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RE: IRP Manager's Notes on the Background Study (BGS) Technical Exchange Meeting (TEM) in Hinkley, CA on April 17, 2014

Key Words
Cr VI Background Study, groundwater, anthropogenic, TWG, Hinkley

On April 17, 2014 the USGS, PG&E, Water Board, CAC and the IRP Manager participated in a Technical Exchange Meeting (TEM) in Hinkley to review and discuss USGS's contract, Task 1, Task 2, Task 4, Task 5 and Task 8. Participants to the BGS TEM were:

John Izbicki, USGS	Lisa Dernbach, Water Board
Iain Baker, PG&E	Dennis Maslonkowski, CH2MHill
Chris Maxwell, Stantec	Raudel Sanchez, Project Navigator, Ltd.
Betty Hernandez, CAC	Rajeev Sane, Project Navigator, Ltd.
Daron Banks, CAC	Halil Kavak, Project Navigator, Ltd.

BGS Contract Update

Water Board approved the additional $100K for work for BGS. Final BGS contract is expected to be completed between the Water Board and USGS by June/July 2014.

Task 1: Analysis of Existing PG&E Data

- **Cr VI trend data**
  USGS has reviewed PG&E's Cr VI domestic and monitoring data and concluded that the Cr VI data, specifically from 2011 through 2013 is "good quality data" with no apparent limitations for estimation of trends Cr VI trend analysis was performed for both domestic and monitoring wells with the intent of guiding the well selection processes for wells to be sampled this summer.. Data from 2011 to 2013 was used to conduct the trend analysis. The trend analysis produced two statistics: Kendall Tau's showing the direction of trend (increasing Cr VI trend, decreasing Cr VI trend, or no trend), and an associated significance probability (p values less than 0.1 and 0.05 were discussed and considered significant for the purposes of well selection). . The method considers outliers but does not weight them significantly. The software used to conduct the trend analysis was SAS (Statistical Analyses System) The magnitude of the trend for

wells showing statistically significant Kendall Tau values (increasing or decreasing) will be estimated as part of Task 1 using the Sen slope estimator using USGS statistical software package. To estimate a trend at a well a minimum of 4 Cr VI sampling events is required however, 8 Cr VI sampling events produce more accurate results.

  - Domestic wells results show 19 percent of the wells with a downward trend, 8 percent upward trend and the rest show no significant trend (a total of 166 wells and 1,581 data points).
  - Upward trends were shown near the school (well 27-40) and west of the compressor station. Two key outliners were reported at domestic well 26-45 and 27-40.

For monitoring wells, 13 percent of wells showed an upward trend, 36 percent showed a downward trend and the rest showed no trend. A total of 396 monitoring wells were used for the analysis and a total of 3,978 data points. The data shows the effect remedial measures throughout the plume.

- **Comparison with WL trends**
  Water level data was used from 2008-2013 to conduct the analysis. Upward trends were observed near the Mojave River from the 2010 flow event.
- **Comparison with mapped plume extent**
  USGS showed a map of the maximum extent of the plume from 2011 through 2013.
- See Figure 1 for pie diagram summarizing USGS Cr VI trend analysis for domestic and monitoring wells.

Task 2: Hand-held XRF Acquisition

USGS has procured a handheld XRF. They will use the XRF to measure key constituents in field samples.

Task 3: Preliminary well selection for BGS

The results from Task 1 will provide a rationale for the selection of wells for the BGS. Trend analysis is not the only rationale for well selection and wells will be considered for other reasons. For example, MW-195 which has too short of a record for calculation of Cr VI trends is a possible candidate that might be included in the BGS. Discussing and selecting of wells for the BGS is planned for May 14 in San Diego (USGS Office).

Task 4: Cr total and Cr VI water extraction results from core sample at well MW-195

Water was extracted from the cores at MW-195. Highest concentration reported at ~140 ft. USGS to verify the depth of the water table at MW-195. See Figure 2 for results at MW-195. Highest chloride from extracted water from core around 10 to 15 ft.

Task 5: USGS Model Update

USGS MODFLOW Model has been updated from MODFLOW 1999 to MODFLOW 2005. USGS MODFLOW Model is compiled and is completed. MODPATH still has a few issues and needs to be calibrated.

Task 8: Preliminary Study Design Matrix

USGS plans to use 54 microcosms to evaluate the oxidation/reduction of Cr. All 54 microcosms will be incubated for a minimum of 2 years. Analysis to be done include the following Cr isotopic analysis, mineralogy, XANES, particle size, chemical characterization, and EPA 3060A extraction and CrVI. This work will be conducted at the USGS Lab in Menlo Park. See Figure 3 showing a typical microcosm experimental setup. This work will be conducted at the USGS Lab in Menlo Park. See Figure 3 showing a typical microcosm experimental setup.

Action Items

No TWG BGS TEM scheduled for May. Next meeting scheduled for May 14 (San Diego) to discuss the selection of well for the BGS and Task 8. Next scheduled TWG BGS Meeting on June 25 at 1 pm at the IRP Manager Office. First field sampling event of wells selected from the Work in Task 1 is tentatively scheduled for August / September 2014.

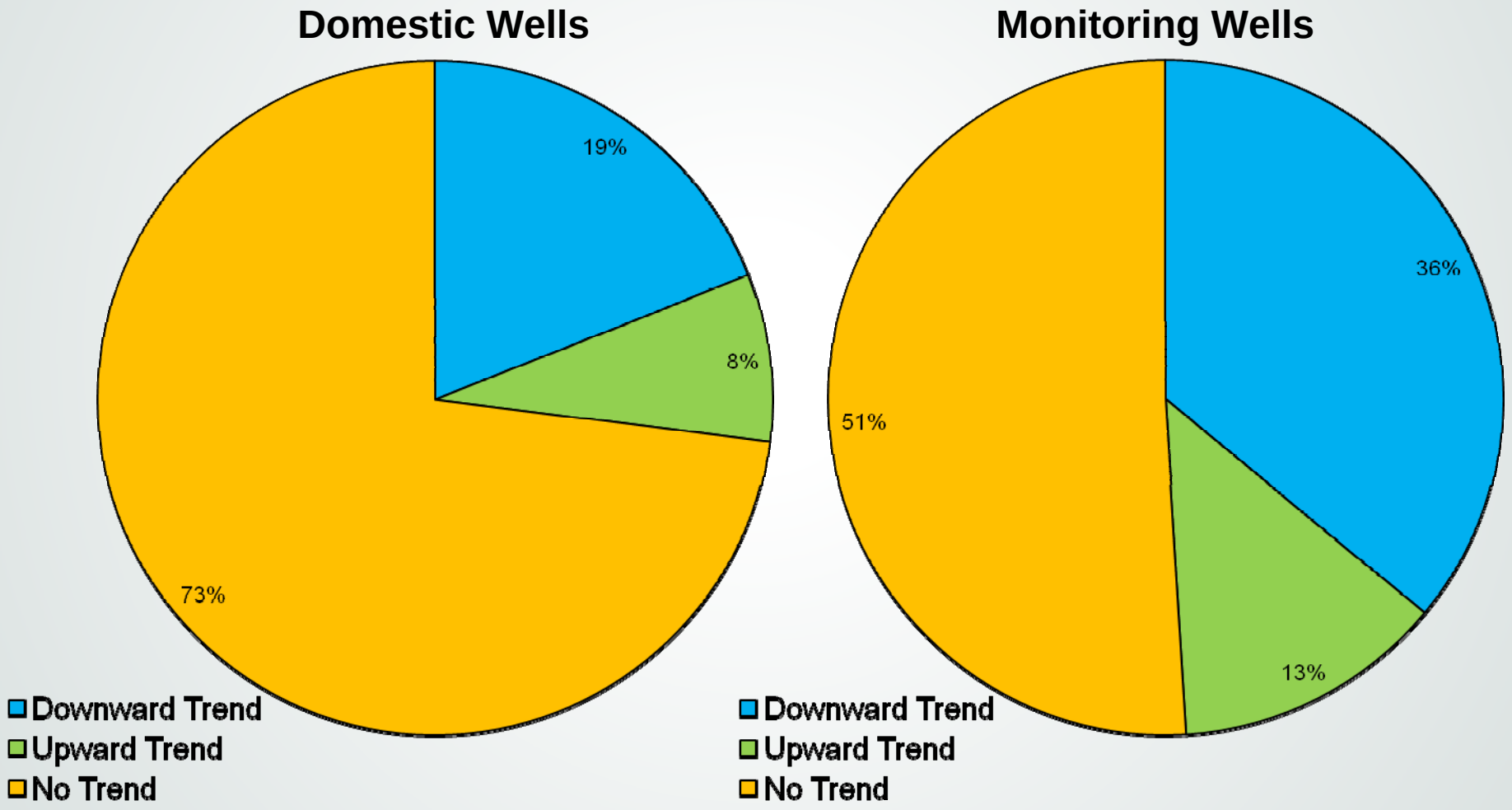
Attachments

Figure 1: Summary of USGS Data Trend Analysis for Domestic and Monitoring Wells

Figure 2: Preliminary Chloride, Chromium and Primary Lithology Results from Core Material at MW-195

Figure 3: Typical Microcosms Experimental Setup

Summary of USGS Data Trend Analysis for Domestic and Monitoring Wells.



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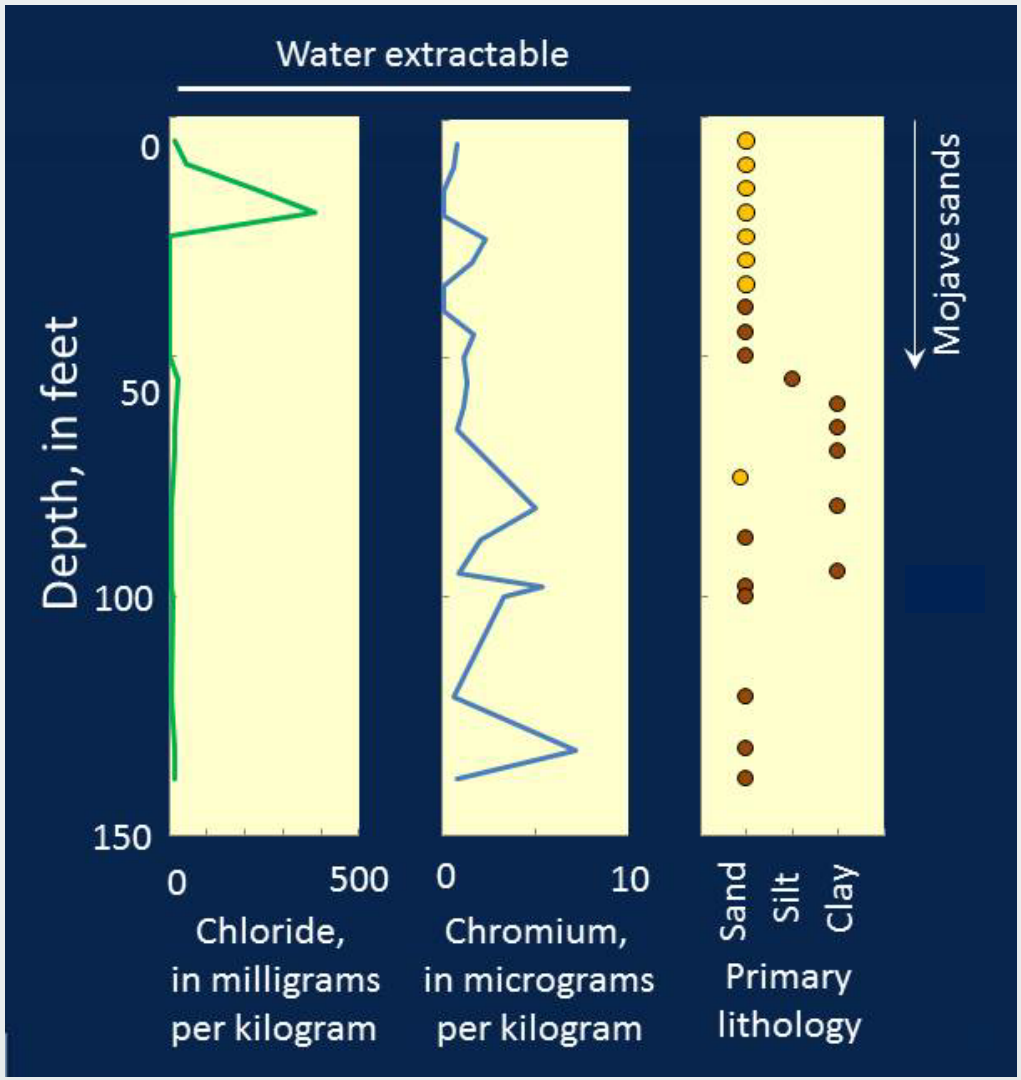
Preliminary Chloride, Chromium and Primary Lithology Results from Core Material at MW-195.



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Typical Microcosm Experimental Setup.

Core material is obtained from the sand and gravel aquifer.

Sample is slurried with groundwater in microcosms and incubated at *in situ* temperature.

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