



# ***HIGHLIGHTS***

**National Risk Management Research Laboratory  
Ground Water and Ecosystems Restoration Division  
Robert S. Kerr Environmental Research Center  
Status Report for the week of April 13, 2015**

## TECHNICAL ASSISTANCE

Technical Assistance Region IX: On March 13, 2015, Dr. Milovan Beljin (CSS-Dynamac Corporation), under the direction of Dr. Randall Ross (GWERD), provided technical review comments to RPM Andrea Benner on the “RI Report Appendix L, Groundwater Model Documentation Memorandum, Cyprus Tohono Mine Site, Tohono O’odam Nation, Arizona.” It should be noted that the current groundwater model simulates only groundwater flow. It is anticipated that the model will be adapted in the future to include contaminant transport to support the evaluation of potential remedial alternatives as part of the Feasibility Study. The groundwater flow model encompasses the entire CTC Mine Site. Considering the existing sulfate, uranium, and perchlorate plumes at the Site, the focus of the model should be the basin-fill aquifer. The model limitations should be recognized, particularly regarding the bedrock aquifer. In spite of its limitations, the model will play important role in evaluating remedial alternatives. The Report should include two additional sections: (1) model sensitivity, and (2) water budget. In addition, particle-tracking scenarios would be useful for the model calibration. The visualization of the complex three-dimensional system is a challenge. Additional cross-sections, particularly in the plume area, are recommended, several additional tables were also suggested.

(15-R09-001) (R. Ross (GWERD) 580-436-8548)

Technical Assistance Region IX: On March 23, 2015, Dr. Richard Wilkin (GWERD), provided technical review comments to CPM Lily Lee on “Mercury Evaluation at Parcel B, Installation Restoration Site 26 Work Plan, Hunters Point Naval Shipyard, San Francisco, California,” dated February 2015. An evaluation of the mass discharge of mercury to the bay near high-concentration wells was recommended as a follow-up action in the third 5-year review of remedial actions for this site. Comparison levels of mass discharge will be needed in order use the information collected in this new effort. The work plan indicates that samples for mercury concentrations will be collected 2 feet below the water table and at an unspecified location near the bottom of aquifer, close to the surface of bedrock. It is recommended that: 1) the sample collected 2 feet below the water table is referenced to the maximum water level as expressed by tidal influences at the site, and 2) additional sampling points in the vertical direction be added between specific locations. It is important that the work plan clearly describe how mass discharge of mercury will be calculated at various points in the aquifer. The work plan should also be revised to indicate how the hydraulic gradient will be determined and how variability in the hydraulic gradient will be handled in the mass flux estimates. Also, it would be useful to map the proposed locations of wells that will be equipped with pressure transducers.

(15-R09-004) (R. Wilkin (GWERD) 580-436-8874)

Technical Assistance Region II: On March 30, 2015, Dr. Scott Huling (GWERD), provided technical review comments to RPM Sin-Kie Tjho and Sharissa Singh on the “Pilot Test Workplan, AOC 1 – Fluoroproducts Area, DuPont Chambers Works, Deepwater, New Jersey.” An experimental technology involving a combination of hydrogen peroxide ( $H_2O_2$ ) and permanganate are proposed to oxidize and reduce a complex mixture of contaminants including chlorofluorocarbons (CFCs). Calculations were provided projecting that the mass of  $H_2O_2$  to be injected into the DNAPL pilot study area would result in many pore volumes of  $O_2(g)$  that would sparge the DNAPL zone. Subsurface pressurization and  $O_2(g)$  migration in heterogeneously distributed gas channels in the subsurface, and transport of contaminants in a direction of decreasing energy were also projected. Inducing widespread vacuum and capture of volatile emissions by the SVE system in the 3-4 ft unsaturated zone would be challenging under pressurized conditions from  $O_2(g)$  sparging. The proposed performance evaluation period (30 days) would represent transient conditions and insufficient time for chemical equilibrium of time-dependent mass transfer and transport mechanisms. The supporting bench scale tests permitted volatile emissions to escape during the testing period. Given the volatile nature of the contaminants in the test reactors, conclusions regarding the test results are uncertain. The global warming potential (GWP) for a gas is a measure of the total energy that a gas absorbs over a particular period of time. Chlorofluorocarbons, such as CFC-11, exhibit a GWP of 5350, this means that the CFCs will cause 5350 times as much warming as an equivalent mass of carbon dioxide and therefore much greater impact on greenhouse warming. Given the uncertainties with the bench test results, the basic treatment process, the ISCO deployment system, the role of non-degradation fate mechanisms, the capture of volatile emissions, and the sensitive nature of CFC releases, it was recommended that the technology not be deployed and that other technologies be evaluated.

(15-R02-001) (S. Huling (GWERD) 580-436-8610)