

## Item 3

Statistical Analysis of Background  
Chromium Groundwater Subset Data from  
PG&E's  
2007 Groundwater Chromium  
Background Study Report

*Hinkley Groundwater Cleanup Project*



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## Existing Background Chromium Values

- Average and maximum values for total and hexavalent chromium:
  - ✓ Total chromium  
average/max = 1.5/3.2  
parts per billion
  - ✓ Hexavalent chromium  
average/max = 1.2/3.1  
ppb
- Adopted in November 2008  
CAO based on data in PG&E's  
2007 Background Study Report



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## The Water Board uses background values to...

- Define groundwater chromium plume boundary, assess remediation progress
- Determine cleanup levels for groundwater
- Evaluate cleanup alternatives for Environmental Impact Report
- Define “affected area” requiring replacement water per Water Code section 13304 (CAO R6V-2011-005, as amended)

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## Recent History

March 2011: Water Board requested peer review of PG&E’s 2007 Background Study in response to public concerns on validity of study

October 2011: Peer review comments critical of:

- 1) Quality of laboratory sample analysis procedures
- 2) Type of wells used for majority of Background Study sampling
- 3) Statistical methods used to summarize groundwater sample results
- 4) Uncertainty in determining past chromium plume migration

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## Recent History

### February 2012:

- PG&E releases new background study plan responding to peer review
- 25 Hinkley residents request re-calculation of background values using subsets of data from 2007 Background Study (Appendix 1 of Enclosure 1, p. 3-17)

### March 2012:

- At meeting, Water Board directs staff to -
  - ✓ Re-calculate background using subset data
  - ✓ Work with Community Advisory Committee, other experts to review PG&E's new background study

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## Why re-calculate using subsets?

- Potential to address three main peer review comments:
  - ✓ Questionable lab quality control data
  - ✓ Wrong type of wells used for sampling
  - ✓ Questionable statistical assumptions
- Address public concern over potential bias (wells added after 2<sup>nd</sup> quarter sampling event for 2007 Background Study Report)

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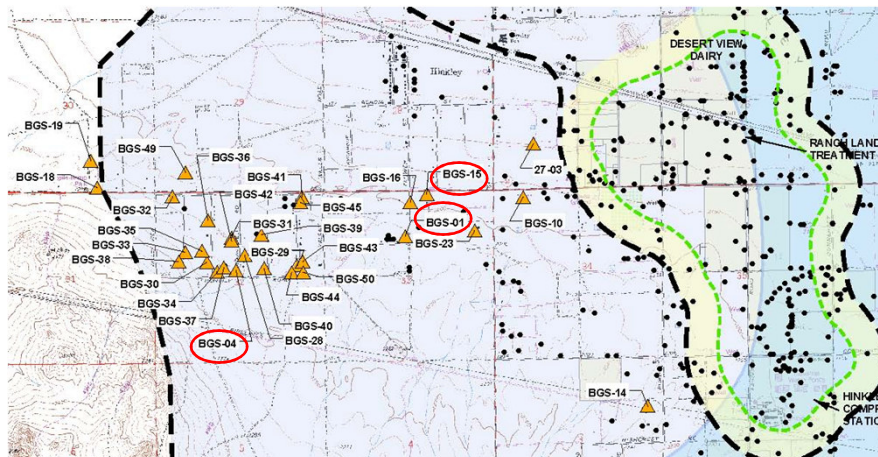



## Subsets from 2007 Background Study Report

- First, removed all sampling results with questionable lab quality control
- Next, develop dataset #1 (data from wells screened only in upper aquifer)
- Then, develop dataset #2 (data from wells *not* added after 2<sup>nd</sup> quarter sampling event)
- Finally, request Dr. Neil Willits of UCD Stats Lab to evaluate datasets, and re-calculate background values

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## Dataset #1 Wells – Upper Aquifer Only



 Upper Aquifer wells

01-06 is southeast and upgradient of plume →

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## Results

- Dr. Willits used “upper prediction limit” instead of “upper tolerance limit” used by PG&E (better approach for the data)
- 95% upper prediction limit (maximum background estimate)

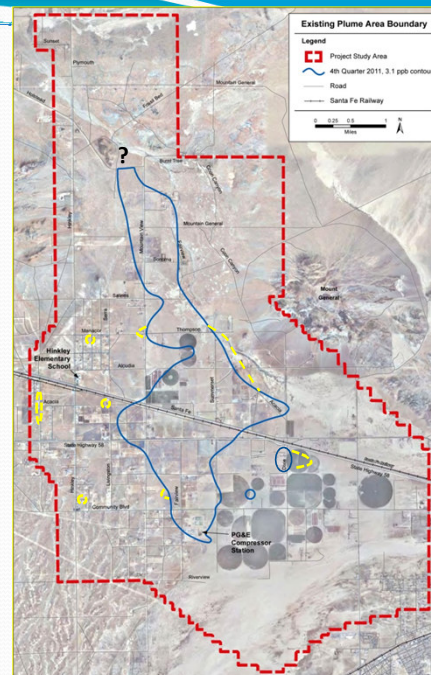
Total chromium: 2.7 parts per billion

Hexavalent chromium: 2.5 parts per billion

- Less than current adopted values of CrT 3.2/Cr6 3.1 ppb, so plume drawn on maps would change

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- Red dashed area is EIR study area, blue line is 4<sup>th</sup> quarter 2011 plume (3.2/3.1 line)
- “Cartoon” of potential plume changes (yellow dashed lines)
- 13 additional monitoring or domestic wells in west; 5 in east would be over maximum background estimates of 2.7 CrT/2.5 Cr6



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## Staff Proposal

*Retain existing background values for now*

### Why?

- Subset values still represent “mixed aquifer” waters  
Data subset of upper aquifer only wells too small to use
- Review PG&E’s proposal for new study  
Best chance to address all peer review concerns
- Expanded Whole-house Replacement Water CAO  
All homes in affected area with *detectable Cr* get water  
Maximum background not the trigger  
Alleviates water use concerns for many residents

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## Moving forward

- Re-calculated values could be considered in future if 2012 background study review doesn’t resolve main challenge:
  - Historic plume migration uncertainty and sampling locations to represent background conditions
- Could be that uncertainty around this remains high; if so, need to carefully consider value of new study

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## Next Steps

- Carry out staff proposal, or modify based on Water Board direction
- Prepare for release of draft EIR in July 2012, including tentative site-wide General WDRs
- Provide status report on background study review progress to Water Board in September 2012

