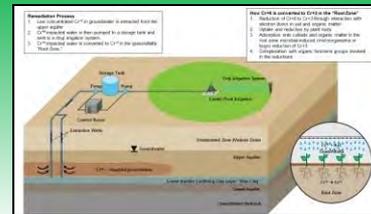
Hydraulic Gradient Controls



Background Study



IRZ Operations



Ag Treatment Operations



SEP Program

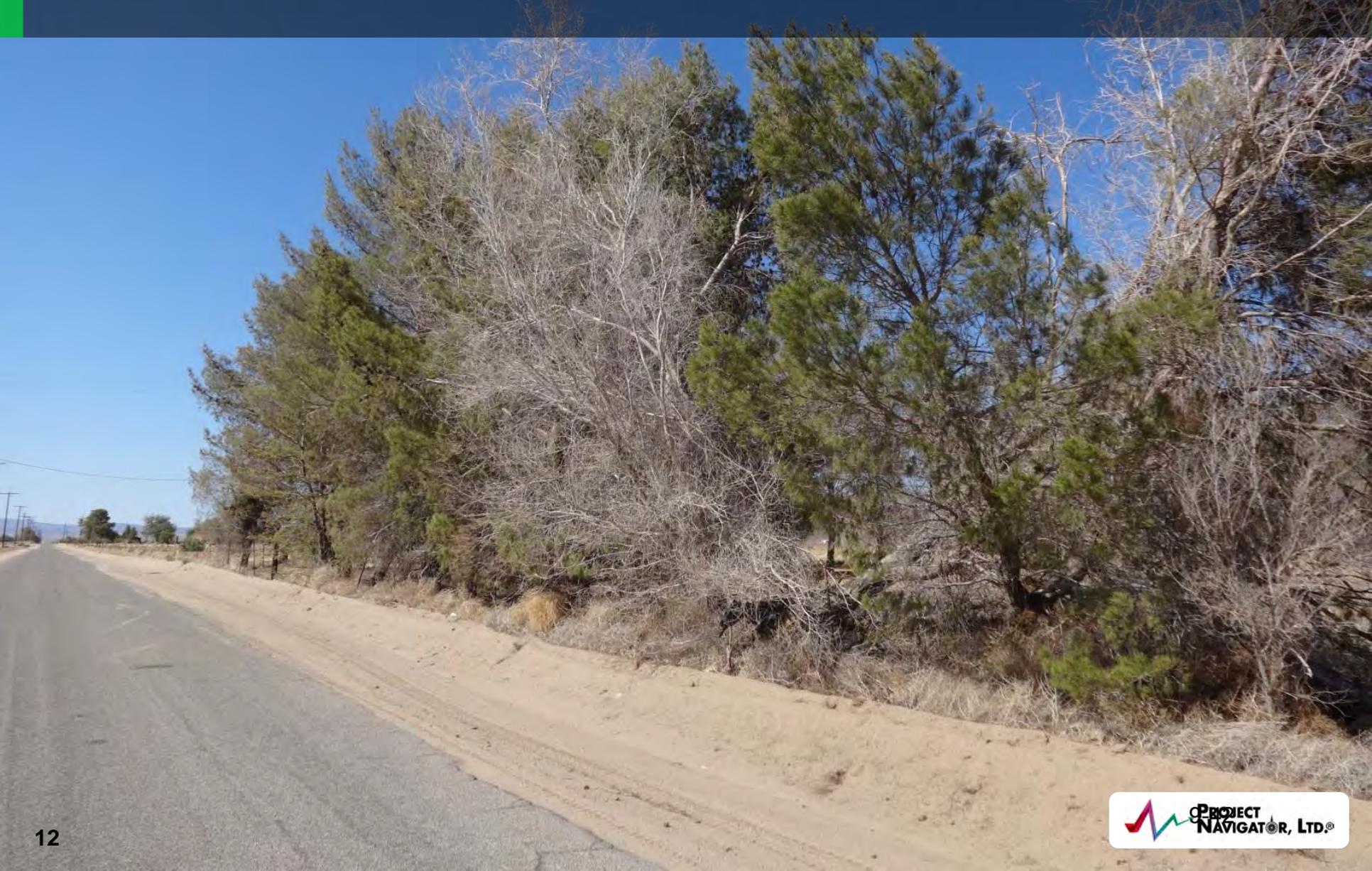
Groundwater

(*) New PG&E modeling forecasts predict time frames to attain MCL, plume-wide.
1st DRAFT, 7/3/14, IRP Manager

✓ Cr6 → Cr3 (*)



For Example, Some Community Stakeholders Prefer to Invest Their Time (and Passion) in Watering Trees on PG&E Owned Property.



To Assess, We Conducted a Poll to Rank “Above Ground” Vs “Below Ground” Topics...First, at a Community Meeting...



...and Later with a Different Group of Residents at the Hinkley Senior & Community Center.

					Property Purchase	Other
		(vacant lots, blowing sand, trees, dogs, etc.)	Wells	Household		Please write issue on post-it
Prime Definition And Containment	IRZ (Treatment of Cr 6 hotspots in place in groundwater)	Agricultural Treatment Units	SEP (Freshwater pipeline to school)	USGS Background Study	Waste Pit (impact on groundwater)	Other
						Please write issue on post-it

Each resident receives 3 post-it notes to "vote" on MOST IMPORTANT issues to that person. Residents can vote on one issue or divide up as individual sees fit. Write name on post-it.

Result: Above Ground Topics are Most Important to the Hinkley Community.

Survey at Community Meeting

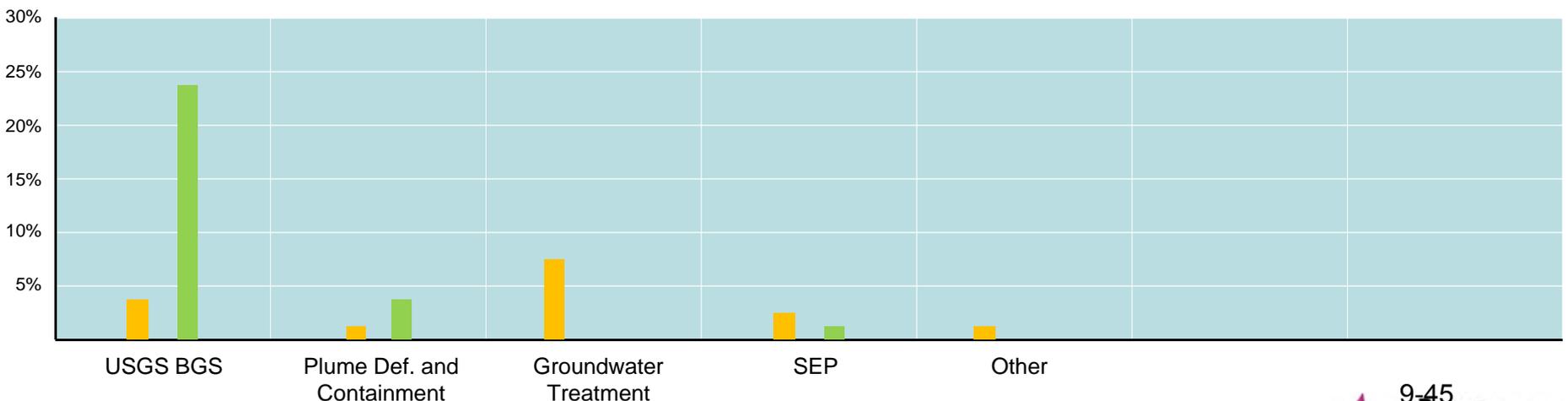
Survey at Senior Center

Note: Results from Senior Center were after rescindment of WHW/bottled water.

Above Ground Issues



Below Ground Issues



Recognize that PG&E's Remedy, Pursuant to Water Board Orders, Will Alter the Above-Ground Landscape...

(Addition of up to 500 Acres of "Green" ATUs within the Current 1,400 Acres of Core Plume)



Native PG&E Acreage



PG&E Operated and Maintained ATU Acreage

...So, Is There an Opportunity to Adjust Our Thinking to Frame the Concept of a “Sustainable Remedy” Which Will Exist for Decades in the Hinkley Community to the Benefit of all Stakeholders?

Per EPA, a Sustainable Remedy is:

“The practice of considering all environmental effects of remedy implementation and incorporating options to minimize the environmental footprints of cleanup actions.”

Reference: USEPA, 2010. Superfund Green Remediation Strategy. September.

Many Sustainable Remedy Factors Are Presently “In Operation,” ...But Could The Topic be Integrated Under a Master Plan?

TABLE 3-3 Sustainable Remedy Selection Factors

Environmental	Social	Economic
<ol style="list-style-type: none"> 1. Impacts on air (including climate change) 2. Impacts on soil and ground condition 3. Impacts on groundwater and surface water 4. Impacts on ecology 5. Use of natural resources and waste 	<ol style="list-style-type: none"> 1. Impacts on human health and safety 2. Ethics and equality 3. Impacts on neighborhood and locality 4. Communities and community involvement 5. Uncertainty and evidence 	<ol style="list-style-type: none"> 1. Direct economic costs and benefits 2. Indirect economic costs and benefits 3. Employment and employment capital 4. Induced economic costs and benefits 5. Project lifespan and flexibility

Reference: USEPA, 2010. Superfund Green Remediation Strategy. September.

Conclusion: Can a “Common Ground” be Defined Regarding a Sustainable Remedy?

■ For PG&E

- Requires the company’s continued work in the project space, beyond pure compliance
- Willingness to continue to participate in discussions on the 2 right-hand columns in the prior slide

■ For Water Board

- Review of WB’s authority to add components of 2 right-hand columns into final CAO

■ For Community

- Willingness to adopt a “show me results and recognize them” attitude which can drive improved “Trust & Collaboration”