

Peer Review of PG&E's 2007 Groundwater Chromium Background Study Report

Hinkley Groundwater Cleanup Project



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What is the Background Study?

Groundwater sampling conducted by PG&E in 2006 to determine range of naturally occurring (or “background”) levels of chromium in Hinkley Valley groundwater.

What is Peer Review?

An scientific review of the Background Study Report by independent experts.

Chromium Background Study History

2002-2004: Background study sampling design developed by PG&E; peer reviewed through State Water Board contract with University of CA

2006: PG&E conducts groundwater sampling to determine background chromium concentrations in Hinkley Valley

2007: PG&E's Background Study Report submitted to Water Board staff

2008: Water Board adopts average and maximum values for background total and hexavalent chromium, based on PG&E's 2007 Background Study Report

Chromium Background Study History

2010: Plume migration, background study sampling issues raise concerns about validity of background chromium values

March 2011: Water Board members request scientific peer review of 2007 Background Study

October 2011: Peer review comments are submitted to Water Board staff

Peer Reviewers

- University of California engineering professor
 - ✓ Statistics, modeling, and hydrology expertise
- College of New Jersey chemistry professor
 - ✓ Analytical chemistry background
- Consulting Hydrogeologist
 - ✓ Chromium remediation and modeling expertise

Peer Review Summary

Main Issues:

- 1) Laboratory analysis procedures
- 2) Historic plume migration
- 3) Statistical assumptions and methods used
- 4) Type of wells used for sampling

Peer Review Summary

- 1) Chemistry lab procedures used for groundwater sample analysis did not follow certain requirements.
 - Could effect quality of data and results.
 - ✓ Water Board staff working with CA Department of Public Health and Water Board's contract lab on significance of issues, and effects on results.
 - ✓ PG&E labs in question asked to respond to criticism.

Peer Review Summary

2) Uncertainty about past groundwater flow patterns:

- Extensive agricultural history (pumping/irrigation), and length of time since chromium discharge makes understanding past plume migration difficult.
- Determining, with certainty, sampling locations not affected by historic chromium discharges is difficult.

Peer Review Summary

3) Statistical methods used for sample data analysis questionable:

- Assumptions and analysis need closer look.
- Clustered sample locations need to be accounted for.

Peer Review Summary

4) Types of wells used for groundwater sampling:

- Many wells sampled in study were supply wells, not monitoring wells.
- Sampled both upper and lower aquifers, which could affect results and conclusions.
- Need wells constructed to sample specific depths of groundwater.

Peer Review Summary

Other Questions from Reviewers:

- More information needed on groundwater flow modeling
- Land treatment of chromium (agricultural unit approach) needs proof of effectiveness

These issues can be addressed with information PG&E has provided in other reports.

Next Steps

- Review input from CA Department Public Health, contract lab on significance of lab issues (by late December)
- Water Board staff develop recommendations to address peer review comments in early 2012
- Bring to Water Board for consideration and direction at March Board meeting