Results of Facilitated Session on Future Directions for Groundwater Research with Focus on Long Term Surveillance and Maintenancs (LTS&M)

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Session held on November 16, 2010, at the LTS&M Conference, Grand Junction, Colorado.

Purpose: The purpose of this session was to solicit input regarding future directions for applied science and technology efforts for groundwater investigation at legacy sites.

Summary of Discussion Topics from Session

- Monitored Natural Attenuation
  - Adsorption Kinetics – Measuring how fast contaminants come off surfaces
    - Use field-based measurements
    - Resolve the data and map results using advanced spectroscopy
    - Put into codes for use in decision making

- Enhance the amount/number of projects that partner with other technology offices
  - Provides more opportunities to collaborate in radiological studies
  - Other technology offices can provide technical assistance
  - Office of Science – Subsurface Biogeochemical Research http://esd.lbl.gov/research/projects/ersp/field_research/index.html

- Greater use of independent reviews
  - Create multi-disciplined teams with representatives from national laboratories, academia, industry, etc.
  - Bring the teams into the process/project early to maximize input

- Prioritize project needs and apply a reasonable budget to attain results
  - Give project enough time to demonstrate results

- Determine how to demonstrate long-term effectiveness
  - Improve understanding of parameters and resulting predictions

- Use range of models to understand contamination and plume scenario to address concerns about migration of contamination
  - Hyporheic zone models
  - Multiple conceptual models
    - Get conceptual models right
  - Increased use of flow models
    - Ground truth with simulations

- Better site characterization
  - There is a need for improved site characterization tools

- Monitoring design
  - Evaluate the fallacy of developing an effective network
  - Investigate monitoring systems, not just collecting groundwater quality data

- Determine the cost/benefit of long-term groundwater contamination actions
    - Educate the regulators to enhance decision making

- Develop better geochemical methods for evaluating groundwater systems
    - More use of Eh/pH measurement to evaluate specific mineral changes
    - Understand the role of natural reduction
    - Develop process to understand adsorption
    - Surface area may be more important than mineralogy

- Experimental reality
    - Need to determine best methods to scale up experimental data to field

- Heterogeneity
    - Need better understanding and appreciation of natural heterogeniety in groundwater systems

- Involve LM as an advocate during the cleanup phase
    - Third party to develop cleanup strategies because have decades of experience in evaluating long-term strategy performance
    - LM can address needs they will have for long-term surveillance and maintenance
    - May not be conflicts of interest
    - Helps develop an understanding about what was done during remediation

- Identify where the heavy radionuclide go and what strategies address it
    - Sink to the bottom of the aquifer
    - Strategies
        - Pump-and-treat
        - Evaporation
        - Steam injection

- Consider methods to encapsulate the source area

- Remove the source before sites transition to LM
    - Focus on radium, not uranium or vanadium

- Develop greater understanding of geomicrobiology (Old Rifle, CO, Processing Site example)
    - Determine if these processes are applicable to other sites
    - Develop an understanding of the controls on dominant processes

- Develop partnerships with those working specifically on processes dealing with uranium
    - Gather information from studies
    - Assemble teams to brainstorm and identify the gaps in knowledge