



# ***HIGHLIGHTS***

**National Risk Management Research Laboratory  
Ground Water and Ecosystems Restoration Division  
Robert S. Kerr Environmental Research Center  
Status Report for the Week of January 3, 2011**

## **TECHNICAL ASSISTANCE**

Technical Assistance to Region VI: On December 14, 2010, Mr. Steven Acree (GWERD) and Dr. Daniel Pope (Shaw Environmental and Infrastructure, Inc) provided comments to Nancy Fagan (USEPA, Region 6) for the Interpretation of Available Contaminant & Geochemical Data, Myrtle Grove Site, Plaquemine, Louisiana. The review focused on data related to the effectiveness of natural attenuation processes (NA) at the site. The statistical screening tests were generally inconclusive due to the variability of the data and the low magnitude of any potential trends. Given the general contaminant concentration trends, it would be expected that future concentration changes would be slow, such that the contaminant plume may continue to persist for years or even decades. If, as it appears, natural attenuation of VC and DCE is slow, it is possible that these contaminants could be transported into new areas of the aquifer over time.

(11RC06-001)

(S. Acree (GWERD) 580-436-8609)

Technical Assistance to Region II: On December 29, 2010, Dr. Eva Davis (GWERD) provided comments to Judy Canova (South Carolina Department of Health & Environmental Control) of the Comparison of Electrical Resistance Heating and Thermal Conduction Heating for Remediation at the Former Philip Services Corporation Site, Rock Hill, South Carolina, prepared by URS Corporation (the document), and parts of the Draft Feasibility Study (FS) Report (February 2010) for the subject site. In general, the document comparing Electrical Resistance Heating (ERH) and Thermal Conduction Heating (TCH) overstates the differences between the two technologies as they may apply to this site. Both thermal technologies have been used successfully under buildings. For many sites, there is not a clear advantage of ERH or TCH for remediation of VOCs, and both technologies are applicable. It is common to solicit technical proposals and cost bids for either of the technologies, then to select the technology for a specific site that has the best value in terms of the technical approach and the costs. I recommend that the choice of a specific thermal technology to remediate this site not be made at this time, but that 'thermal remediation' in general be specified.

(Misc.)

(E. Davis (GWERD) 580-436-8548)

## **SCIENTIFIC AND TECHNICAL PUBLICATIONS**

Wilkin, Richard T. (GWERD) and David A. Rogers (Corresponding author. Email: [wilkin.rick@epa.gov](mailto:wilkin.rick@epa.gov)). 2010. "Nickel sulfide formation at low temperature: initial precipitates, solubility and transformation products." *Environ. Chem.*, 7, 514-523. doi:10.1071/EN10076. [www.publish.csiro.au/journals/env](http://www.publish.csiro.au/journals/env).

(R. Wilkin (GWERD) 580-436-8874)



# ***HIGHLIGHTS***

**National Risk Management Research Laboratory  
Ground Water and Ecosystems Restoration Division  
Robert S. Kerr Environmental Research Center  
Status Report for the Week of January 24, 2011**

## **TECHNICAL ASSISTANCE**

Technical Assistance to Region III: On January 4, 2011, Dr. John T. Wilson (GWERD) provided comments to RPM Josh Barber for the Preliminary Report-Evaluation of Remedial Technologies for Runway 8-26/Enterprise Avenue Landfill (EAL) prepared by Weston Solutions, Inc. 2 International Plaza, Ste. 540, Philadelphia, PA. The report is primarily organized to make a case for monitored natural attenuation as a remedy at the site. However, the number and location of monitoring wells is not adequate to evaluate the contribution of natural attenuation processes. The sparse distribution of sampling wells at the site makes it impossible to interpret natural attenuation processes. An adequate case that attenuation was protective could be made with a circle of monitoring wells that were spaced no more than 100 feet apart, which connected the existing WM sentinel wells.

(11-R03-002)

(J. Wilson (GWERD) 580-436-8534)

Technical Assistance to Region VII: On January 21, 2011, Dr. Scott Huling (GWERD) provided comments to CAO Ruby Crysler for the Harcros Chemicals, Inc. documents entitled “Long-Term Groundwater Monitoring Plan for 2040 West River Drive, Davenport, Iowa” (the plan), and “RCRA Corrective Action Environmental Indicator (EI) RCRA Info code (CA750) Migration of Contaminated Groundwater Under Control (revised 4/7/10)” (the RCRA Corrective Action Report). It appears that the specific ground water monitoring details associated with the in-situ chemical oxidation (ISCO) activities may not have been included in these two reports. Rather these details may be included in other reports associated with site remedial activities. It is recommended that future ISCO activities consider the possible use of injection wells installed in the source area(s) but transverse to the ground water plume. Recommendations also include the development of a specific remedial action targeting contaminants in the shallow bedrock.

(11RC07-001)

(S. Huling (GWERD) 580-436-8610)

## **SCIENTIFIC AND TECHNICAL PUBLICATIONS**

Ford, Robert G. (LRPCD) and Richard T. Wilkin (GWERD). 2010. “Monitored Natural Attenuation of Inorganic Contaminants in Ground Water Volume 3 Assessment for Radionuclides Including Tritium, Radon, Strontium, Technetium, Uranium, Iodine, Radium, Thorium, Cesium, and Plutonium-Americium.” EPA/600/R-10/093.

(R. Ford (LRPCD) 513-569-7501)

(R. Wilkin (GWERD) 580-436-8874)



# ***HIGHLIGHTS***

**National Risk Management Research Laboratory  
Ground Water and Ecosystems Restoration Division  
Robert S. Kerr Environmental Research Center  
Status Report for the Week of February 21, 2011**

## **TECHNICAL ASSISTANCE**

Technical Assistance to Region IV: On January 27, 2011, Dr. Randall Ross (GWERD) and Dr. Bruce Pivetz (Shaw Environmental & Infrastructure, Inc.) provided review comments to RPM Galo Jackson for the Draft Work Plan for the Development, Design, and Implementation of Conventional Treatment Measures to Enhance the Existing Caustic Brine Pool (CBP) Remedy at the LCP Chemicals Site, Brunswick, GA. The proposed overall approach toward meeting the RAOs and the metals removal objective appears acceptable. It combines the use of previously collected information with additional treatability studies focusing on addressing specific questions on CBP fluid treatment processes. The proposed approach of the draft work plan is based on promising preliminary treatability testing by WRI. The one significant deficiency in the draft work plan is that there is virtually no information on the treatment processes used by WRI. It is recommended that additional information on the actual treatment process(es) be provided and that the rationale for use of aerobic biological treatment be explained prior to moving forward with the proposed treatability testing.

(11-R04-003)

(R. Ross (GWERD) 580-436-8611)

Technical Assistance to Region VII: On February 18, 2011, Dr. Ann Keeley (GWERD) provided review comments to RPM Nancy Swyers for the “Hot Spot Test Evaluation Report” dated December 2010 for the Chemplex Site in Clinton, Iowa. The report clearly demonstrates that the investigators are aware of problems and are taking steps to rectify them as the work moves forward. For example, they are going back to the basics by rethinking injection locations, improving injection techniques, and examining well construction with respect to injection efficiencies. In this regard, all the corrective measures to improve the outcome of the selected enhance bioremediation technology will be implemented including the down-hole positioning of the packer, compatibility of the injected oil with the injection well(s) and surrounding formation in terms of volume, concentration, and viscosity; as well as the selection of the larger diameter wells for injections. The use of the combined remedial approach is encouraged to remove the initial mass using chemical oxidation, followed by enhanced bioremediation.

(11-R07-002)

(A. Keeley (GWERD) 580-436-8890)

## **SCIENTIFIC AND TECHNICAL PUBLICATIONS**

Sivirichi, Gwendolyn M., Sujay S. Kaushal (Univ. of Maryland); Paul M. Mayer (GWERD); Claire Welty (Univ. of Maryland); Kenneth T. Belt (USDA Baltimore, MD); Tamara A. Newcomer, Katie D. Newcomb, and Melissa M. Grese (Univ. of Maryland). 2010. “Longitudinal variability in streamwater chemistry and carbon and nitrogen fluxes in restored and degraded urban stream networks.” *Journal of Environmental Monitoring* 13:288-303 (DOI: 10.1039/c0em00055h). [www.rsc.org/jem](http://www.rsc.org/jem).

(P. Mayer (GWERD) 580-436-8647)



# ***HIGHLIGHTS***

**National Risk Management Research Laboratory  
Ground Water and Ecosystems Restoration Division  
Robert S. Kerr Environmental Research Center  
Status Report for the Week of March 7, 2011**

## **TECHNICAL ASSISTANCE**

Technical Assistance to Region VII: On February 25, 2011, Dr. Randall Ross (GWERD) and Dr. Milovan Beljin (Shaw Environmental & Infrastructure, Inc.) provided review comments to RPM Matthew Jefferson for the Conservation Chemical (CCC) Site, Kansas City, Missouri. The focus of the review was an evaluation of capture by the existing ground water extraction system and use of ground water modeling of the site. The hydraulic containment system at the CCC site relies on two extraction wells. For a more comprehensive approach to capture zone analysis, recently published guidelines by the USEPA should be consulted. Using the systematic approach, capture at the CCC site should be evaluated twice a year, during periods of high and low river stage. The ground water model should be updated as the new data become available. The existing extraction wells could be used for conducting aquifer pumping tests under various pumping regimes. The pumping test data could be used in verifying (validating) the model. Use of the groundwater model as a management tool is encouraged.

(11-R07-001)

(R. Ross (GWERD) 580-436-8611)

Technical Assistance to Region I: On February 28, 2011, EPA's Ground Water Technical Support Center and the Center for Subsurface Modeling Support (CSMoS) completed a technical review for RPM Elaine Stanley of the report *Final Modeling Analysis of Potential Environmental Impact of the Pilot CDF New Bedford Harbor Superfund Site* prepared by Jacobs Engineering Group for the U.S. Army Corps of Engineers New England District for the New Bedford Harbor Superfund Site, New Bedford, MA, dated October 2010. The review was conducted under the direction of Dr. David Burden (GWERD), by Mr Rob Earle and Dr. Noman Ahsanuzzaman (Shaw Environmental & Infrastructure, Inc.). The comments were focused on the hydrogeologic aspects of the modeling. It is recommended that the ground-water flow and PCB transport model undergo major adjustments before being used for any decision making.

(11-R01-005)

(D. Burden (GWERD) 580-436-8606)

Technical Assistance to Region I: On March 2, 2011, Dr. Scott Huling (GWERD) and Dr. Bruce Pivetz (Shaw Environmental & Infrastructure, Inc.) provided review comments to RPM Joseph LeMay for several documents for the proposed full-scale anaerobic bioreactor (ABR) treatment system at the ReSolve Superfund Site, North Dartmouth, MA. These documents were prepared for the ReSolve Site Group by Weston Solutions, Inc. and their consultants. The documents describe the design of a system to treat extracted ground water contaminated by PCBs, chlorinated ethenes, and chlorinated ethanes. The ground water also contains some metals (notably iron). The technical review primarily focused on the broad issues related to design and implementation of the ABR system.

(11-R01-005)

(S. Huling (GWERD) 580-436-8610)



# ***HIGHLIGHTS***

**National Risk Management Research Laboratory  
Ground Water and Ecosystems Restoration Division  
Robert S. Kerr Environmental Research Center  
Status Report for the Week of March 14, 2011**

## **TECHNICAL ASSISTANCE**

Technical Assistance to Region IV: On March 2, 2011, Dr. Richard Wilkin (GWERD) provided review comments to RPM Beth Walden for the Draft Operations and Maintenance Plan for Ross Metals Operable Unit 2, Ross Metals Site, Rossville, Tennessee. Monitored Natural Attenuation (MNA) is targeted as a remedy for lead contamination in groundwater at the site. In general, work done at the site to assess MNA as a groundwater remedy should follow EPA's technical guidance on MNA for inorganics in groundwater as described in EPA reports published in 2007 (*Monitored Natural Attenuation of Inorganic Contaminants in Ground Water, Volume 1: Technical Basis for Assessment*, EPA/600/R-07/139 and *Monitored Natural Attenuation of Inorganic Contaminants in Ground Water, Volume 2: Assessment for Non-radionuclides Including Arsenic, Cadmium, Chromium, Copper, Lead, Nickel, Nitrate, Perchlorate, and Selenium*, EPA/600/R-07/140). Additional groundwater data are needed to assess concentration trends for lead across the site. After collecting these data, it is recommended that core samples be collected from a selected area of the site for additional analyses. These will provide supportive confirmation of any proposed attenuation mechanism and be used to assess the long-term stability of lead in the sequestered phase.

(11-R04-004)

(R. Wilkin (GWERD) 580-436-8874)

Technical Assistance to Region III: On March 8, 2011, EPA's Ground Water Technical Support Center completed a technical review for RPM Bruce Rundell of the *Treatability Pilot Study Report for Butz Landfill Site, Jackson Township, Monroe County, Pennsylvania* in regard to the study design, monitoring program, and pilot study effectiveness for the Butz Landfill Site (the Site). The review was conducted under the direction of Dr. David Burden (GWERD), by Dr. Daniel Pope (Shaw Environmental and Infrastructure, Inc.). Also, comments on materials that might be used for long-lasting carbon sources such as walnut and pecan shells (i.e., electron donors to stimulate reductive dechlorination of chlorinated solvents) were requested. In general, the Pilot Study seems to have been conducted primarily so as to provide useful information on the hydrogeologic nature and characteristics of the Site, and a basic understanding of how injected materials were distributed in the subsurface system. It would be useful to provide more details of the design rationale for the study approach as related to biological/geochemical issues.

(11-R03-003)

(D. Burden (GWERD) 580-436-8606)

## **SCIENTIFIC AND TECHNICAL PUBLICATIONS**

Melanie D. Harrison (Univ. of Maryland, Baltimore, MD), Peter M. Groffman (Cary Institute of Ecosystems, Millbrook, NY), Paul M. Mayer (GWERD), Sujay S. Kaushal and Tamara A. Newcomer (Univ. of Maryland, College Park, MD). 2011. "Denitrification in Alluvial Wetlands in an Urban Landscape." *Journal of Environmental Quality*. March-April. 40:634-646([doi:10.2134/jeq2010.0335](https://doi.org/10.2134/jeq2010.0335)).

(Paul Mayer (GWERD) 580-436-8647)





# ***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 4, 2011**

## **TECHNICAL ASSISTANCE**

Technical Assistance to Region VII: On March 16, 2011, Dr. Ann Keeley (GWERD) provided review comments to RPM Daniel R. Gravatt for the Draft Quality Assurance Project Plan (QAPP) Continued Monitored Natural Attenuation Sampling for the Missouri Electric Works Superfund Site Cape Girardeau, Cape Girardeau County, Missouri. It is recommended that the QAPP include tables listing all the analytical parameters, analytical method requirements, quantitative acceptance criteria, and all referenced SOPs. Also, ensure that the QAPP identifies the project's technical and quality objectives, and that the intended measurement and data acquisition methods will satisfy the objectives. Furthermore, it should be stated that there is a process to identify any limitations on the use of the data.

(11-R07-003)

(A. Keeley (GWERD) 580-436-8890)

Technical Assistance to Region VI: On March 29, 2011, EPA's Ground Water Technical Support Center completed a technical review for RPM Michael Hebert of Appendix N of the report, "Focused Remedial Investigation Report, Building 3001 and Industrial Wastewater Treatment Plant Groundwater Operable Units" dated November 2010. Appendix N of this report contains a detailed discussion of the updated ground-water flow and transport model. The Groundwater Vistas model itself was also used for this review. The report and model were prepared by Science Applications International Corporation (SAIC) for the Tinker Air Force Base Environmental Management Division. The review was conducted under the direction of Dr. David Burden (GWERD), by Mr. Rob Earle and Dr. Noman Ahsanuzzaman (Shaw Environmental and Infrastructure, Inc.). It is recommended that the handling of the modeling boundary at the interface of the previous model domain and the PZ aquifer be re-examined. Attention should be given on assigning natural boundaries rather than artificially creating a recharge boundary to balance the water flux. It is also recommended that there be more explanation of individual mass balances, particle tracking analysis, and calibration criteria.

(11-R06-001)

(D. Burden (GWERD) 580-436-8606)

Technical Assistance to Region I: On March 30, 2011, under the direction of Mr. Steven Acree (GWERD), Dr. Bruce Pivetz (Shaw Environmental and Infrastructure, Inc.) provided review comments to RPM Karen Lumino for the Report of October 2010 Soil Data, Subsurface Investigation and Evaluation-Northwestern Well Area, Pine Street Canal Superfund Site, Burlington, Vermont. The purpose of this review was to identify if there were any potential concerns regarding a barrier wall that would need to be addressed in a forthcoming detailed design. The report is well-written and very complete in terms of all the supporting materials provided. The interpretations and conclusions appear valid. It is recommended that a detailed design be prepared for a vertical barrier and that the barrier include appropriately designed DNAPL monitoring and collection locations.

(11-R01-006)

(S. Acree (GWERD) 580-436-8609)



# ***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 11, 2011**

## **TECHNICAL ASSISTANCE**

Technical Assistance to Region IV: On March 23, 2011, Dr. John T. Wilson (GWERD) provided review comments to RPMs Felicia Barnett and Carolyn Callihan for stable isotope data collected on TCE, *cis*-DCE and vinyl chloride in ground water from the Mill Gap Road Groundwater Contamination Site, North Carolina. The isotope analyses were conducted to determine whether it might be possible to use isotope analyses to attribute the contamination in wells at the Mills Gap Site to ground water contamination that originated from the CTS of Asheville, Inc. Site (CTS Site) and/or to differentiate between separate or additional sources in the area of the contaminated private wells. The analysis follows procedures and processes as described in *A Guide for Assessing Biodegradation and Source Identification of Organic Ground Water Contaminants using Compound Specific Isotope Analysis (CSIA)*, EPA 600/R-08/148 (2008).

(11-R04-005)

(J. Wilson (GWERD) 580-436-8534)

Technical Assistance to Regions II, III & VII: Technical support has been provided by Dr. Scott Huling (EPA R.S. Kerr Environmental Research Center (RSKERC), Ada, OK), Dr. Saebom Ko (NRC Post Doctoral Fellow), and Dr. Bruce Pivetz (Shaw Environmental & Infrastructure, Inc.) regarding ground water sampling at several hazardous waste sites where in-situ chemical oxidation (ISCO) has been performed. Based on recent research conducted at RSKERC, ground water sampling at ISCO sites may involve binary mixtures where both the oxidant and contaminants may co-exist in the same aqueous sample. Under this condition, (1) the quality of the ground water sample can be compromised due to oxidation reactions occurring in the ground water sample, and (2) the analytical instruments used to analyze the sample can potentially be damaged. Comments and recommendations were provided by the RSKERC staff to several EPA RPMs regarding the site specific impact of the binary mixtures and steps to mitigate the problems. The Project Managers and sites include Laura Johnson (EPA Region 3) Fike/Artel Superfund Site, Nitro, WV; Diana Cutt (EPA Region 2) Department of Defense, Area of Concern 1, Vieques, Puerto Rico; and Ruby Chrysler (EPA Region 7), Hacros Chemical Site, Davenport, IA. Additionally, a draft Ground Water Forum Issue Paper has been prepared by the RSKERC staff and is under review that provides preservation guidelines to be used in the collection of binary mixture ground water samples at ISCO sites. The recommended guidelines can be used to minimize the impact of the oxidants (persulfate, permanganate) on both the quality of the ground water sample and the instruments used in the analysis of the sample.

(S. Huling (GWERD) 580-436-8610)

## **COMMUNITY OUTREACH**

On March 25, 2011, the following individuals served as judges at the 2011 Oklahoma State Science and Engineering Fair at East Central University: Special Award Judge: Dr. Ann Keeley (GWERD); Category Judges: Dr. John T. Wilson, Dr. Mary Gonsoulin, Mr. Joe Williams, Dr. Ann Keeley (GWERD), Dr. Dennis Fine, Dr. Daniel Pope, and Dr. Charles Beall (Shaw Environmental Inc.).



# ***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 18, 2009**

## TECHNICAL ASSISTANCE

Technical Assistance to the Office of Superfund Remediation & Technology Innovation: On April 7, 2011, Dr. Ann Keeley (GWERD) provided review comments to Linda Fiedler, Acting Chief of the Technology Assessment Branch, regarding the “*ITRC External Review Version of the Environmental Molecular Diagnostics (EMD) Fact Sheets [EMD-1]*” developed by the ITRC EMD Team dated January 4, 2011. The fact sheets are designed to provide basic information about EMDs applicable to environmental management, including site assessment, remediation, and closure. In that regard, the level of complexity of the documents is such that most environmental practitioners (Agency RPMs, consultants, and project managers) should be able to understand and apply the concepts. They also successfully serve their original intent of being developed as such that each individual fact sheet pertains to one method except for the Microbial Fingerprinting Methods and EMD Sampling Devices. There is an issue of the scarcity of clear governmental guidance documents addressing the selection criteria, sampling matrix soil versus water and QA/QC criteria. It is recommended that the fact sheets could benefit from the citation of additional references.

(Misc.)

(A. Keeley (GWERD) 580-436-8890)

Technical Assistance to Region VII: On April 13, 2011, technical review comments were provided by Dr. Ann Keeley (GWERD) and Dr. Bruce Pivetz (Shaw Environmental and Infrastructure, Inc.) for the monitored natural attenuation (MNA) portions of the *Corrective Measures Study, Hydrite Chemical Company, 2815 WCF&N Drive, Waterloo, Iowa* (the CMS), which was prepared by Environmental Resources Management, Inc. for the Hydrite Chemical Company dated February 18, 2011. This review focused on the overall technical adequacy of the evaluation of monitored natural attenuation as a potential component of the site remedy. The MNA report provides technically sound discussions and interpretations of MNA specific to the site. While there may always be some uncertainties in knowing what attenuation processes are occurring, at what locations, and at what rates, there do appear to be sufficient data and a variety of types of information to indicate that significant attenuation has been occurring at the site. The most uncertain or least supported aspect of the MNA report may be the relative significance of the impact of source reduction activities on the downgradient contaminant concentrations as opposed to the impact of natural attenuation. However, despite this uncertainty, there is sufficient evidence of a variety of effective attenuation processes for the downgradient ground-water contaminants, especially the destructive processes. This issue does not appear to impact the recommendations or conclusions of the CMS, MNA, or this review.

(11RC07-002)

(A. Keeley (GWERD) 580-436-8890)





# ***HIGHLIGHTS***

National Risk Management Research Laboratory  
Ground Water and Ecosystems Restoration Division  
Robert S. Kerr Environmental Research Center  
Status Report for the Week of May 9, 2011

## **SCIENTIFIC AND TECHNICAL PUBLICATIONS**

Technology transfer was provided by Dr. Scott Huling (EPA, R.S. Kerr Environmental Research Center, Ada, OK) involving a monograph entitled, “*In-situ Chemical Oxidation for Groundwater Remediation.*” This document has been published through the Department of Defense SERDP and ESTCP Remediation Technology monograph series. SERDP and ESTCP have joined to develop a series of monographs written by leading experts in each subject area. This monograph provides a review of the state-of-the-art of in-situ chemical oxidation and contains detailed information, data, and guidelines that will help decision makers, practicing engineers and hydrogeologists to select, design, and operate such systems, as well as researchers seeking to improve the current state of the art. For further information, contact Dr. Scott G. Huling (580-436-8610; huling.scott@epa.gov).

Jones, Edward H. (NRC, GWERD), David A. Reynolds (Golder Associates, West Perth, WA, Australia), A. Lynn Wood (GWERD), and David G. Thomas (Chevron Energy Technology, Perth WA, Australia). (2011). “*Use of Electrophoresis for Transporting Nano-Iron in Porous Media.*” *Ground Water*, Vol. 49, No. 2, pages 172-183.

Petri, Benjamin G. (Colorado School of Mines, Golden, CO), Richard J. Watts and Amy L. Teel (WA State Univ., Pullman, WA), Scott G. Huling (GWERD), and Richard A. Brown (Environmental Resources Management, Ewing, NJ). 2011. Chapter 2. Fundamentals of ISCO Using Hydrogen Peroxide. R.L. Siegrist et al. (eds), *In Situ Chemical Oxidation for Groundwater Remediation*, doi: 10.1007/978-1-4419-7826-4\_5, © Springer Science+Business Media, LLC 2011.

Clayton, Wilson S. (Aquifer Solutions, Inc., Evergreen, CO), Benjamin G. Petri (Colorado School of Mines, Golden, CO), Scott G. Huling (GWERD). 2011. Chapter 5. Fundamentals of ISCO Using Ozone. R.L. Siegrist et al. (eds), *In Situ Chemical Oxidation for Groundwater Remediation*, doi: 10.1007/978-1-4419-7826-4\_5, © Springer Science+Business Media, LLC 2011.



# ***HIGHLIGHTS***

**National Risk Management Research Laboratory  
Ground Water and Ecosystems Restoration Division  
Robert S. Kerr Environmental Research Center  
Status Report for the Week of May 16, 2011**

## **TECHNICAL ASSISTANCE**

Technical Assistance Region X: On May 5, 2011, EPA's Ground Water Technical Support Center completed a technical review for Kira Lynch, Howard Orlean, and Rene Fuentes (Region 10) of the Ground-Water Plume Management Strategy for the Wyckoff/Eagle Harbor Superfund Site, Bainbridge Island, Washington. The review was conducted under the direction of Dr. David Burden (GWERD), by Dr. Daniel Pope (Shaw Environmental and Infrastructure, Inc.). The Region requested assistance in evaluating a ground-water plume management strategy for the Wyckoff wood treatment site. The Region is re-evaluating the potential of doing aggressive source treatment in the upper aquifer (i.e., considering thermal remediation for removal of mobile NAPL) and desires assistance with designing a monitoring strategy for evaluating monitored natural attenuation (MNA) in the lower aquifer. In general, it appears that MNA could be a viable alternative remedy for the lower aquifer, in that the contaminants of interest (naphthalene, BaP, and PCP) are considered to be biodegradable, and are of course subject to dilution and dispersion, other components of the natural attenuation process. Therefore, MNA could reduce the concentrations of contaminants in the lower aquifer. There is some evidence that natural attenuation is currently reducing contaminant concentrations; however, several complicating aspects must be considered.

(11-R10-002)

(D. Burden (GWERD) 580-436-8606)

Technical Assistance to Region IX: On May 10, 2011, Mr. Steven Acree (GWERD) and Dr. Robert Ford (LRPCD) provided technical review comments to RPM Jere Johnson for the On-Site Monitor Well Installation Work Plan, Yerington Mine Site, Yerington, Nevada. In general, the work proposed under this plan appears to be appropriate. It is suggested that a longer default screen length for bedrock be considered for use in this portion of the investigation. The longer screen length may increase the probability of intercepting transmissive fracture zones. It is also recommended that the table and/or maps should be amended to clarify the proposed well locations. The default screen length could be modified at a given location based on data obtained during drilling.

(11-R09-001)

(S. Acree (GWERD) 580-436-8609)

(R. Ford (LRPCD) 513-569-7501)

## **SCIENTIFIC AND TECHNICAL PUBLICATIONS**

Huling, Scott G. (GWERD), Saebom Ko (National Research Council, GWERD), and Bruce Pivetz (Shaw Environmental & Infrastructure, Inc., GWERD). 2011. *Groundwater Sampling at ISCO Sites: Binary Mixtures of Volatile Organic Compounds and Persulfate*. Ground Water Monitoring & Remediation 31, No. 2/Spring 2011/Pages 72-79.

(Scott G. Huling (GWERD) 580-436-8610)



# ***HIGHLIGHTS***

National Risk Management Research Laboratory  
Ground Water and Ecosystems Restoration Division  
Robert S. Kerr Environmental Research Center  
Status Report for the Week of June 6, 2011

## **TECHNICAL ASSISTANCE**

Technical Assistance Region I: On June 1, 2011, Dr. Randall Ross (GWERD) and Dr. Milovan Beljin (Shaw Environmental & Infrastructure, Inc.) provided technical review comments to RPM Anna Krasko for the Groundwater Flow and Solute Transport Modeling Report, Picillo Pig Farm Superfund Site, Coventry, Rhode Island. The reviewed model is the latest update of a groundwater flow model originally developed by GeoTrans in 1997. The current model includes, in addition to the updated flow model, the solute transport component. The model was calibrated to the latest field data available and was used as a predictive tool for various remedial scenarios. The model continues to be a valuable management tool. However, recommendations include the addition of a particle track analysis, evaluation of the capture at the Site twice a year, and improvements to the model calibration.

(11-R01-002)

(R. Ross (GWERD) 580-436-8611)

## **SCIENTIFIC AND TECHNICAL PUBLICATIONS**

Chen, Gexin (National Research Council, GWERD), Xuyang Liu (National Research Council, GWERD), and Chunming Su (GWERD). 2011. *Transport and Retention of TiO<sub>2</sub> Rutile Nanoparticles in Saturated Porous Media under Low-Ionic-Strength Conditions: Measurements and Mechanisms*. Langmuir 2011, 27, 5393-5402.

(Chunming Su (GWERD) 580-436-8638)

## **TECHNOLOGY TRANSFER**

A Workshop on Geophysical Techniques for Shallow Ground Water, co-sponsored by GWERD and Region 6, was held at Richland College, Dallas, TX, on May 11–12, 2011. Lectures and case studies were presented by individuals from Aestus (consultants to Shaw Environmental & Infrastructure, Inc.), GWERD, Oklahoma Corporation Commission, Oklahoma State University, Texas Railroad Commission, Texas Bureau of Economic Geology, and the USGS. The 66 participants also gained hands-on experience during field demonstrations by three instrumentation vendors.

(R. Ross (GWERD) 580-436-8611)



# ***HIGHLIGHTS***

**National Risk Management Research Laboratory  
Ground Water and Ecosystems Restoration Division  
Robert S. Kerr Environmental Research Center  
Status Report for the Week of June 13, 2011**

## **TECHNICAL ASSISTANCE**

Technical Assistance Region IV: On June 6, 2011, Dr. Eva Davis (GWERD) provided technical review comments to RPM Josephs Robenson for the Supplemental Feasibility Study Work Plan, West Florida Natural Gas Company Site, Ocala, Marion County, Florida (the work plan), March 31, 2011, prepared for TECO/Peoples Gas System (TECO) by Arcadis. The review concentrated on characterization needs for evaluating thermal remediation as a potential remedy for the contamination at the site. While the work plan generally contains the types of characterization activities that are needed, further refinement in terms of the locations and the number of wells and borings should be done. One specific objective should be to fully determine the extent of the dissolved phase plume throughout the depths at which it exists. Also, determination of the physical properties of the NAPL as a function of temperature would aid in evaluating thermal remediation as an option for this site. (11-R04-001) (E. Davis (GWERD) 580-436-8548)

Technical Assistance Region IX: On June 7, 2011, Dr. Ralph Ludwig (GWERD) provided responses to STL Mike Gill for questions posed by the California Regional Water Quality Control Board (Lohontan Region) to the USEPA in a letter dated May 2, 2011 regarding the Feasibility Study prepared by Haley and Aldrich, Inc. for the Pacific Gas and Electric Company (PG&E) Compressor Station site, Hinkley, California. In reviewing the responses, it is important to note that the subject site has not been visited by the reviewer. Current knowledge of the site is limited to review of the documentation that has been provided (Feasibility Study dated August 30, 2010; Addendum #1 to Feasibility Study dated January 31, 2011; Addendum #2 to Feasibility Study dated March 3, 2011). The Feasibility Study provides a reasonably well-rounded evaluation of best available technologies. However, an explanation should be provided for why chemical reductants were excluded as part of the remedy for the source zone area(s) and why the use of organic carbon amendments alone is considered more appropriate. (Misc.) (Ralph Ludwig (GWERD) 580-436-8603)

Technical Assistance Region IV: On June 8, 2011, Dr. Scott Huling (GWERD) and Dr. Bruce Pivetz (Shaw Environmental & Infrastructure, Inc.) provided technical review comments to RPM Josephs Robenson for the Supplemental Feasibility Study Work Plan, West Florida Natural Gas Company Site, Ocala, Marion County, Florida (the work plan), March 31, 2011, prepared for TECO/Peoples Gas System by Arcadis. The work plan proposes activities to be conducted to address the general Data Quality Objectives (DQOs). The general justification for the DQOs and specific activities to address the DQOs was to obtain information to more fully evaluate potential remedial technologies (in situ chemical oxidation (ISCO) and thermal) for the manufactured gas plant (MGP)-related contamination at the site. It is recommended that additional wells be located within the central portion of the concrete-covered impacted area, or that some of the proposed wells be relocated from their proposed locations to this area. It is further recommended that some additional soil borings be located in the NAPL-impacted area, or relocation of proposed soil borings. (11-R04-001) (S. Huling (GWERD) 580-436-8610)





# ***HIGHLIGHTS***

**National Risk Management Research Laboratory  
Ground Water and Ecosystems Restoration Division  
Robert S. Kerr Environmental Research Center  
Status Report for the Week of July 11, 2011**

## **TECHNICAL ASSISTANCE**

Technical Assistance Region V: On June 23, 2011, Dr. Ralph Ludwig (GWERD) and Dr. Bruce Pivetz (Shaw Environmental & Infrastructure, Inc.) provided technical review comments to RPM Scott Hansen on documents for the Ashland /Northern States Power, Lakefront site, Ashland, WI (the site), located along the shore of Lake Superior. This was an evaluation of the feasibility of installing a GAC-based permeable reactive barrier (PRB) at the site. The PRP proposes that the PRB be installed in the surficial aquifer (above the Miller Creek Formation) within the Kreher Park area. The intent of the PRB is to prevent further MGP hydrocarbon contaminant discharge from the Kreher Park area into Lake Superior. Conceptually, a GAC-based PRB may be a viable alternative for treatment of dissolved-phase hydrocarbons at the site. However, several factors/variables could adversely impact the success of a GAC-based PRB at the site including the presence of NAPLs, iron and manganese precipitation, and general implementability issues.

(11-R05-003)

(R. Ludwig (GWERD) 580-436-8603)

## **SCIENTIFIC AND TECHNICAL PUBLICATIONS**

Beak, Douglas G. (GWERD) (formerly CSIRO Land and Water, Adelaide, Australia), Jason K. Kirby (CSIRO Land and Water, Adelaide, Australia), Ganga M. Hettiarachchi (Kansas State Univ., Manhattan, KS), Laura A. Wendling (CSIRO Land and Water, Adelaide, Australia), Michael J. McLaughlin (CSIRO Land and Water/Univ. of Adelaide, Adelaide, Australia), and Raju Khatiwada (Kansas State Univ., Manhattan, KS). 2011. *Cobalt Distribution and Speciation: Effect of Aging, Intermittent Submergence, In Situ Rice Roots*. Journal of Environmental Quality, May-June 2011, Volume 40:679-695.

(Doug Beak (GWERD) 580-436-8813)

de Livera, Jennifer (Univ. of Adelaide, Adelaide, Australia), Mike J. McLaughlin (University of Adelaide, Adelaide, Australia; and CSIRO Land and Water, Adelaide, Australia), Ganga M. Hettiarachchi (CSIRO Land and Water, Adelaide, Australia; and Kansas State University, Manhattan, KS), Jason K. Kirby (CSIRO Land and Water, Adelaide, Australia), Douglas G. Beak (GWERD) (formerly CSIRO Land and Water, Adelaide, Australia) 2011. *Cadmium solubility in paddy soils: Effects of soil oxidation, metal sulfides and competitive ions*. Science of the Total Environment, 409 (2011) 1489-1497.

(Doug Beak (GWERD) 580-436-8813)

Forshay, Kenneth J. (GWERD) (formerly Univ. of Wisconsin, Madison, WI), and Stanley I. Dodson (Univ. of Wisconsin, Madison, WI). 2011. *Macrophyte presence is an indicator of enhanced denitrification and nitrification in sediments of a temperate restored agricultural stream*. Hydrobiologia (2011) 668:21-34.

(K. Forshay (GWERD) 580-436-8912)





# ***HIGHLIGHTS***

**National Risk Management Research Laboratory  
Ground Water and Ecosystems Restoration Division  
Robert S. Kerr Environmental Research Center  
Status Report for the Week of August 8, 2011**

## **TECHNICAL ASSISTANCE**

Technical Assistance Region I: On July 29, 2011, Dr. Eva Davis (GWERD) provided technical review comments to RPM Kevin Heine for the Source Area Pre-Design Investigation Work Plan, South Municipal Water Supply Well Superfund Site, Peterborough, New Hampshire, May 2011, prepared by Hull & Associates for New Hampshire Ball Bearing, Inc. This document outlines an approach for completing the delineation of the source zone area(s) to be remediated using thermal technologies. Although both soil and groundwater samples, as well as membrane interface probe (MIP) sampling are proposed, it appears that the intent is to rely on ground water concentrations for the delineation of the area to undergo thermal treatment. Experience shows that groundwater concentrations are not a clear indication of the presence or absence of NAPL. It is also true that it can be difficult to determine the presence or absence of NAPL in a soil core. An approach using multiple lines of evidence works best in delineating thermal treatment zones.

(11-R01-004)

(E. Davis (GWERD) 580-436-8548)

Technical Assistance Region IX: On August 5, 2011, Mr. Steven Acree (GWERD) provided technical review comments to RPM Jere Johnson for the Draft Aquifer Test Work Plan, Yerington Mine Site, Yerington, Nevada. In general, the plan appears to be of high quality. However, it appears that the test would significantly benefit from a longer duration and addition of other monitoring locations. Based on the data presented in the hydrographs, it appears that a longer test is warranted to provide a robust data set sufficient for analyses of aquifer properties throughout the proposed monitoring network. It will be necessary to enhance the proposed monitoring network to more fully realize this broader objective. It is also recommended that consideration be given to temporarily redeploying the existing pressure transducers used for long-term water level monitoring for use during this aquifer test.

(11-R09-001)

(S. Acree (GWERD) 580-436-8609)

## **SCIENTIFIC AND TECHNICAL PUBLICATIONS**

Jorgensen, Eric E. (GWERD). 2011. *Biofuel Ethanol Transport Risk*. EPA/600/F-11-011.

(E. Jorgensen (GWERD) 580-436-8545)



# ***HIGHLIGHTS***

**National Risk Management Research Laboratory  
Ground Water and Ecosystems Restoration Division  
Robert S. Kerr Environmental Research Center  
Status Report for the Week of August 22, 2011**

## **TECHNICAL ASSISTANCE**

Technical Assistance Region IV: On June 16, 2011, Dr. Ralph Ludwig (GWERD) provided technical review comments to RPM Ken Mallary for the *Northern Drainage Feature Remedial Alternatives Evaluation* report for the subject FCX (Statesville) Superfund site (OU3). The report is well written and, in general, is technically sound. Alternative 2 involving installation of a PRB to prevent PCE and its daughter products from entering the Northern Drainage Feature through horizontal and vertical groundwater flow is an appropriate preferred alternative. In addition, the selection of Alternative 4 (subsurface drains and an on-site treatment cell to treat intermittent overland flow originating from groundwater seepages south of the Northern Drainage Feature) as a supplement to Alternative 2 (if deemed necessary) is also appropriate.

(11-R04-006)

(R. Ludwig (GWERD) 580-436-8603)

Technical Assistance Region VII: On August 16, 2011, Dr. Eva Davis (GWERD) provided technical review comments to On-Scene Coordinator, Jeffrey Weatherford, for the document “In situ Thermal Desorption for Treating PCB-Contaminated Soils Potential Application at the Carter Carburetor Site in St. Louis, MO,” prepared by Stephen Lester, Science Direction of the Center for Health, Environment & Justice, on July 1, 2011. In general, the document presents a fair description of the In Situ Thermal Desorption (ISTD) technology. However, some information stated in the memo is out-dated and should be revised.

(11-R07-004)

(E. Davis (GWERD) 580-436-8548)

Technical Assistance Region III: On August 17, 2011, Dr. Scott Huling (GWERD) and Dr. Bruce Pivetz (Shaw Environmental & Infrastructure, Inc.) provided technical review comments to RPM Jill Lowe for the *ISCO Performance Report for 3-Year Review for the Dublin NPL Site, PA*, April 18, 2011, for the Dublin TCE Superfund Site, Dublin Borough, PA, prepared by Geosyntec Consultants for Sequa Corporation. The report presents the methodology, results, and interpretations of an in situ chemical oxidation (ISCO) treatment system for remediating dissolved-phase and potentially DNAPL-phase trichloroethene (TCE) in ground water at the fractured bedrock site. Comments and recommendations were provided regarding fate and transport of ground-water contaminants, ISCO performance evaluation, and monitoring strategies and requirements. Additional monitoring, data analysis, and interpretations suggested in the report would help in resolving some of the uncertainties, and appear necessary to fully evaluate the performance of the in situ  $\text{MnO}_4^-$  treatment.

(11-R03-004)

(S. Huling (GWERD) 580-436-8610)



# ***HIGHLIGHTS***

**National Risk Management Research Laboratory  
Ground Water and Ecosystems Restoration Division  
Robert S. Kerr Environmental Research Center  
Status Report for the Week of September 12, 2011**

## **TECHNICAL ASSISTANCE**

Technical Assistance Region IX: On August 31, 2011, at the request of RPM John Lucey, Dr. Dan Pope (Shaw Environmental & Infrastructure, Inc.), under the direction of Dr. David Burden (GWERD) provided review comments for the *Interim Enhanced In Situ Bioremediation Pilot Study Report, Site 8, Buildings 355/373 Area, and Site 36, March Air Reserve Base, California*, located in Riverside County, California (the Site). Either lactate or EVO, or a combination of the two, would be suitable for use at the Site in that either material is suitable for the development of conditions suitable to the reductive dechlorination of the chlorinated solvent contaminants. The hydrogeological conditions (i.e., permeability) will probably be the determining factor for which one is used. Remedial timeframes are difficult to predict due to the large number of factors involved, but this Site is likely to require an extended timeframe compared to a site where hydrogeological conditions are more favorable.

(11-R09-004)

(D. Burden (GWERD) 580-436-8606)

Technical Assistance Region IX: On September 1, 2011, at the request of Lisa Dernbach, Lahontan Regional Water Quality Control Board, South Lake Tahoe, California, Dr. Milovan Beljin (subcontractor to Shaw Environmental & Infrastructure, Inc.), under the direction of Dr. David Burden (GWERD) provided review comments for the ground water capture and extraction for the Pacific Gas and Electric (PG&E) Site, Hinkley California. It is important to recognize that there must be a clear definition of the target capture zone, and that the target capture zone be described in three dimensions. In addition to the hydraulic head maps, other lines of evidence should be presented when analyzing the capture zone at the site. For a more comprehensive approach to the capture zone analysis, the published guidelines by the USEPA should be consulted ("A Systematic Approach for Evaluation of Capture Zones at Pump and Treat Systems," EPA 600/R-08/003).

(Misc.)

(D. Burden (GWERD) 580-436-8606)

Technical Assistance Region IX: On August 16 and 17, 2011, at the request of RPM Jere Johnson, Mr. Steve Acree (GWERD) and Dr. Randall Ross (GWERD) provided technical assistance in subsurface investigations at the Yerington Mine Site in Yerington, Nevada. Mr. Acree and Dr. Ross met with representatives from the U.S. EPA-Region 9, Nevada Division of Environmental Protection, U.S. Bureau of Land Management, Yerington Paiute Tribe, Atlantic Richfield Company, and others to discuss the results of work performed during the 2010/2011 field programs. Discussions included identification of data needs and plans, roles, and responsibilities for obtaining the data.

(11-R09-001)

(S. Acree (GWERD) 580-436-8609)

(R. Ross (GWERD) 580-436-8611)

## **SCIENTIFIC AND TECHNICAL PUBLICATIONS**

Jorgensen, Eric E. (GWERD), Bruce Pivetz and Daniel Pope (Shaw Environmental & Infrastructure, Inc., GWERD). 2011. *Biofuel Ethanol Transport Risk*. EPA/600/F-11-011.

(E. Jorgensen (GWERD) 580-436-8545)

Liu, Xuyang and Gexin Chen (National Research Council, GWERD) and Chunming Su (GWERD). 2011. "Effects of Material Properties on Sedimentation and Aggregation of Titanium Dioxide Nanoparticles of Anatase and Rutile in the Aqueous Phase." *Journal of Colloid and Interface Science* 363 (2011) 84-91.

(C. Su (GWERD) 580-436-8638)



# ***HIGHLIGHTS***

**National Risk Management Research Laboratory  
Ground Water and Ecosystems Restoration Division  
Robert S. Kerr Environmental Research Center  
Status Report for the Week of September 19, 2011**

## **TECHNICAL ASSISTANCE**

Technical Assistance Region IX: On September 9, 2011, Dr. Michael Brooks (GWERD) provided technical review comments to RPM Penny Reddy for the *DRAFT Plume Cleanup Time Evaluation, Middlefield-Ellis-Whisman Regional Groundwater Remediation Program, Mountain View, California*. This document summarizes work completed to estimate clean-up times associated with five remedial alternatives that are being considered at the site. Overall, the modeling approach used to evaluate cleanup times struck a necessary balance between complex and simple models. While the former can represent the processes in much better detail, they can be expensive to complete and require very detailed spatial data. On the other hand, simple models by necessity require simplifying assumptions, which can result in questions about the applicability of the model when used at complex sites. However, it is important to view the results within the proper context. This type of model should be classified as a screening-level model, wherein predictions are useful for investigating general trends and relative changes. The accuracy of absolute numbers, however, should be viewed cautiously.

(11-R09-005)

(M. Brooks (GWERD) 580-436-8982)

Technical Assistance Region IX: On September 9, 2011, Mr. Steven Acree (GWERD) provided technical review comments to RPM Jere Johnson for the Addendum to the On-Site Monitor Well Installation Work Plan, Rev 1, Yerington Mine Site, Yerington, Nevada. The proposed additional well locations and installation methods appear to be appropriate and should provide useful information.

(11-R09-001)

(S. Acree (GWERD) 580-436-8609)

Technical Assistance Region IX: On September 9, 2011, Mr. Steve Acree (GWERD) and Dr. Robert Ford (LRPCD) provided technical review comments to RPM Jere Johnson for the On-Site Monitor Well Installation Work Plan, Rev. 1, Responses to Comments on the On-Site Monitor Well Installation Work Plan, Yerington Mine Site, Yerington, Nevada. The responses and modifications to the work plan adequately address previous comments.

(11-R09-001)

(S. Acree (GWERD) 580-436-8609)

(R. Ford (LRPCD) 513-569-7501)

## **SCIENTIFIC AND TECHNICAL PUBLICATIONS**

Huling, Scott G. (GWERD), Sanchul Hwang (Univ. of Puerto Rico at Mayaguez), Dennis Fine (Shaw Environmental & Infrastructure (GWERD)), Saebom Ko (NRC (GWERD)). 2011. *Fenton-like initiation of a toluene transformation mechanism*. *Water Research* 45 (2011) 5334-5342.

(S. Huling (GWERD) 580-436-8610)

Huling, Scott G. (GWERD), Saebom Ko (National Research Council, GWERD), Saehan Park (Univ. of Arizona) and Eunsung Kan (MT State Univ., Bozeman, MT). 2011. *Persulfate oxidation of MTBE- and chloroform-spent granular activated carbon*. *Journal of Hazardous Materials* 192 (2011) 1484-1490.

(S. Huling (GWERD) 580-436-8610)



# ***HIGHLIGHTS***

**National Risk Management Research Laboratory  
Ground Water and Ecosystems Restoration Division  
Robert S. Kerr Environmental Research Center  
Status Report for the Week of October 3, 2011**

## **TECHNICAL ASSISTANCE**

Technical Assistance Region III: On September 15, 2011, Dr. Scott Huling (GWERD) and Dr. Bruce Pivetz (Shaw Environmental & Infrastructure, Inc.) provided technical review comments to RPM Michael Towle and On-Scene Coordinator, Greg Powell, for a bench-scale treatability study report entitled, “CTS-HWV Permanganate Soil Oxidant Demand Treatability Study Report (Aug. 29, 2011)” prepared by Terra Systems for the Coyne Textile Services Superfund Site, Huntington, West Virginia. The details of the report are primarily focused on the methods and results of the natural oxidant demand test. The overall feasibility of using in-situ chemical oxidation (ISCO) at the site is dependent on several site specific conditions and parameters that extend beyond the oxidant demand study. In general, the results of the treatability study provide insight regarding depth-dependency of the oxidant demand. This trend in oxidant demand results is typical. Additional information is needed, however, to assess whether ISCO deployment at pilot-scale or full-scale should be performed. (11-R03-005) (S. Huling (GWERD) 580-436-8610)

Technical Assistance Region IX: On September 16, 2011, Dr. Milovan Beljin (Shaw Environmental & Infrastructure, Inc.), under the direction of Dr. David Burden (GWERD), provided technical review comments to RPM Lynda Deschambault for documents regarding the groundwater contamination at Operable Unit 2 (OU2) of the Omega Chemical Corporation Superfund Site (Omega Site) located in Whittier, California. Technical review comments are based on a preliminary review of technical documents, a site visit, and an interview of the CH2M HILL groundwater modelers in June of 2011. The contaminants at the Omega Site have been introduced to the groundwater as a result of the release of hazardous substances at the former Omega facility. The contaminant plumes emanating from the Omega facility moved with the regional groundwater flow and have commingled with contaminants released from other source areas. It is possible that contamination from the former Omega facility could have migrated a distance of 4.5 miles and that the groundwater model is an appropriate tool for the evaluation of the remedial alternatives. (11-R09-006) (D. Burden (GWERD) 580-436-8606)

Technical Assistance Region IV: On September 21, 2011, Dr. Scott Huling (GWERD) and Dr. Bruce Pivetz (Shaw Environmental & Infrastructure, Inc.) provided technical review comments to RPM Robenson Joseph for the *Response to Comments (EPA and FDEP) on March 2011 Supplemental Feasibility Study Work Plan, West Florida Natural Gas Company Site – Ocala, FL* (August 26, 2011), prepared by Arcadis. The work plan proposed field and laboratory activities to obtain information and evaluate potential remedial technologies (in situ chemical oxidation (ISCO) and thermal) for the manufactured gas plant (MGP)-related contamination at the site. After a review of the Arcadis responses to the comments, and a re-review of the sections of the Supplemental Feasibility Study Work Plan, there is concern that the proposed procedures focus on indirect measurements. It is recommended that a more direct testing strategy be used within the impacted zone at the site. (11-R04-001) (S. Huling (GWERD) 580-436-8610)





# ***HIGHLIGHTS***

**National Risk Management Research Laboratory  
Ground Water and Ecosystems Restoration Division  
Robert S. Kerr Environmental Research Center  
Status Report for the Week of October 17, 2010**

## **TECHNICAL ASSISTANCE**

Technical Assistance Region IX: On September 23, 2011, Mr. Steven Acree (GWERD) provided technical review comments to RPM Jere Johnson for the Aquifer Test Work Plan, Rev. 1, for the Yerington Mine Site, Yerington, Nevada. The revised plan and responses fully address previous comments. The plan appears to be of high quality and should provide a good data set for evaluating aquifer hydraulic properties. It is noted that the updated water balance calculations using the new pumping rate and test duration were not included in Attachment 7. If needed, minor adjustments can be made to either the test duration or pumping rate to ensure there is sufficient storage capacity for the produced water.

(11-R09-001)

(S. Acree (GWERD) 580-436-8609)

Technical Assistance Region I: On September 29, 2011, Dr. Richard Wilkin (GWERD), provided technical review comments to PG Kevin Heine for “Amendment No. 2, Permeable Reactive Barrier Pre-Design Investigation Work Plan (Hull Document No. NHB034.200.0033), South Municipal Water Supply Well Superfund Site, Peterborough, New Hampshire” dated July 27, 2011. The plan is intended to add additional field and lab activities to support the design of a permeable reactive barrier. These activities include installing up to eight additional monitoring wells, hydraulic performance pulse interference tests, and additional bench-scale testing. All of these tasks seem reasonable and should move forward as they are important to the overall design of the PRB. The work plan indicates that a trenchless PRB is being considered. The trenchless approach has merit, however, there are several factors to be considered when using this method. With regard to the column testing, if possible it would be desirable to have the testing also include the incorporation of the gel that would be used in the emplacement process.

(11-R01-004)

(R. Wilkin (GWERD) 580-436-8874)

Technical Assistance Region III: On October 5, 2011, Dr. Scott Huling (GWERD) and Dr. Saebom Ko (National Research Council) provided technical review comments to RPM Laura Johnson for the Oct. 4, 2011 memorandum involving the preservation of ground water samples, as outlined by *de maximis, inc.*, for the Fike/Artel Superfund Site, Nitro, West Virginia. It was reported that 3:1 concentration of ascorbic acid:persulfate would be amended to ground water samples that contained persulfate. Converting units of g-L/g-L to molar quantities, this is 3.3 ascorbic acid:persulfate (mol/mol). In general, this ratio appears appropriate. It is implied but not specifically stated that the aqueous samples in the three testing groups would be analyzed for HMPA. It is recommended that EPA confirm that these samples will be analyzed for HMPA.

(12-R03-001)

(S. Huling (GWERD) 580-436-8610)



# ***HIGHLIGHTS***

**National Risk Management Research Laboratory  
Ground Water and Ecosystems Restoration Division  
Robert S. Kerr Environmental Research Center  
Status Report for the Week of November 7, 2011**

## **TECHNICAL ASSISTANCE**

Technical Assistance Region IX: On November 2, 2011, Dr. Daniel Pope (Shaw Environmental & Infrastructure, Inc.), under the direction of Dr. David Burden (GWERD), provided technical review comments to RPM Penny Reddy on the *Work Plan For Trial Shutdown of Groundwater Extraction System* at the Middlefield-Ellis-Whisman Study Area (the Site), Mountain View, California, dated September 12, 2011. The Site has ground water in a shallow aquifer contaminated with chlorinated solvent VOCs. Currently, a ground-water extraction system (SCGWR) is operating to control and remove the VOCs. It is proposed in the Work Plan to shut down the SCGWR for two years or more to determine if natural attenuation processes are sufficient to control, and eventually remove, contaminants in the ground water. The proposed trial shutdown calls for a shutdown time, and a few sampling rounds, involving sampling of selected performance monitoring (PM) wells. It is recommended that the temporal density of sampling be increased, and that a more detailed rationale be provided for the choice of the wells. Also, it is particularly important that upgradient and sidegradient wells be sampled in addition to the on-site wells.

(12-R09-001

(D. Burden (GWERD) 580-436-8606)

Technical Assistance Region IX: On November 3, 2011, Mr. Steven Acree (GWERD) and Dr. Robert Ford (LRPCD) provided technical review comments to RPM Jere Johnson on the 2010 Monitor Well Installation and Agricultural Fields Characterization Data Summary Report (DSR) for the Yerington Mine Site, Yerington, Nevada. The work reported in this document greatly exceeds the scope of work originally proposed. In general, the work appears to be of high quality and greatly expands the knowledge base for the site. It should be noted that the calculated velocities are based on site-wide average aquifer hydraulic conductivity and, while useful in illustrating certain concepts of the general site conditions, likely underestimate field-scale transport velocities in some areas. It is suggested that caution be exercised in the use of the calculated velocities.

(12-R09-002)

(S. Acree (GWERD) 580-436-8609)

(R. Ford (LRPCD) 513-569-7501)

Technical Assistance Region X: On November 4, 2011, Dr. Scott Huling (GWERD) and Dr. Bruce Pivetz (Shaw Environmental & Infrastructure, Inc.), provided technical review comments to RPM Jonathan Williams and STL Kira Lynch on the “Fairchild AFB Priority Three Sites PBC Revision 1 Site SS-39 In-Situ Pilot Testing and Additional Characterization Activities, Completed in 2010 and 2011”. The focus of the review was on the sections addressing the pilot-scale deployment of in-situ chemical oxidation (ISCO). In general, ISCO deployment at pilot-scale utilizing permanganate has provided useful information to assess the potential for treatment performance under field conditions, and will assist in the design and deployment of ISCO at field-scale. The main limitation of the technology will be to address the issue of aquifer heterogeneities and variability in hydraulic conductivity which will strongly influence the extent to which the oxidant can be effectively and uniformly delivered to the targeted zone(s).

(12-R10-001)

(S. Huling (GWERD) 580-436-8610)



# ***HIGHLIGHTS***

**National Risk Management Research Laboratory  
Ground Water and Ecosystems Restoration Division  
Robert S. Kerr Environmental Research Center  
Status Report for the Week of November 14, 2011**

## **TECHNICAL ASSISTANCE**

Technical Assistance Region VII: On November 4, 2011, Dr. Eva Davis (GWERD) and Dr. Bruce Pivetz (Shaw Environmental & Infrastructure, Inc.), provided technical review comments to Region 7 Environmental Scientist, Ruby Crysler, on the *Draft SS-01 Corrective Measure Study, Environmental Restoration Services, McConnell Air Force Base, Kansas* (CMS), August 2011, prepared for United States Corps of Engineers, McConnell Air Force Base, Air Mobility Command, and Air Force Center for Engineering and the Environment by URS. The CMS presents an evaluation of potential remedial technologies and alternatives (corrective measures) for volatile organic compounds (VOCs) (primarily trichloroethene (TCE) and benzene) in ground water at site SS-01 at the McConnell AFB, Kansas. The document also presents site characterization data collected during 2011 for the purpose of determining if TCE dense nonaqueous phase liquid (DNAPL) is present at the site and to fully delineate the TCE and benzene plumes. It is recommended that additional figures be included in the CMS. These figures would help in identifying any additional gaps in the characterization data for the site, and would be useful to help evaluate remedial options. It is also recommended that additional monitoring data be included in the CMS.

(12RC07-001)

(E. Davis (GWERD) 580-436-8548)

## **SCIENTIFIC AND TECHNICAL PUBLICATIONS**

Su, C. (GWERD), J. W. Quinn (NASA). 2011. EZVI Injection Field Test Leads to Pilot-Scale Application. *Technology News and Trends*, U. S. Environmental Protection Agency, Cincinnati, OH. July 2011 (54): 4–6.

Kanel, Sushil R. (Air Force Institute of Technology), Chunming Su (GWERD), Upendra Patel (Dr. Jivraj Mehta Institute of Technology, India), Abinash Agrawal (Wright State University). 2012. Use of Metal Nanoparticles in Environmental Cleanup (Chapter 10), pp 271–319. *Nanoscale Multifunctional Materials: Science and Applications*, First Edition. © 2012 John Wiley and Sons, Inc. (Published online: 31 August 2011).

Harrison, Melanie D. (Univ. of MD), Peter M. Groffman (Cary Institute of Ecosystem Studies, Millbrook, NY), Paul M. Mayer (GWERD), and Sujay S. Kaushal (Univ. of MD). 2012. Microbial Biomass and Activity in Geomorphic Features in Forested and Urban Restored and Degraded Streams. *Ecological Engineering* 38 (2012) 1-10.



# ***HIGHLIGHTS***

**National Risk Management Research Laboratory  
Ground Water and Ecosystems Restoration Division  
Robert S. Kerr Environmental Research Center  
Status Report for the Week of November 28, 2011**

## **TECHNICAL ASSISTANCE**

Technical Assistance Region IV: On November 14, 2011, Dr. Randall Ross (GWERD) and Dr. Bruce Pivetz (Shaw Environmental & Infrastructure, Inc.), provided technical review comments to RPM Galo Jackson for the “Honeywell Brunswick Caustic Brine Pool Offsite/Onsite Treatment Evaluation Report, LCP Chemicals Superfund Site, Brunswick, GA”, dated November 2011. The report evaluated the results of conventional wastewater treatment technologies for the caustic brine pool (CBP) fluid waste extracted from the subsurface of the site. Remedial action objectives for the CBP fluid in the subsurface at the site are to decrease the pH and to reduce the density; as well as removal of mercury and other heavy metals. The report presents results of offsite CBP fluid treatment by Water Recovery, Inc. (WRI). Treatability tests were also conducted to evaluate potential onsite treatment for the CBP fluid. An important focus of the review was on the estimation of the volume of waste, which affects the duration of remediation at the site.

(12-R04-001)

(R. Ross (GWERD) 580-436-8611)

Technical Assistance Region IV: On November 15, 2011, Dr. Scott Huling (GWERD) provided technical review comments to RPM Debbie Vaughn-Wright for a summary presentation of the precipitation issues in the chemical oxidant injection wells at Cecil Field Naval Air Station, Site 16. Information provided by David Grabka (Florida Department of Environmental Protection, 11/3/11) was also used in the review. The “concentrated carbon source” appears to be the cause of the highly reduced ground water conditions and therefore the high concentrations of dissolved iron (Fe). Generally, ferrous iron ( $\text{Fe}^{+2}$ ) is ideal for Fenton treatment systems because of the role  $\text{Fe}^{+2}$  plays in the Fenton reaction. The steps and injection activities involving Fenton-driven In Situ Chemical Oxidation (ISCO) at the site is unclear. In general, it is unclear whether appropriate steps were performed to give ISCO a reasonable chance of success, and whether ISCO could be successful given site specific conditions.

(12-R04-002)

(S. Huling (GWERD) 580-436-8610)

Technical Assistance Region VI: On November 21, 2011, Dr. Daniel Pope (Shaw Environmental & Infrastructure, Inc.), under the direction of Dr. David Burden (GWERD), provided technical review comments to RPM Mike Hebert on the “Revised Feasibility Study (RFS) Report, Oklahoma Refining Company Superfund Site, Cyril, Oklahoma, February 2011.” In addition to this review, Dr. Burden and Dr. Pope conducted a site visit, lead by OKDEQ personnel, on September 22, 2011. In general, the RFS evaluation of the criteria seems appropriate. However, some components of the evaluation (in particular, the components of the Primary Balancing Criteria - Long-term Effectiveness and Permanence; Reduction of Toxicity, Mobility, or Volume through Treatment; Short-Term Effectiveness; Implementability; and Costs) should be carefully considered before choosing the final remedial approach.

(12-R09-001)

(D. Burden (GWERD) 580-436-8606)





# ***HIGHLIGHTS***

**National Risk Management Research Laboratory  
Ground Water and Ecosystems Restoration Division  
Robert S. Kerr Environmental Research Center  
Status Report for the Week of December 5, 2011**

## **TECHNICAL ASSISTANCE**

Technical Assistance Region IX: On November 22, 2011, Mr. Steve Acree (GWERD) provided continued technical support to RPM Jere Johnson in a technical review of Proposed Locations for 2012 Electronic Water Level Monitoring, Yerington Mine Site, Yerington, Nevada. The locations proposed for deployment of the pressure transducers/data loggers during 2012 appear to be appropriate to supplement data from the monthly water level monitoring program.

(12-R09-002)

(S. Acree (GWERD) 580-436-8609)

Technical Assistance Region VII: On November 22, 2011, Dr. Daniel Pope (Shaw Environmental & Infrastructure, Inc.), under the direction of Dr. David Burden (GWERD), provided technical review comments to RPM Lisa Gotto of the *Assessment of the Potential for Enhanced Bioremediation* for the Chemical Waste Management Site, Valley Center, KS. Additional documents were used to find information on contaminant concentrations over time in the various monitoring wells. In the Report, the use of an edible oil substrate to enhance the bioremediation of chlorinated VOCs in ground water is suggested. The proposed remedy is potentially suitable for the Site, and there are no serious data gaps in the site conceptual model. It is not clear that the existing monitoring wells are sufficient in number, density, and location to provide the needed detailed monitoring appropriate for acquiring the data needed. It is recommended that these detailed design calculations be implemented to ensure an adequate pilot study.

(12-R07-001)

(D. Burden (GWERD) 580-436-8606)

Technical Assistance Region IV: On November 28, 2011, Dr. Scott Huling (GWERD) and Dr. Bruce Pivetz (Shaw Environmental & Infrastructure, Inc.), provided technical review comments to RPM Robenson Joseph on the *Supplemental Feasibility Study Work Plan, West Florida Natural Gas Company Site, Ocala, Marion County, Florida*, November 7, 2011 (the work plan), prepared for TECO/Peoples Gas System by Arcadis. The work plan presents the proposed activities for additional site characterization at the West Florida Natural Gas Company Site, Ocala, FL, and for field and laboratory studies to evaluate in situ chemical oxidation (ISCO) to address manufactured gas plant (MGP) residuals-contaminated weathered limestone, "hard" (unweathered) limestone, and ground water at the site. It is recognized that some final decisions regarding the laboratory bench-scale study configuration cannot be made until the quantity of available NAPL-impacted sample and available NAPL is known. It is recommended that the tests not be initiated until the procedures have been reviewed and approved. It is also recommended that the work plan be revised to provide the metrics for defining success of the push-pull tests (e.g., recovery of a high percentage of the tracer to show that the injected fluids were recovered).

(12-R04-003)

(S. Huling (GWERD) 580-436-8610)





# ***HIGHLIGHTS***

**National Risk Management Research Laboratory  
Ground Water and Ecosystems Restoration Division  
Robert S. Kerr Environmental Research Center  
Status Report for the Week of December 12, 2011**

## **TECHNICAL ASSISTANCE**

Technical Assistance Region IX: On December 5, 2011, Mr. Steve Acree (GWERD), Dr. Randall Ross (GWERD), and Dr. Milovan Beljin (Shaw Environmental & Infrastructure, Inc.) provided technical review comments to RPM Stephen Tyahla on the *Carson Regional Groundwater Group Model Development Report*, Carson Ground Water Contamination Site, Carson, CA. The review focused solely on the major aspects of the updates to the 2005 groundwater flow model developed for the site. The 2005 model has been significantly improved as a result of the additional data collection and recalibration. The transport of the contaminants under various pumping scenarios was evaluated using particle tracking techniques. The particle tracking is a very efficient and useful tool for siting monitoring wells for verification of the model predictions. However, as with most groundwater flow models, uncertainties are inherent in the results. The uncertainties in this modeling effort were quantified to the degree possible using state-of-the-practice techniques. However, the model results should always be applied with caution and always validated with field data. Following the installation of a new sentinel well, it is recommended that hydraulic head data from this location be compared with values predicted by the model to provide a measure of validation for the model results in this area.

(12RC09-01)

(S. Acree (GWERD) 580-436-8609)

(R. Ross (GWERD) 580-436-8611)

Technical Assistance Region I: On December 8, 2011, Dr. Randall Ross (GWERD), and Dr. Milovan Beljin (Shaw Environmental & Infrastructure, Inc.) provided technical review comments to RPM Anna Krasko on the *Groundwater Flow and Solute Transport Modeling Report*, Picillo Pig Farm Superfund Site, Coventry, RI. These comments generally reflect issues brought up and discussed during the meeting on November 11, 2011. The contaminant source is arguably the most important input for the predictive runs. However, more information is needed regarding how the source(s) will be presented in the model. During the meeting, the concept of a declining TCE source was presented. Using more than one well to determine the percentage of TCE, however, could reduce the uncertainties in the model. More information is needed regarding how the contaminant source(s) will be presented in the model, and what criteria should be used when evaluating whether the model accurately simulates behavior of the plume(s). It is also recommended that the concept of a long-term tracer study be evaluated.

(12-R01-001)

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