A proposal to study the occurrence of natural and anthropogenic (man-made) Cr VI near a mapped plume, Hinkley, CA

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Prepared under contract with the
Lahontan Regional Water Quality Control Board
in cooperation with the Hinkley Technical Working Group (TWG):

Hinkley Citizens Advisory Committee (CAC)

Project Navigator, Ltd.

Lahontan Regional Water Quality Control Board

Pacific Gas and Electric Company and affiliated consultants
(CH2M-Hill, Stantec, and ARCADIS)

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Scope of proposal

- Evaluation of existing data
- Sample collection and analyses of rock and alluvium
- Sample collection and analyses of water (chemistry and isotopic tracer data)
- Evaluation of local conditions
- Evaluation of groundwater movement
- Evaluation of occurrence of natural and anthropogenic chromium
- Estimation of background Cr VI concentrations
- Fate of chromium within the IRZ

Mapped extent of Cr VI (> 3.1 µg/L), 1st quarter 2013

0 5 Miles

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Update of Study

http://ca.water.usgs.gov/projects/hinkley/

- Anticipate the beginning of sample collection in mid-August
- Result of work by members of the community, the Lahontan Regional Water Quality Control Board (LRWQCB), PG&E and their consultants
- Funding for the entire study (about $5.5 M) is in an escrow account held by the LRWQCB. Contract for the study will be between the U.S. Geological Survey and the LRWQCB. Input for the study provided through the Technical Working Group (TWG).

Mapped extent of Cr VI (> 3.1 µg/L), 1st quarter 2013

0 5 Miles

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Sample collection

- 90 Samples of water from wells allocated for the study. 40 samples to be collected in 2014, 30 samples in 2015, and 20 samples in 2016.
- The first round of sample collection will inform the second round. The first and second rounds will inform the third rounds
- Some analytics will require almost 10 months to complete

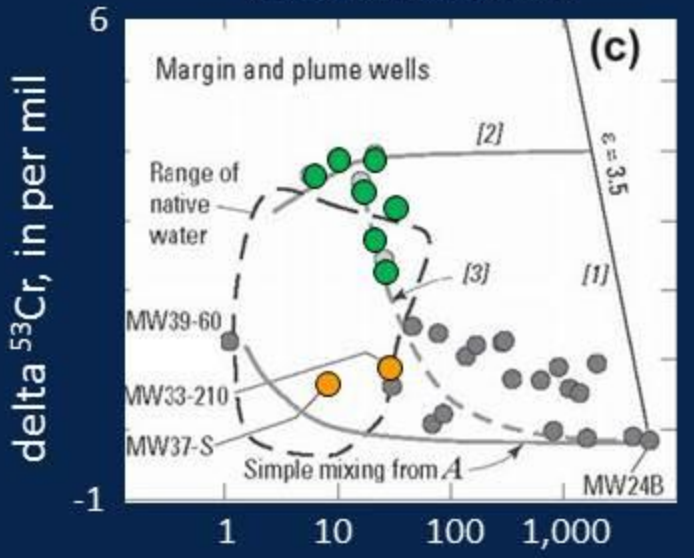
Mapped extent of Cr VI (> 3.1 µg/L), 1st quarter 2013

0 5 Miles

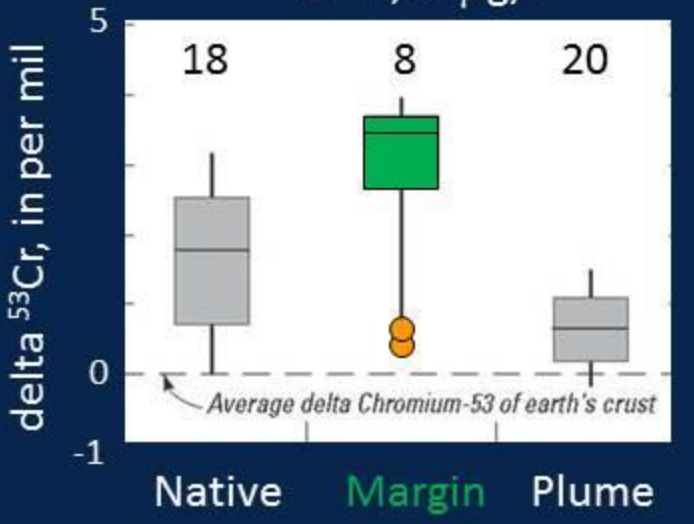
Chemical and isotopic tracers of water and chromium

- Major-ions, selected minor-ions, and selected trace elements (including arsenic, uranium, manganese)
- delta Oxygen-18 and delta Deuterium
- Dissolved atmospheric gasses (N and Ar)
- Tracers of the age (time since recharge) of water
  - Tritium
  - Tritium / Helium-3
  - Industrial gasses (CFC's and SF_6)
  - Carbon-14
- Tracers of rock-water interactions ($^{87/86}Sr$)
- Chromium isotopes

Topock, CA
(Izbicki and others, 2012)



Cr VI, in µg/L



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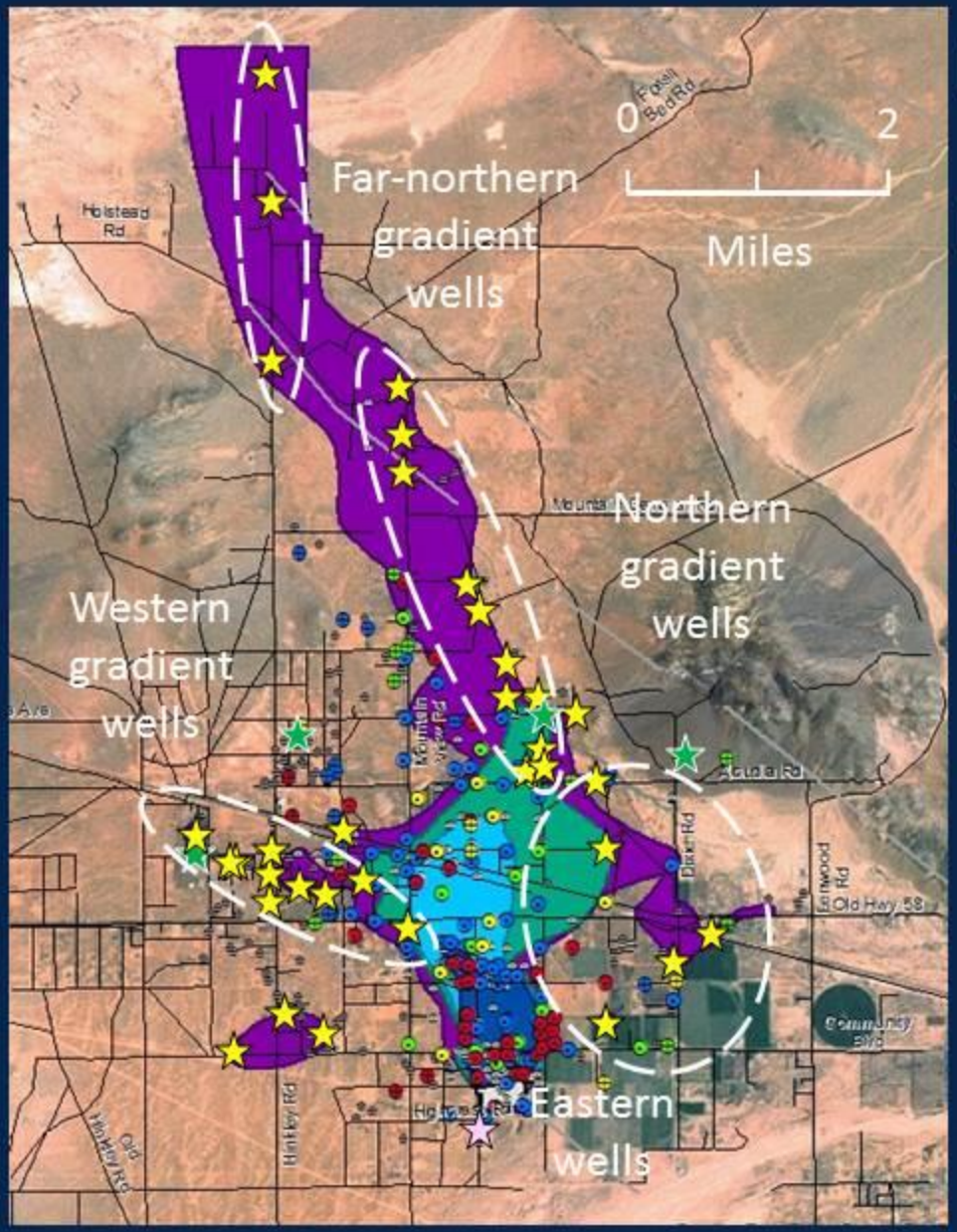
Candidate wells: summer 2014



- Extent of 3.1 Cr VI mapped area between 2008-2013
- PG&E professional judgment of plume extent 4th Q, 2013
- > 50 micrograms per liter
- > 100 micrograms per liter

- Monitoring wells
- Domestic wells

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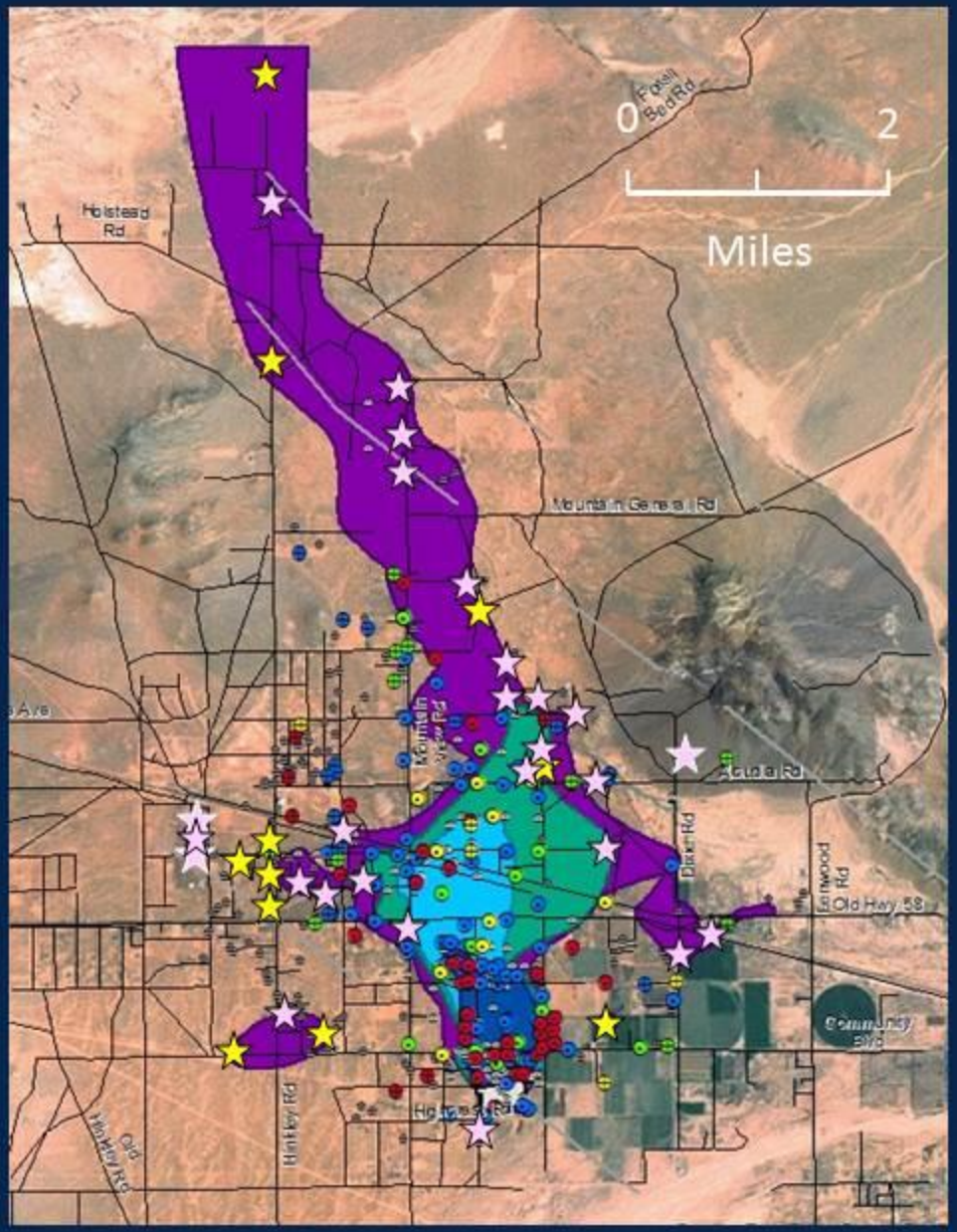
Candidate wells: summer 2014



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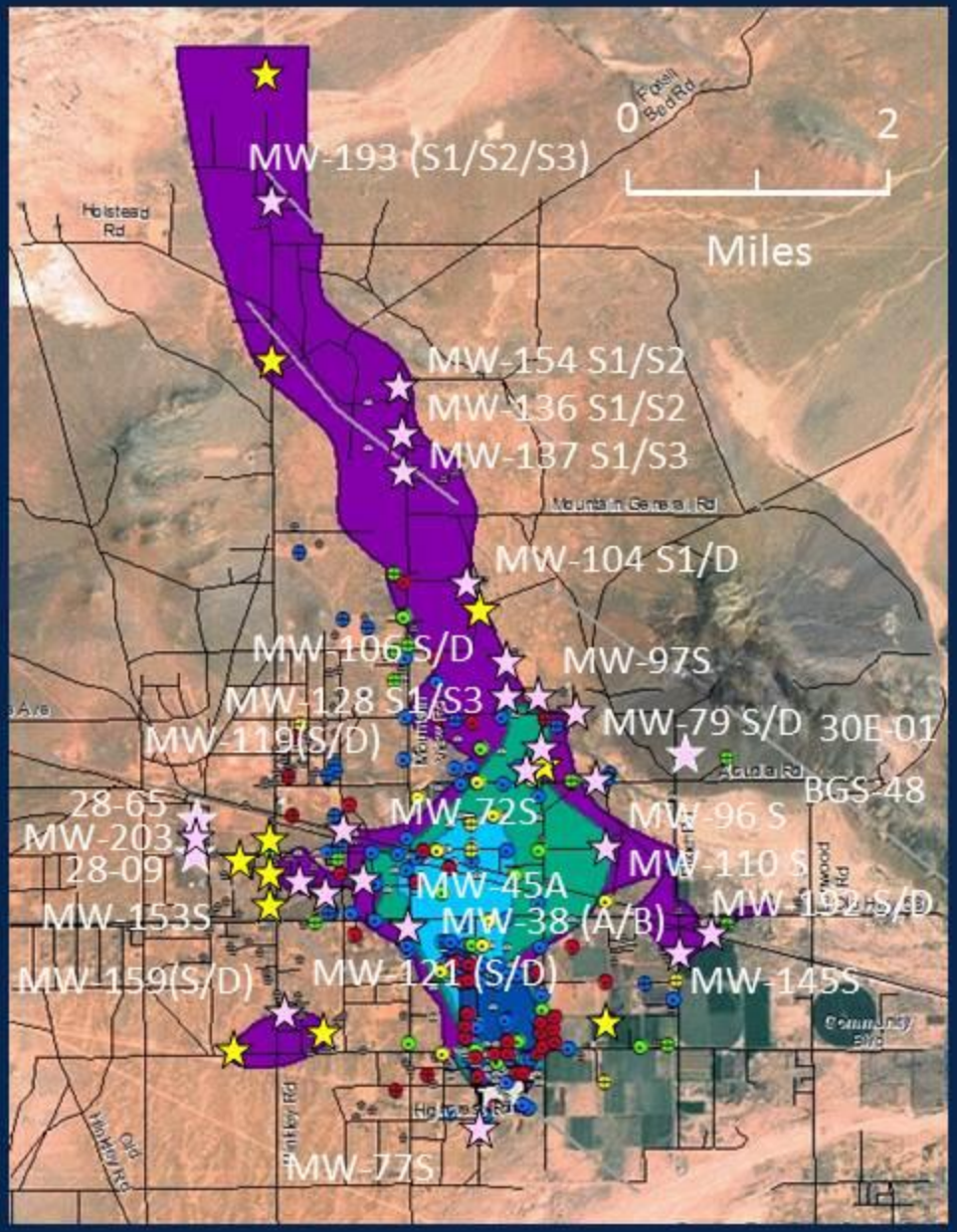

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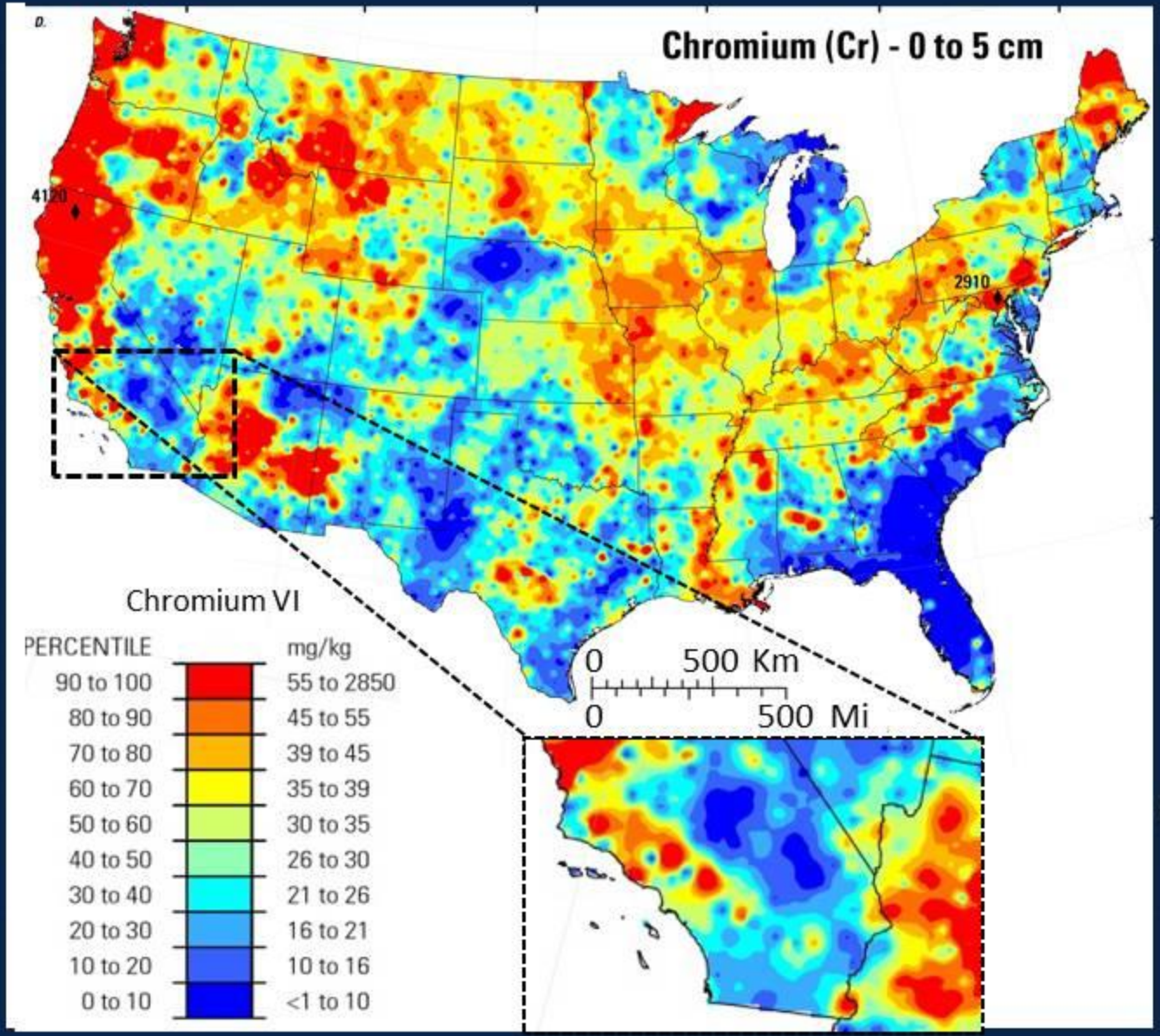
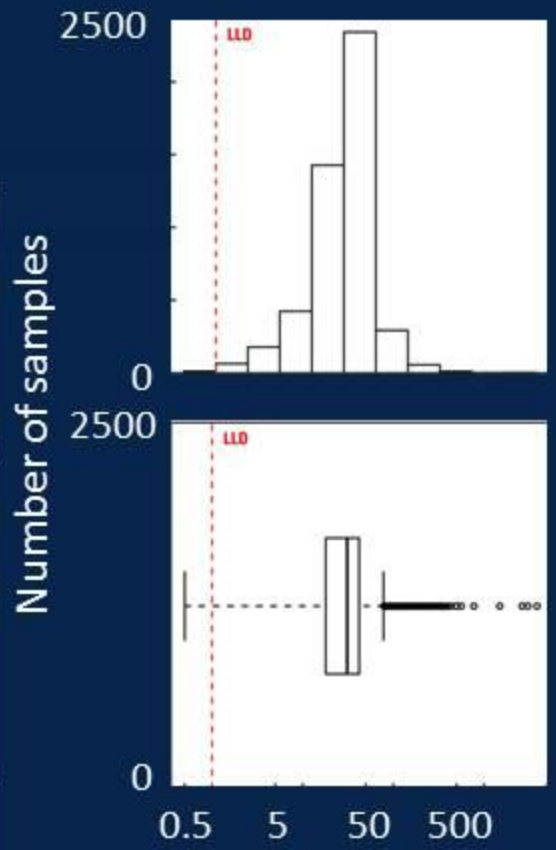
USGS Open-File Report 2014-1082

http://pubs.usgs.gov/of/2014/1082/pdf/ofr2014-1082.pdf





Low-resolution data
(1,600 square mile sample grid,
40 mile by 40 mile resolution)

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