



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 7, 2013

TECHNICAL ASSISTANCE

Technical Assistance Region IX: On December 15, 2012, Mr. Steven Acree (GWERD), and Dr. Robert Ford (LRPCD) provided technical review comments to RPM Jere Johnson on the *Site-Wide Groundwater Monitoring Plan, Rev. 2, Yerington Mine Site, Yerington, Nevada*. In general, the procedures described in this plan are technically sound. Recommendations include modifications to Figures and Tables to provide additional information and clarity. It is also recommended the meter calibration section include a description of calibration checks and frequency, and that purge volume criterion be specified.

(13-R09-001)

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

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

Technical Assistance Region VII: On December 13, 2012, Dr. Scott Huling (GWERD), provided technical review comments to RPO Brian Zurbuchen on the “Revised Final Feasibility Study Garvey Elevator Site, Hastings, Nebraska” prepared by HydroGeoLogic Inc. (transmitted to US EPA Region 7 in August, 2012). Conceptually, there is a concern that insufficient contact may occur between the oxidant and the target contaminants in the source area. There are significant challenges in the design of an ISCO system that assures both the delivery of sufficient quantity of oxidant to the targeted zone, and long term physical contact between the oxidant and target contaminants. It is recommended that future wells and exploratory borings in the source area be constructed in a manner that minimizes the potential for DNAPL migration, and that an aggressive soil vacuum system be selected as a component to the overall remedy. Actual results from a pilot study would likely provide the most representative and best data and information to make informed decisions.

(13-R07-001)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Su, Chunming (GWERD), Robert W. Puls (University of Oklahoma), Thomas A. Krug, Mark T. Watling, Susanne K. O’Hara (Geosyntec), Jacqueline W. Quinn (NASA), Nancy E. Ruiz (US Navy). 2012. A two and half year-performance evaluation of a field test on treatment of source zone tetrachloroethene and its chlorinated daughter products using emulsified zero valent iron nanoparticles. *Water Research* 46 (2012) 5071–5084.

Jones, Edward. H., Chunming Su (GWERD). 2012. Fate and transport of elemental copper (Cu0) nanoparticles through porous media in the presence of organic materials. *Water Research* 46 (2012) 2445–2456.

Seymour, Megan B. (University of Nebraska-Lincoln), Chunming Su (GWERD), Yang Gao, Yongfeng Lu, Yusong Li (University of Nebraska-Lincoln). 2012. Characterization of carbon nano-onions for heavy metal ion remediation. *Journal of Nanoparticle Research* (2012) 14:1087–1099.



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 21, 2013**

TECHNICAL ASSISTANCE

Technical Assistance Region IX: On January 2, 2013, Dr. Eva Davis (GWERD) provided technical review comments to RPM Carolyn D'Almeida on the *Draft Pre-Design Investigation Work Plan, Operable Unit 2, for Site ST012, at the Former Williams AFB, in Mesa, Arizona*, dated November 30, 2012. The purpose of the pre-design investigation is to better delineate the occurrence of light nonaqueous phase liquid (LNAPL) to refine the area to be remediated using steam injection. The investigation approach appears to be well thought out and is presented well in the document. However, it is recommended that additional boring be considered along Ulysses Avenue.
(13-R09-002) (E. Davis (GWERD) 580-436-8548)

Technical Assistance Region VII: On December 18, 2012, Dr. Daniel Pope (Shaw Environmental & Infrastructure, Inc.), under the direction of Dr. David Burden (GWERD), provided technical review comments to RPM Lisa Gotto on the *Monitored Natural Attenuation Program Evaluation, Area Immediately North of Facility* for the Chemical Waste Management Site, Valley Center, Kansas. The preliminary evaluation of monitored natural attenuation (MNA), the summary of Site geochemical data, and the proposals for a fuller evaluation of MNA as found in the MNA Program Evaluation appear to be reasonable efforts toward understanding what MNA could offer as part of the Site remedy. However, given that some wells have substantial concentrations of contaminants, it seems prudent to install additional wells to complete the transect of the plume and establish more precisely-defined lateral boundaries of the plume.
(13-R07-002) (D. Burden (GWERD) 580-436-8606)

Technical Assistance Region V: On December 19, 2012, Dr. Daniel Pope (Shaw Environmental & Infrastructure, Inc.), under the direction of Dr. David Burden (GWERD), provided technical review comments to RPM Donald Heller on the *Source Area Delineation and Enhanced Reductive Dechlorination (ERD) Bench Scale Study Workplan*, for the Demmer Properties, LLC/Former Motor Wheel Facility, Lansing, Michigan. Generally, the proposed Workplan appears to be a useful approach towards developing a better understanding of source materials, and for evaluating the potential effect of adding electron donors to enhance bioremediation at the Site. The Workplan does not provide any proposed efforts to investigate the area at the southeast portion of the Site where vinyl chloride has begun to appear. Also, some additional membrane interface probe (MIP) borings and other source area investigations could provide useful data for source control/removal efforts, as well as for implementation of ERD and MNA.
(13RC05-001) (D. Burden (GWERD) 580-436-8606)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Adeuya, Roxanne (GWERD), Nathan Utt, Jane Frankenberger, Laura Bowling, Eileen Kladviko, Sylvie Brouder, Brad Carter (Purdue University, Dept. of Agronomy, West Lafayette, IN) (2012). Impacts of drainage water management on subsurface drain flow, nitrate concentration, and nitrate loads in Indiana. *Journal of Soil and Water Conservation*, Nov/Dec 2012, vol. 67, no. 6, 474-484.



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 4, 2013**

TECHNICAL ASSISTANCE

Technical Assistance Region III: On January 14, 2013, Dr. Scott Huling (GWERD), provided technical review comments to RPM Darius Ostrauskas on the “Fike/Artel Site Trust, Full Scale Pilot Test Design Report for the Phase IA Sodium Persulfate Groundwater Treatment System”, Fike/Artel Superfund Site, Nitro, West Virginia. In general, aspects of data interpretation and proposed in-situ chemical oxidation (ISCO) activities presented in the report appear straight-forward. However, some matters require resolution prior to ISCO deployment. It should be noted that the existing infrastructure that currently exists at the site resulting from previous investigations and remedies may not be ideal for ISCO deployment. Compromises on some aspects of the system were needed to utilize the existing infrastructure and to achieve a timely and effective remedy. Utilization of existing infrastructure was therefore one of the criteria adhered to in the recommendations, including a more efficient injection design/strategy be considered involving the periodic injection of larger volumes of more dilute persulfate solutions.

(13-R03-002)

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

Technical Assistance Region II: On January 22, 2013, Dr. Daniel Pope (Shaw Environmental & Infrastructure, Inc.), under the direction of Dr. David Burden (GWERD), provided technical review comments to RPM Carla M. Struble on the *Draft Final – Workplan Monitored Natural Attenuation/ Plume Stability Study* (Workplan) for the Joint Base McGuire-Dix-Lakehurst site (JBMDL) located near Lakehurst, Ocean County, New Jersey. In general, the Workplan proposes to use standard methods and approaches to evaluating NA processes. However, there are several areas which should be considered while evaluating the appropriateness of the Workplan, and the potential viability of MNA as part of the JBMDL remedy. Soil and ground water at JBMDL have been contaminated with petroleum fuels and other contaminants, including chlorinated solvents. A pump and treat (P&T) system and air sparging/soil vacuum extraction system (AS/SVE) have been used to treat contaminated media. The Workplan does not provide contaminant/geochemical data, aquifer cross sections and well screen locations. The Workplan should present data to show the 3-dimensional extent of the plumes, and show that the wells are sufficient to bound and monitor all parts of the plumes.

(13-R02-001)

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

Technical Assistance Region IX: On January 28, 2013, Dr. Eva Davis (GWERD) provided technical review comments to RPM Carolyn d’Almeida on the *Draft Amended Proposed Plan for Operable Unit 2, Former Williams Air Force Base*. A Thermal Enhanced Extraction (TEE) pilot test was performed for this site. While TEE is not the chosen technology for the site, it has the same basis (steam injection and extraction) as the chosen technology, and the pilot demonstrated that the technology will enhance the recovery of LNAPL. It is recommended that additional information be provided on the successes of the TEE pilot and that LNAPL was removed from the subsurface. The Plan should indicate that the chosen technology has already been implemented at the site at a smaller scale, and it has been proven to be both safe and effective. It is also recommended any possible community concerns be addressed in the Plan.

(13-R09-002)

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



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 25, 2013**

TECHNICAL ASSISTANCE

Technical Assistance Region II: On January 23, 2013, Dr. Milovan Beljin (contractor for Shaw Environmental & Infrastructure, Inc.), under the direction of Dr. David Burden (GWERD), provided technical review comments to RPM Trevor Anderson on the *Site Optimization Study* (the report) for the *King of Prussia Technical Corporation Superfund Site*, Winslow Township, New Jersey. The report, by Roux Associates, Inc., was reviewed in January 2012. The report was updated and the portion of the report that addressed the hydraulic gradient comment was reviewed in November 2012. The original comment was that the hydraulic gradients for a select group of shallow monitoring wells were calculated in a way that is not a “true” hydraulic gradient. The revised document has addressed this issue by taking the distance between the groundwater contour lines, rather than the distance between the fixed points (i.e., the monitoring wells). The other concerns in the January 2012 review were addressed by providing additional text that acknowledged the lack of data and the uncertainties in the capture zone interpretation.

(13-R02-002)

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

Technical Assistance Region III: On February 1, 2013, Dr. Daniel Pope (Shaw Environmental & Infrastructure, Inc.), under the direction of Dr. David Burden (GWERD), provided technical review comments to RPM Rashmi Mathur on the *Phase II Treatability Pilot Study Report* (Report) For *Butz Landfill Site* (Site), dated July 2012. The Site is located in Jackson Township, Monroe County, Pennsylvania. The Site ground water is contaminated with trichloroethylene (TCE), 1,2-dichloroethene (DCE), and vinyl chloride (VC) derived from the Butz Landfill. A two-phase treatability study (Study) has been conducted at the Site to evaluate in situ bioremediation (ISB) for replacement of the existing pump and treat (P&T) system in order to reduce the restoration time for Site ground water. In general, the results of the pilot study indicate that enhanced bioremediation may have a useful role to play as part of the Site remedy. However, it is not clear that optimal conditions for bioremediation were achieved in the pilot study. The Report should be edited to provide a better presentation of the Site data to allow for easier understanding and interpretation of Site conditions and treatability study results.

(13-R03-003)

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

Technical Assistance Region IX: On February 20, 2013, Mr. Steven Acree (GWERD) and Dr. Robert Ford (LRPCD), provided technical review comments to RPM Jere Johnson on the *Site-Wide Groundwater Operable Unit (OU-1) Remedial Investigation Work Plan, Revision 1*, Yerington Mine Site, Yerington, Nevada. In general, the document provides an overview of characterization data obtained to support the remedial investigation and a general framework for completing the investigation. However, the plan does not contain a clear and concise discussion of the remaining data gaps to be filled during the remedial investigation. It is recommended that a brief section summarizing the remaining data gaps, particularly the data gaps requiring additional field data collection, be added to the work plan. It is also recommended that discussions of groundwater velocities in this document be prefaced with the notation that these are preliminary estimates that are likely to increase as more representative field-scale studies are finalized and incorporated. Inclusion of approximate submittal dates and time frames would aid in insuring timely completion of the activities.

(13-R09-001)

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

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



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 25, 2013**

TECHNICAL ASSISTANCE

Technical Assistance Region V: On March 5, 2013, Dr. Daniel Pope (CB&I), under the direction of Dr. David Burden (GWERD), provided technical review comments to RPM Pamela Moliter on the *Revised 30% Design Report For Remediation Enhancement* for the Chem Central Superfund Site, Wyoming, Michigan. The Site consists of soil and ground water contaminated with numerous contaminants, including petroleum hydrocarbons and chlorinated solvents. In general, the proposed remediation enhancement plan conceptually seems reasonable and potentially effective. However, it is likely that the proposed remediation enhancement plan will have to be adjusted and fine-tuned more or less continually, depending on the kind of reactive zone developing. It would be useful to present figures showing the chemical and geochemical changes from 2011 and onward. The data in tables should be presented by well, so that all the data over time for one well are together, making it easy to determine what changes have occurred in each well over time.

(13-R05-001)

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

Technical Assistance Region IX: On March 22, 2013, Dr. Milovan Beljin (contractor for CB&I), under the direction of Mr. Steven Acree and Dr. Randall Ross (GWERD), provided technical review comments to RPM Jere Johnson on the *Groundwater Flow Model Work Plan*, Yerington Mine Site, Yerington, Nevada. In general, the work plan provides a reasonable approach to development of the numerical model for groundwater flow at this site. However, several parameters rely on various levels of estimation. Given the importance of the modeling efforts to upcoming remedial decisions, it is recommended that additional attention be given to validation of both the critical data used in model construction as well as the final calibrated model. Also, it should be noted that a significantly higher level of detail will be needed in the report describing model calibration to facilitate its review.

(13-R09-001)

(S. Acree (GWERD) 580-436-8609) & (R. Ross (LRPCD) 580-436-8611)

Technical Assistance Region IX: On March 22, 2013, Mr. Steven Acree (GWERD) provided technical review comments to RPM Jere Johnson on the *2011 Monitor Well Installation Data Summary Report*, Yerington Mine Site, Yerington, Nevada. The report provides a concise summary of data collected under the On-Site Monitor Well Installation Work Plan and its amendments. No significant deficiencies were noted during this review.

(13-R09-001)

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

Technical Assistance Region VI: March 25, 2013, Dr. Ralph Ludwig (GWERD) and Dr. Robert Ford (LRPCD), provided technical comments to RPM Janet Brooks on the background conditions for a near-surface aquifer system that was created at the United Nuclear Corporation Church Rock Mill and Tailings Site, Church Rock, New Mexico, as a result of historical dewatering activities supporting uranium mining near the site. This is an opinion on the technical approach applied to establish background conditions for the artificial aquifer system prior to tailings disposal at the site. Given the conditions, it would be unrealistic to consider the artificial aquifer system as a viable source of water for human and/or animal consumption at present or in the future. Sustained decreases in water levels are being observed over time at the site consistent with the gradual dissipation of groundwater and gradual drying of the aquifer. The proposed clean-up levels for contaminants of potential concern using the statistically-based 95th percentile upper prediction limits (UPL95) for background water samples are reasonable and should be adopted.

(13-R06-001)

(R. Ludwig (GWERD) 580-436-8603) & (R. Ford (LRPCD) 513-569-7501)



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 15, 2013

TECHNICAL ASSISTANCE

Technical Assistance Region II: On March 28, 2013, Mr. Steven Acree (GWERD), Dr. Bruce Pivetz (CB&I), and Dr Daniel Pope (CB&I) provided technical review comments to RPM Clifford Ng on the “Response to Comments on Groundwater Characterization Report-Well 13 Area along Acid Brook”, DuPont Pompton Lakes Works, Pompton Lakes, New Jersey. In general, the responses adequately addressed the comments, and reflect an agreement to conduct the requested data collection, analysis, and/or planning. It appears acceptable that the responses have a narrower focus and that they address the relevant previous comments by deferring to the future Site-wide remedial activities. However, it is important to make certain that the data and evaluations for the Well 13 Area will be later integrated into the Site-wide groundwater remedial activities.

(13RC02-001)

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

Technical Assistance Region I: On April 1, 2013, Dr. Randall Ross (GWERD), Dr. Daniel Pope (CB&I), and Dr. Milovan Beljin (a contractor for CB&I) provided technical review comments to RPM Karen Lumino on the “2012 Groundwater Sampling and Monitored Natural Attenuation Report”, SRSNE Superfund Site, Southington, Connecticut. The proposed monitoring plans appear to be reasonable and to adequately monitor Site ground-water contamination and conditions, though changes may be necessary as further information about the Site is developed. It appears at this time that natural attenuation processes are contributing significantly to reduction of contaminant concentrations in the ground water. Another possible adverse change is a change in the supply of electron donors needed to drive cometabolism/reductive dechlorination. Current Site monitoring practices should provide the necessary data adequately detect such changes in Site conditions.

(13-R01-001)

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

Technical Assistance Region VI: On April 3, 2013, Dr. Scott Huling (GWERD) provided technical review comments to RPM Stephen Tzhone on the “2012 Annual Report, Arkwood Inc. Site, Omaha, Arkansas. There are several technical issues regarding the overall remedial strategy including (1) on-site clean water injection and on-site ozonation treatment, (2) ground water treatment at the New Cricket Spring, (3) dye testing, and (4) a conceptual site model. It is recommended that on-site clean water injection near the sinkhole be permanently discontinued. It is also recommended that a critical review be performed of site data and information to assess whether this condition exists, and that a fate and transport investigation be conducted to assess the extent to which contaminated ground water may be leaving the site. Assuming previous site characterization activities and the resulting data and information have not been previously generated, it is recommended that site characterization be conducted to assess the fate and transport of PCP-contaminated ground water within the property boundary.

(13-R06-002)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Chiu, Chao-An (AZ State University, Tempe, AZ), Kiril Hristovski (AZ State University, Mesa, AZ), Scott Huling (GWERD), Paul Westerhoff (AZ State University, Tempe, AZ). 2013. In-situ regeneration of saturated granular activated carbon by an iron oxide nanocatalyst. *Water Research* 47 (2013) 1596-1603.



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 22, 2013

TECHNICAL ASSISTANCE

Technical Assistance Region VI: On April 5, 2013, Dr. Scott Huling (GWERD) provided technical review comments to RPM Stephen Tzhone on the document entitled, “Thomas Aley – Letter Report 10-11-12 Ozark Underground Laboratory”. One of the main findings of this review is whether contaminated ground water exiting the site was fully captured by New Cricket Spring. Recommendations were provided regarding the importance of additional site characterization and the development of a conceptual site model (CSM).

There is a high potential that NAPL residuals currently exist at the Arkwood site and that they will persist for a very long period of time despite water treatment at New Cricket Spring. Significant developments in site characterization and remediation of sites containing NAPLs have occurred over the last 22 years since the ROD was issued. During the current 5 year review period, it is recommended that EPA Region 6 consider a re-review of existing site characterization data and information, the need to develop a more accurate CSM which advances the understanding of (1) the nature and extent of waste residuals that currently exist at the site, (2) the ground water flow directions/patterns, (3) contaminant fate and transport, and (4) whether New Cricket Spring captures all of the contaminated water that emanates from the site. It is also recommended that a hydrogeologic investigation be initiated that includes the review of previous ground water investigations reports, remedial investigations, etc.

(13-R06-002)

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

Technical Assistance Region V: On April 12, 2013, Dr. Ann Keeley (GWERD) provided technical review comments to RPM David Petrovski on the “Aquifer Vulnerability - Contaminant Time versus Contaminant Decay”, Region 5 draft analysis for the proposed Clinton Landfill on the underlying Mahomet Aquifer in Dewitt County, Illinois. Region 5 correctly considered the retardation coefficient and degradation in their PCB model transport and transformation calculations. They also recognize that these input parameters vary with the molecular weight and amount of chlorination of the various isomers of PCBs. It is suggested that the Region emphasize the concept of PCB transport and transformation rather than the numerical results.

(13-R05-003)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Passeport, Elodie (Univ. of CA at Berkeley, Berkeley, CA), Philippe Vidon (State Univ. of NY, Syracuse, NY), Kenneth J. Forshay (GWERD), Lora Harris (Univ. of Maryland, Solomons, MD), Sujay S. Kaushal (Univ. of Maryland, College Park, MD), Dorothy Q. Kellogg, Julia Lazar (Univ. of Rhode Island, Kingston, RI), Paul Mayer (formerly of GWERD) (currently with U.S. EPA Region 10), Emilie K. Stander (American Association for the Advancement of Science/United States Agency for International Development, Office of Water, Washington, DC). 2013. Ecological Engineering Practices for the Reduction of Excess Nitrogen in Human-Influenced Landscapes: A Guide for Watershed Managers. *Environmental Management* (2013) 51:392-413. DOI 10.1007/s00267-012-9970-y.



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 29, 2013**

TECHNICAL ASSISTANCE

Technical Assistance Region V: On April 10, 2013, Dr. Daniel Pope (CB&I), under the direction of Dr. David Burden (GWERD), provided technical review comments to RPM Leah Evison on the *Work Plan/Field Sampling Plan for Supplemental Remedial Investigation* for the Burlington Northern Railroad Tie Treatment Facility Superfund Site located in Brainerd and Baxter, Minnesota. In general, the characterization efforts proposed in the Work Plan seem useful for further delineating soil and ground-water contamination at the Site. The tools proposed for use seem well-suited for achieving the Work Plan objectives, assuming that the quantitative soil and ground-water sampling effort is used to correlate with and confirm the qualitative TarGOST and MIP sampling effort. However, the TarGOST/EC sampling locations do not adequately cover the footprint of the former RCRA lagoon, and it is recommended that another location be considered for TarGOST sampling.
(13-R05-002) (D. Burden (GWERD) 580-436-8606)

Technical Assistance Region IV: April 10, 2013, Dr. Eva Davis (GWERD) provided technical comments to RPM Jennifer Tufts on the “90% Remedial Design Report *In Situ* Source Treatment Using Deep Soil Mixing for the Southwest Groundwater Plume Volatile Organic Compound Source at the C-747-C Oil Landfarm (Solid Waste Management Unit 1) for the Paducah Gaseous Diffusion Plant,” Paducah, Kentucky. The review has presented several concerns. First, the RDR cannot be considered a 90% design because a vendor for the technology is not yet on board to provide a design for Agency review. Another concern is that the estimate of the amount of mass in the source zone is significantly biased low. A third concern is that the remedial action objectives (RAOs) for the Paducah Solid Waste Management Unit 1 (SWMU 1) are more stringent than the RAOs for the three corrective measures described in the reports provided, and thus, these reports do not demonstrate that the RAOs for the Paducah site can be achieved.
(13-R04-001) (E. Davis (GWERD) 580-436-8548)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Liu, Xuyang, Gexin Chen (NRC, GWERD), Arturo A. Keller (Univ. of CA, Santa Barbara, CA), Chunming Su (GWERD). 2013. Effects of dominant material properties on the stability and transport of TiO₂ nanoparticles and carbon nanotubes in aquatic environments: from synthesis to fate. *Environ. Sci.: Processes Impacts*, 2013, 15, 169-189. DOI: 10.1039/c2em3062e.
(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 May 13, 2013**

TECHNICAL ASSISTANCE

Technical Assistance Region IX: On April 16, 2013, Dr. Eva Davis (GWERD) provided technical review comments to RPM Yvonne Fong on the *Draft NAPL Treatment Pilot Study Work Plan for Installation Restoration Site 03, Former Oily Waste Ponds, Parcel E, Hunters Point Naval Shipyard, San Francisco, California*. The review concentrated on the pre-design characterization activities and the proposed in situ thermal remediation pilot study. There are concerns about the proposed location for the thermal treatment Pilot Study, and it is recommended that a more complete design for the thermal treatment pilot study should be provided. Also, while the Work Plan proposed the use of a Triad approach for the pre-design characterization, the information needed to use the Triad approach is not included in the Work Plan. Decision criteria on where to locate HPT borings and soil borings are also needed. Additionally, more information should be provided in the Work Plan for the thermal pilot study.

(13-R09-004)

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

Technical Assistance Region X: On April 22, 2013, Dr. Daniel Pope (CB&I), under the direction of Dr. David Burden (GWERD), provided technical review comments to RPM Denise Baker on the *Development of Data Quality Objectives (DQOs) for sampling private wells near the North Ridge Estates Site (Site), Klamath Falls, Oregon*. As discussed in a previous review, the U.S. EPA provides various kinds of guidance for developing DQOs for a project. This guidance was used to evaluate the development of DQOs for the Site with a seven-step process. This process included 1) state the problem that is to be solved, 2) identify the goal of the study, and decisions to be made, 3) identify the data needed to make the decision, 4) define the boundaries of the study, 5) develop an evaluation approach and the decision rules, 6) specify criteria for accepting or rejecting data for use, and for dealing with decision errors, and 7) develop a sampling plan.

(13-R10-001)

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

Technical Assistance Region V: On May 3, 2013, Dr. Daniel Pope (CB&I), under the direction of Dr. David Burden (GWERD), provided technical review comments to RPM Donald Heller on the *Bench-Scale Treatability Study And Proposed Pilot-Scale Final Design Report* (Eli Lilly & Company) for the Evonik Degussa Corporation Tippecanoe Laboratories Site, Tippecanoe County, Indiana. The proposed treatment train includes in-situ chemical oxidation (ISCO) in source areas, followed by enhanced bioremediation, and finally, monitored natural attenuation (MNA) in the source and plume areas. The Report details the results of a bench-scale ISCO test. In general, the results of the bench-scale test indicate that ISCO could contribute to a significant reduction of concentrations of many of the Site COCs, assuming management of the full-scale ISCO operation was appropriate. It seems worthwhile to proceed with the pilot-scale ISCO tests. However, some characteristics of the way the bench-scale study was conducted mean that there is considerable uncertainty connected with interpretation and application of the results.

(13RC05-001)

(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 June 10, 2013**

TECHNICAL ASSISTANCE

Technical Assistance Region II: On May 3, 2013, Dr. Daniel Pope (CB&I), under the direction of Dr. David Burden (GWERD), provided technical review comments to RPM Carla M. Struble on the *Actions Taken on Comments* on an earlier review of the *Draft Final Workplan MNA/Plume Stability Study, Joint Base McGuire-Dix-Lakehurst*, Lakehurst, New Jersey. The comments from the earlier review are still relevant. For example, it is not clear how source control will be conducted (as also noted in the State of NJ comments, NAPL is found in some wells, so source control efforts will be necessary, as expected by USEPA guidance on MNA (OSWER Directive 9200.4-17P)). Also, the monitoring network does not appear to meet the U.S. EPA guidelines in terms of clearly defining the 3-dimensional configuration of the plumes. Site constraints may limit the number and placement of sampling wells, but it should be noted that such a limited monitoring network constrains the reliability of the evaluation techniques proposed in the Workplan.

(13-R02-001)

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

Technical Assistance Region IV: On May 7, 2013, Dr. Eva Davis (GWERD) provided technical review comments to RPM Jennifer Tufts on the *Operations and Maintenance (O&M) Plan for Phase IIa of the Interim Remedial Action for the Volatile Organic Compound Contamination at the C-400 Cleaning Building at the Paducah Gaseous Diffusion Plant*, Paducah, Kentucky. Various sections in the O&M Plan discuss operational shutdowns. Heating of the subsurface should not continue when the vapor and ground water extraction and treatment systems are not operational. Continued heating of the subsurface when the extraction systems are down will cause additional loss of control of contaminant vapors and contaminated ground water. This is particularly important at this site because of the high ground water flow rate in the regional gravel aquifer (RGA). Also, it is of particular importance to turn off the ERH system if the vapor treatment system is shut down due to high volatile organic compound concentrations in the effluent. Also, there is a lack of a clear definition of the sampling and analysis that will be done to monitor the progress of the remediation so that the decision on when the system can be shut down can be made in a timely manner. The necessary data needed to make this determination should be clearly spelled out, and the frequency of the data collection stated. This data should be made available to EPA and the State of Kentucky at the time it is collected so that a timely determination can be made on when to turn the system off. Delays in communicating the data to the Agencies can cause a delay in reaching concurrence that the system can be shut down.

(13-R04-001)

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

Technical Assistance Region II: On May 31, 2013, Dr. Daniel Pope (CB&I), under the direction of Dr. David Burden (GWERD), provided technical review comments to RPM Carla M. Struble on the *Revised Response to Comments Lakehurst MNA Plume Stability Work Plan May 17, 2013* for the Joint Base McGuire-Dix-Lakehurst (JBMDL), Lakehurst, New Jersey. Generally, it seems reasonable that the proposed study of natural attenuation processes should proceed. However, there are some problematic areas connected with remedy operations (e.g., contingency triggers) and interpretation of data derived from the proposed study. These issues, as well as comments expressed earlier in the Review of Actions should be addressed.

(13-R02-001)

(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 June 17, 2013**

TECHNICAL ASSISTANCE

Technical Assistance Region IX: On June 6, 2013, Dr. Milovan Beljin (sub-contractor for CB&I), under the direction of Mr. Steven Acree (GWERD), provided technical review comments to RPM Jere Johnson on the *Groundwater Flow Model Work Plan, Rev. 1*, Yerington Mine Site, Yerington, Nevada. The work plan revisions adequately address the comments that were provided. It is recommended that the groundwater flow model calibration phase proposed in this work plan proceed.

(13-R09-001)

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

Technical Assistance Region IX: On June 7, 2013, Mr. Steven Acree (GWERD) and Dr. Robert Ford (LRPCD) provided technical review comments to RPM Jere Johnson on the *2012 Annual Groundwater Monitoring Report Proposed Modifications* to the site-wide groundwater monitoring plan, Yerington Mine Site, Yerington, Nevada. The report proposes a reduction in monitoring frequency. It is recommended the monitoring frequency remain quarterly for a specific group of wells. Semi-annual monitoring is sufficient for the remaining wells. If future evaluations of the data from any given well or specific data uses indicate the need for increases or decreases in monitoring frequencies, additional adjustments can be made. In addition, it is recommended that one well be properly abandoned, as proposed. It is proposed to reduce the suite of analytes that are routinely monitored based on the frequency of detection. Although a review of the data indicates that routine monitoring of several of the parameters provides little additional information useful for supporting the data quality objectives of the RI/FS, it is recommended that an evaluation with a stronger technical basis be applied to most of the parameters proposed for elimination. Also, it is recommended that the routine monitoring of hydraulic head in these piezometers be ceased, as proposed. However, it is recommended that these piezometers be moved to the inactive list rather than abandoned, as there may be a future need for additional monitoring.

(13-R09-001)

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

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

Technical Assistance Region III: On June 12, 2013, Dr. Daniel Pope (CB&I), under the direction of Dr. David Burden (GWERD), provided technical review comments to RPM Rashmi Mathur on the "Response to Comments" for the Phase II Treatability Pilot Study Report, Butz Landfill Site, Jackson Township, Pennsylvania. The Report concerned a two-phase pilot treatability study (Study) conducted at the Site to evaluate in situ bioremediation (ISB) for replacement of the existing pump and treat (P&T) system in order to reduce the restoration time for Site ground water. The choice between the two remediation approaches is a difficult one for the Site. It is noted that the pilot-scale bioremediation system did not perform optimally. The technical issues with the pilot-scale bioremediation effort could possibly be overcome; however, these issues mean that the proposed full-scale effort would in reality be somewhat of a "next-phase pilot-scale effort" because so many issues have to be dealt with to develop a successful remedial approach. It could be useful to plan to roll out the full-scale effort in a phased manner so that adjustments could be made as implementation proceeds. Given the need for a contingency remedy, the possible use of the pump and treat (P&T) system as a circulation aid, it seems likely that the P&T system will continue to be used in some capacity whatever choice may be made about the use of bioremediation.

(13-R03-003)

(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 July 8, 2013**

TECHNICAL ASSISTANCE

Technical Assistance Region VII: On June 13, 2013, Dr. Scott Huling (GWERD) and Dr. Bruce Pivetz (CB&I) provided technical review comments to CAO Ruby Crysler on the *2012 Annual Remedy Performance Report, 2040 West River Drive, Davenport, Iowa* (the ARPR), February 2013, and the *Operation, Monitoring, and Maintenance Plan, 2040 West River Drive, Davenport, Iowa* (the OMMP), July 2012. The focus was on *Appendix C, ISCO Injection Plan* (the ISCO Plan). The overall assessment of the ISCO Plan is that as a stand-alone document, it is not sufficient to demonstrate that the proposed injection and sampling program is appropriate and sufficient. However, given that there have been four or five full-scale injection events to date, it may have been considered that the proposed additional injections would be routine and that there was sufficient experience in implementing the injections. Thus, a very detailed ISCO work plan would not be necessary as Appendix C. In order to fully determine if the ISCO injection program has been designed and conducted appropriately in the past, it would be necessary to review additional documentation, including a more detailed work plan for the proposed additional injections. In general, the Annual Remedy Performance Report (ARPR) reflects a detailed analysis of the ground-water monitoring results using a variety of statistical and graphical methods. However, the full picture of remediation for all of the contaminants should be discussed. (13-RC07-001) (S. Huling (GWERD) 580-436-8610)

Technical Assistance Region II: On June 24, 2013, Mr. Steven Acree (GWERD), Dr. Bruce Pivetz (CB&I), and Dr. Daniel Pope (CB&I) provided technical review comments to RPM Clifford Ng on the *Supplemental Onsite Groundwater Investigation Report, DuPont Pompton Lakes Works, Pompton Lakes, New Jersey*. In general, the studies reported in these documents provide additional information useful in understanding groundwater conditions at the site and appear to fulfill the stated objectives. The Supplemental Report recommends that the localized exceedances be addressed through re-evaluation of the groundwater monitoring program and modification. This review concurs with those recommendations. The Annual Report presents and discusses the results from 2012 ground-water sampling. In general, conclusions drawn in this report appear to be appropriate on a technical basis. It is recommended that piezometers be installed adjacent to active extraction wells where large cones of depression are currently depicted, and that future reports provide information regarding the volumes of extracted groundwater from each of the pumping wells. (13RC02-001) (S. Acree (GWERD) 580-436-8609)

Technical Assistance Region V: On June 28, 2013, Dr. Daniel Pope (CB&I), under the direction of Dr. David Burden (GWERD), provided technical review comments to Mirtha Capiro, Environmental Scientist, on the *Corrective Measures Proposal (CMP)*, and the *Site-Wide Groundwater Monitoring Report (GWMR)* for the RACER Moraine Facility – Former GM Engine and Assembly Plants (Site) located in Moraine, Ohio. Generally, the Conceptual Site Model (CSM) appears to be reasonably consistent with the hydrogeology and contaminant data presented. The corrective measures options considered and the screening process were appropriate. However, there are some problematic areas, because the proposed corrective measures do not directly address the source issues in terms of actually remediating the source areas in a reasonable amount of time. It is recommended that remedies for the off-site soil vapor problem, both in the neighborhood and outside the neighborhood, be implemented. (13RC05-003) (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 July 29, 2013**

TECHNICAL ASSISTANCE

Technical Assistance Region VII: On June 28, 2013, Dr. Daniel Pope (CB&I), under the direction of Dr. David Burden (GWERD), provided technical review comments to RPM Diana Engeman on “Manganese (Mn) as a Chemical of Concern at Three Manufactured Gas Plant Sites in U.S. EPA Region 7.” Two of the sites already have Technical Impracticability (TI) Waivers on or near the source area and the other site is contemplating a TI Waiver. Monitored natural attenuation (MNA) is being evaluated for the downgradient portion of the groundwater plumes outside of the TI zones. Mn at these sites has exceeded Regional screening levels. Generally, Mn mobility would be expected to be enhanced under high organic loading, low oxygen or anaerobic conditions, and a low to neutral pH, which conditions are relatively common at MGP sites. In contrast, when these geochemical conditions are changed, Mn would tend to be significantly reduced in mobility. This effect could be the basis of an MNA remedial approach to Mn in ground water.

(13-R07-003)

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

Technical Assistance Region IX: On July 3, 2013, Mr. Steven Acree (GWERD), and Dr. Robert Ford (LRPCD) provided technical review comments to RPM Jere Johnson on the *Additional Monitor Well Work Plan*, Yerington Mine Site, Yerington, Nevada. In general, the work proposed in the plan appears to be responsive to previous comments regarding remaining OU-1 site characterization data gaps. In addition to the monitoring well installation and sampling proposed in the current work plan, it is recommended that water quality sampling of the agricultural production wells located east of West Campbell Ditch be initiated under a separate and concurrent effort. At a minimum, it is recommended that these wells be sampled at least three times during the agricultural season. It is also recommended that the work plan be revised to identify the potential utility of surface geophysical methods. It is suggested that additional data be assessed during the groundwater modeling and following the characterization proposed in this work plan.

(13-R09-001)

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

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

Technical Assistance Region IX: On July 3, 2013, Dr. Eva Davis (GWERD) provided technical review comments to RPM Carolyn d’Almedia on the *Draft Record of Decision Amendment 2, Groundwater, Operable Unit 2 (OU-2), Site ST012, Former Williams Air Force Base, Mesa, Arizona*, dated June 6, 2013. In general, the Record of Decision Amendment (RODA) is well written and explains well the need to amend the previous RODA, and what changes are being made. It is recommended that careful consideration be given to the time period required to demonstrate that the cleanup levels have been attained. It should be made clear that the steam injection portion of the remedy will only require approximately a two year period, and the remainder of the 20 year time frame, during which enhanced biodegradation and MNA are occurring, will involve much less risk to the community and the environment. It is also recommended that Section 6.9 be updated to include any comments from the community.

(13-R09-002)

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



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 2, 2013**

TECHNICAL ASSISTANCE

Technical Assistance Region V: On June 4, 2013, under the direction of Dr. David Burden (GWERD), Mr. Rob Earle and Dr. Ke Liu (CB&I), provided technical review comments to Todd Ramaly, on documents associated with the Honeywell Surface Impoundments Site located in Metropolis, Illinois. Pertinent sections of the Andrews report Model Analysis of Fluid and Solute Movement through In-Situ Soil Liner (2012) were reviewed. Overall, the report is comprehensive, well researched, and well organized. While the current conceptual scenario of leaching from the trench to the water table is studied by the report, CSMoS suggests further investigation. The justification of the starting year (1985) is unclear in the Andrews report; however the calibrated results seem to indicate this timeframe to be reasonable for the predicted and measured arrival of fluoride. A more recent date may lead to a higher calibrated infiltration rate (i.e. higher hydraulic conductivity) for the soil liner. While the calibration is history matching and focuses on properties of the soil liner, the predicted groundwater concentration in 2020 is anticipated to be sensitive to properties of the sand that lie between the lysimeter and groundwater. A full range uncertainty analysis on the sand properties is suggested (i.e. saturated hydraulic conductivity and unsaturated flow parameters).

(13RC05-004)

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

Technical Assistance Region IX: On June 28, 2013, Dr. Daniel Pope (CB&I), under the direction of Dr. David Burden (GWERD), provided technical review comments to RPM Lynda Deschambault on the Natural Attenuation of Chlorinated Solvents at the Omega Chemical Corporation Superfund Site, Whittier, California. The Omega Chemical Site PRP Organized Group (OPOG) proposes monitored natural attenuation (MNA) as part of the Site remedy. USEPA Region IX plans to implement a pump and treat remedy to capture and remediate the groundwater contaminant plume, which is specified in the Record of Decision (ROD) for the site. While there does appear to have been some reductive dechlorination taking place in the Omega plume, PCE and TCE are still present throughout the plume. There does not appear to be strong evidence that reductive dechlorination is a major factor in removing PCE and TCE throughout the plume. Well purging data indicate that only a few of the wells sampled were under low DO and low redox (ORP) conditions likely to be suitable for reductive dechlorination. Generally, the plume appears to be under moderately aerobic conditions. Therefore it appears likely that the role of reductive dechlorination in most of the plume is limited.

(13-R09-006)

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

Technical Assistance Region IX: On June 28, 2013, Dr. Milovan Beljin (CB&I), under the direction of Dr. David Burden (GWERD), provided technical review comments to RPM Lynda Deschambault on documents regarding the groundwater contamination at Operable Unit 2 (OU2) of the Omega Chemical Corporation Superfund Site (Omega Site) located in Whittier, California. 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. One of the issues raised is whether a single contaminant source could generate a 4.5 mile-long plume. None of the existing conditions at the Omega Site preclude development of a 4.5 mile plume. The input parameters of the analytical model appear to be reasonable and within the acceptable range. In addition to the analytical model, the transport modeling was implemented using a numerical model (FEFLOW). However, the focus should be on the field data - i.e., the plume is continuous and the geometry of the plume does not suggest other significant contaminant sources along the flow path from the Omega site.

(13-R09-006)

(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 September 2, 2013**

TECHNICAL ASSISTANCE

Technical Assistance Region IV: On July 23, 2013, Dr. Eva Davis (GWERD) provided technical review comments to RPM Jennifer Tufts on the “Remedial Design Report (RDR) *In Situ* Source Treatment Using Deep Soil Mixing for the Southwest Groundwater Plume Volatile Organic Compound Source at the C-747-C Oil Landfarm (Solid Waste Management Unit 1) at the Paducah Gaseous Diffusion Plant in Paducah, Kentucky,” dated June 2013. It is recommended that the performance of the proposed technology, large diameter auger (LDA) soil mixing with the injection of steam and hot air, followed by zero valent iron (ZVI) injection, should be verified for this site to determine what operational parameters and completion criteria will meet the soil cleanup criteria in a cost effective manner. In order to ensure that the system is functioning as designed and meeting the soil cleanup criteria, soil cores should be obtained during the testing phase and analyzed for the contaminants of concern (COCs). Hot soil sampling techniques can be used to obtain valid soil samples without waiting for the subsurface to cool, and this is not a significant increase to the project in terms of scope, time or costs. Also, it is not clear why comparison of this RDR to the RDR for another federal facility should have a bearing on what design information is requested for the Paducah Oil Landfarm facility.

(13-R04-001)

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

Technical Assistance Region II: On July 29, 2013, Mr. Steven Acree (GWERD) provided technical review comments to RPM Clifford Ng on the *Implementation Work Plan-Hydraulic Surcharging Pilot Study, DuPont Pompton Lakes Works, Pompton Lakes, New Jersey*. In general, the proposed system design appears to be viable. However, it is recommended that the monitoring program be enhanced to allow more rapid and definitive determinations of the effectiveness of the system in reducing contaminant concentrations. Further, it is recommended that consideration be given to obtaining detailed water quality profiles within the shallow zone at a few locations sufficiently close to the horizontal well. The monitoring system near the plant boundary should be enhanced through the installation of additional piezometers. It is also recommended that existing infrastructure not be removed until the effects of the new injection well on groundwater conditions and chemistry have been evaluated and sufficient time has elapsed to allow determination of the maintenance that will be associated with the horizontal injection well.

(13RC02-001)

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

Technical Assistance Region VII: On August 20, 2013, Dr. Randall Ross provided technical review comments to RPM Bruce Morrison on the “Pilot/Bench Test Work Plan, Former Chamberlain Manufacturing Corporation Site, Waterloo, Iowa,” dated July 2013. The Work Plan presents a reasonable approach to characterizing the extent of subsurface contamination in the study areas. The use of the membrane interface probe (MIP) should be capable of identifying the vertical extent of the contaminants of concern (COC). However, the lateral extent may or may not be captured by the proposed configuration. As indicated in the Work Plan, additional MIP locations may be required to fully delineate the lateral extent of the COCs. Similarly, use of soil conductivity logging (in conjunction with the MIP), hydraulic pressure testing (HPT) and use of a high resolution injection tool (HRIT) will provide good vertical characterization of subsurface properties that will control fluid movement in the subsurface. The use of these tools at additional locations may be required to capture the spatial variability of subsurface properties.

(13RC07-002)

(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 September 16, 2013**

TECHNICAL ASSISTANCE

Technical Assistance Region I: On August 21, 2013, Dr. Eva Davis (GWERD) provided technical review comments to Steve Johnson, Massachusetts Department of Environmental Quality, on the “Data Gap Action Plan Report for General Chemical Corporation (GCC), located in Framingham, Massachusetts,” dated May 31, 2013. The Report correctly uses a partitioning calculation to estimate the soils concentrations that are indicative of the presence of a multi-component dense nonaqueous phase liquid (DNAPL) comprised of the four most commonly detected chlorinated volatile organic compounds (CVOCs) at this site. However, the Report does not recognize the effect of the presence of multiple components on the solubility of CVOCs, and incorrectly uses the solubility of the pure phase CVOCs, rather than their effective solubility in a mixture, as the indicator of DNAPL presence based on groundwater concentrations. Thus, the Report underestimates the extent of DNAPL at the site. While the data collected during the Data Gap Investigation is useful to further our understanding of the GCC site, 15 wells with sumps do not cover adequately the range of areas where mobile DNAPL may occur. Thus, the Report should not over-interpret the lack of observation of DNAPL in wells to conclude that mobile DNAPL does not exist at the site. (13RC01-001) (E. Davis (GWERD) 580-436-8548)

Technical Assistance Region I: On August 27, 2013, Dr. Eva Davis (GWERD) provided technical review comments to RPM Cheryl Sprague on the “60% Intermediate Thermal Design Report for the Beede Waste Oil Superfund Site in Plaistow, New Hampshire,” dated June 2013. The review focused on the design of the thermal remediation system. The Report states that a small pilot steam injection may be performed in the Phase 2 area during the implementation of Phase 1. A work plan should be provided for this pilot scale steam injection for review with the 90% Thermal Design Report. Temperatures at the extraction wells would appear to be especially important information to determine the distribution of steam vertically in the subsurface and when steam breakthrough at the extraction wells occurs. Thus it must be ensured that adequate temperature data is collected. The Report states that soil data are more important in evaluating the degree of treatment than groundwater or vapor samples. The groundwater and vapor phase data should be of equal importance as the soil samples when evaluating the degree of treatment within a volume of the treatment area. (13-R01-002) (E. Davis (GWERD) 580-436-8548)

Technical Assistance Region IV: On August 29, 2013, Dr. John T. Wilson (GWERD) provided technical review comments to Superfund & Technology Liaison, Rob Weber, and RPM Kurt Limesand on documents concerning the Sioux City Airport site in Sioux City, Iowa, including two forensics analysis reports prepared by Hurst and Associates, Inc., as well as recent tank site gauging reports. The forensics analysis reports provided by Dr. Hurst cannot be used to identify or bracket the age of the spills, and in particular the reports cannot be used to identify whether the fuel was spilled by the U.S. military. However, I strongly recommend that you sample the ground water for concentrations of 1,2-dibromoethane (EDB). This lead scavenger can be present at high concentrations in avgas. (13RC07-003) (J. Wilson (GWERD) 580-436-8534)



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 23, 2013**

TECHNICAL ASSISTANCE

Technical Assistance Region II: On September 3, 2013, Dr. Scott Huling (GWERD) provided technical review comments to RPM Trevor Anderson on the “In-Situ Chemical Oxidation Pilot Study Work Plan – Shallow Ground Water Zone” (Plumsted Township, NJ, August 2013). Also reviewed was Appendix B of the work plan (Bench Scale Treatability Study Report Goose Farm Superfund Site, Plumsted Township, New Jersey, August 9, 2013) that presented the results of the treatability study preceding the work plan. Significant time and expense will be required to execute the steps associated with the proposed in-situ ozone sparging pilot study. Due to several potential limitations and disadvantages, it is recommended that the remedial team re-evaluate in-situ ozone sparging relative to other candidate oxidants prior to final selection.
(13-R02-006) (S. Huling (GWERD) 580-436-8610)

Technical Assistance Region VI: On September 4, 2013, Dr. Scott Huling (GWERD) provided technical review comments to RPM Stephen L. Tzhone on “Remedial Investigations (RI) Report (Vol. 1 and II), Arkwood Inc. Site, March 3, 1990.” It is proposed that the data and information presented in the RI is insufficient to develop consistent ground water piezometric and ground water flow maps. Consequently, it cannot be concluded that all of the contaminated ground water that exits the site is captured by the New Cricket Spring. It is recommended that a hydrogeologic investigation be initiated that includes the review of previous ground water investigation reports, remedial investigations, etc. This data and information should be compiled in a manner that presents a detailed analysis of ground water flow direction, and contaminant fate and transport. This information partially exists in the RI Report, but may also be present in other reports. Data gaps in the hydrogeologic conceptual site model should be identified. Assuming data gaps exist, it is recommended that a workplan be prepared that presents the details of a field investigation that can be used to fill data gaps needed to develop an accurate conceptual site model. In general, the objective of the investigation should be to assess whether the water treatment system at the New Cricket Spring captures all of the contaminated ground water that originates from the Arkwood site.
(13-R06-002) (S. Huling (GWERD) 580-436-8610)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Zhao, Dan (University of Chinese Academy of Sciences and Chinese Academy of Science, Beijing, China), Xiaoyong Liao, Xiulan Yan (Chinese Academy of Science, Beijing, China), Scott G. Huling (GWERD), Tuanyao Chai (University of Chinese Academy of Sciences, Beijing, China), Huan Tao (University of Chinese Academy of Sciences and Chinese Academy of Science, Beijing, China). 2013. Effect and mechanism of persulfate activated by different methods for PAHs removal in soil. *Journal of Hazardous Materials* 254-255 (2013) 228-235. <http://dx.doi.org/10.1016/j.jhazmat.2013.03.056>.
(S. Huling (GWERD) 580-436-8610)

Fine, Dennis D. (The Noble Foundation, Ardmore, OK), Saebom Ko (National Research Council, GWERD), Scott G. Huling (GWERD). 2013. Bromination of aromatic compounds by residual bromide in sodium chloride matrix modifier salt during heated headspace GC/MS analysis. *Talanta*, Volume 117, 15 December 2013, Pages 20-26.
(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 28, 2013**

TECHNICAL ASSISTANCE

Technical Assistance Region IX: On September 11, 2013, Dr. Scott Huling (GWERD) provided technical review comments to RPM Penny Reddy on the “Draft Pilot Study Design and Implementation Work Plan, Evandale Avenue Sources, Mountain View, California” for the Middlefield-Ellis-Whisman Superfund Site. It is recommended that all boreholes made during the various investigations be pressure grouted with appropriate cement/bentonite mixture to minimize the potential for future short circuiting and preferential pathways of ground water and injected oxidants. The lithology of the site involves multiple layers of coarse and fine grained materials. It is possible that the encountered injection interval may be fine grained, low permeable materials which may require greater injection pressure for oxidant delivery. Assuming this condition is encountered and is unacceptable, rather than abandoning the location, it is recommended that the injection tip be incrementally advanced to assess whether more permeable materials can be encountered. This could minimize the number of exploratory boring locations and future preferential pathways during full scale deployment.
(13-R09-008) (S. Huling (GWERD) 580-436-8610)

Technical Assistance Region I: On September 19, 2013, Dr. Eva Davis (GWERD) provided technical review comments to RPM Karen Lumino on the “In Situ Thermal Remediation Remedial Action Work Plan and Project Operations Plan for the Solvents Recovery Service of New England, Inc. (SRSNE) Superfund Site in Southington, Connecticut,” dated July 2013. The document should discuss any changes that will be required to the design due to the increase in the size of the treatment area. Also, the document should clarify how the drill cuttings will be handled. Due to the importance of capturing all the vapors that are generated in order to avoid generating fugitive emissions, it is recommended that the frequency of vacuum/pressure monitoring of the subsurface be increased when the vacuum is decreased. Consideration should be given to allowing portions of the Phase I and/or Phase II areas to be shut down when they meet the soil cleanup goals and are no longer producing significant contaminant mass, without shutting down the entire Phase.
(13-R01-001) (E. Davis (GWERD) 580-436-8548)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Wilkin, Richard T., Steven D. Acree, Randall R. Ross (GWERD), Robert W. Puls (University of Oklahoma), Tony R. Lee (GWERD), and Leilani L. Woods (U.S. Coast Guard Base Elizabeth City, NC). 2014. Fifteen-year Assessment of a Permeable Reactive Barrier for Treatment of Chromate and Trichloroethylene in Groundwater. *Science of the Total Environment* 468-469 (2014) 186-194. <http://dx.doi.org/10.1016/j.scitotenv.2013.08.056>.

(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 November 4, 2013**

TECHNICAL ASSISTANCE

Technical Assistance Region IV: On October 18, 2013, Dr. Eva Davis (GWERD) provided technical review comments to RPM Jennifer Tufts on the “Remedial Action Work Plan (RAWP) for In Situ Source Treatment by Deep Soil Mixing of the Southwest Groundwater Plume Volatile Organic Source at the C-747-C Oil Landfarm (Solid Waste Management Unit 1) at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky,” dated July 2013. Data supporting statements made in the document should be included in the Remedial Design Report (RDR). A consistent approach to the handling of excavated surface soils should be addressed in both the RAWP and the RDR. The document states that posttreatment sampling and monitoring well installation will be delayed by six months due to elevated soil temperatures and other conditions within the area where soil mixing occurred. It should be noted that soil temperatures within this area are likely to still be elevated after six months, and hot soil sampling techniques should be employed for soil sampling. Because the soils are likely to be at elevated temperatures for an extended time period after soil mixing, it should be ensured that the temperature of the soils will not compromise the integrity of the PVC liners during sampling. The design specifications for the additional monitoring wells to be installed should be provided. The RAWP should also discuss how the radioactivity of the released vapors will be monitored to ensure that limits are not exceeded.

(14-R04-001)

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

Technical Assistance Region I: On October 24, 2013, Dr. Bruce Pivetz (Dynamac Corp.), under the direction of Mr. Steven Acree (GWERD), provided technical review comments to RPM Karen Lumino on the “Vertical Barrier Work Plan, Pine Street Canal Site, Burlington, Vermont.” The work plan contained sufficient information and discussion for site activities to move forward with the Field Demonstration Test Program (FDTP). The technical information in the work plan relates primarily to installation and testing methods for jet grout installation of the vertical barrier. The information provided appeared technically adequate and valid. In general, the proposed methods, studies, and locations appear applicable, given the site-specific conditions. No significant problematic issues were noted in the work plan. One deficiency noted is that, if possible, monitoring wells closer to the FDTP location should be used to assess any piezometric impacts. It is recommended that polyvinyl chloride (PVC) casing be used for any vertically installed vertical grout columns in the end walls, to maintain integrity of the borehole through which the jet grouting will occur.

(14-R01-001)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Wilson, John T., Cherri Adair, Cindy Paul (GWERD), Linzi Thompson (East Central University, Ada, OK). 2013. Corrosion in STP Sumps. What Causes It and What Can Be Done About It? Petroleum Equipment Institute Journal (aka The PEI Journal), Third Quarter 2013, pages 26-33.

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



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 18, 2013**

TECHNICAL ASSISTANCE

Technical Assistance Region II: On October 23, 2013, Dr. Bruce Pivetz and Dr. Daniel Pope (Dynamac Corp.), under the direction of Dr. David Burden (GWERD), provided technical review comments to RPM Ashley Wiedemer on the *Draft Supplemental Feasibility Study (SFS) Report, Former Mattiace Petrochemical Facility, Glen Cove, New York, June 2013*. The SFS was well-written, and, in general, included sufficient information and discussion to be able to conduct an initial scientific evaluation of the potential Remedial Alternatives for the site, to determine their applicability. This scientific review of the SFS revealed positive and/or negative aspects of each Alternative and its component remedial technologies. Given the various scientific and technical issues identified during this review, a rough assessment of the relative applicability of each technology and Alternative was made. The reviewers identified that each technology and Alternative has some shortcomings and uncertainties, and would require some modifications and consideration of advantages and disadvantages of the alternatives. Therefore, no Alternative was judged to be immediately and fully applicable as presented.

(13-R02-004)

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

Technical Assistance Region IX: On October 28, 2013, Dr. Eva Davis (GWERD) provided technical review comments to RPM Yvonne Wong on the *Draft-Final In-Situ Thermal Remediation Design NAPL Treatment Pilot Study, Installation Restoration Program Site 03, Former Oily Waste Ponds, Hunters Point Naval Shipyard, San Francisco, California, dated October 2013*. It is concerning that one important piece of characterization data from the 2013 field characterization efforts – the observation that some of the nonaqueous phase liquid (NAPL) at the site can separate into a light NAPL (LNAPL) and a dense NAPL (DNAPL) – has not been incorporated into the design of the In Situ Thermal Remediation (ISTR) system. The ISTR Pilot Study document does not include an updated conceptual site model (CSM) that includes all of the characterization data for the ISTR treatment zone collected during the recent field effort, so additional important data collected during this recent characterization effort may also not be incorporated into the design of the pilot scale. There are also some concerns with how the data from the pilot scale will be evaluated.

(14-R09-001)

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

Technical Assistance Region II: On October 31, 2013, Mr. Steven Acree (GWERD) provided technical review comments to RPM Clifford Ng on the “Response to Comments Re: Supplemental Onsite Groundwater Investigation Report and 2012 Annual Groundwater Report” for DuPont Pompton Lakes Works, Pompton Lakes, New Jersey. In general, the responses appear to address previous comments. However, with regard to issues concerning the representative interpretation of potentiometric surfaces that were noted in review of the 2012 annual report, a recommendation is offered. During the re-evaluation of the monitoring network to be performed following installation of the horizontal well, it is recommended that installation of three piezometers be considered.

(14RC02-001)

(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 December 2, 2013**

TECHNICAL ASSISTANCE

Technical Assistance Region VII: On November 6, 2013, Dr. Bruce Pivetz and Dr. Daniel Pope (Dynamac Corp.), under the direction of Dr. David Burden (GWERD), provided technical review comments to Bruce Morrison, RCRA Corrective Action Project Manager, for two documents for the Former Solutia, Inc., J. F. Queeny Plant Site, St. Louis, Missouri (the Site). It is recommended that there be continued injection of oxidant amendments to achieve further contaminant mass reduction at the Site. The documents should provide clarification of the well identification numbers, locations, depths, and position of the screened interval relative to its intended stratigraphic unit(s). Continued quarterly ground-water monitoring should be conducted for all the wells for at least another year or two, to determine if there is rebound of contaminant concentrations as contaminants are slowly desorbed. It is also recommended that performance monitoring for the in-situ chemical oxidation and biostimulation effort should include sampling of the subsurface saturated soils.

(13-RC07-004)

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

Technical Assistance Region I: On November 18, 2013, Dr. Bruce Pivetz (Dynamac Corp.), under the direction of Mr. Steven Acree (GWERD), provided technical review comments to RPM Karen Lumino on the “Vertical Barrier Field Demonstration Test Program (FDTP) Results and Revised Work Plan (RWP), Pine Street Canal Site, Burlington, Vermont.” The RWP describes the work to be conducted to install a vertical barrier wall to prevent coal-tar-related dense non-aqueous phase liquid (DNAPL) from migrating from the Pine Street Canal Superfund Site to the adjacent Lake Champlain. The reviewed documents contained sufficient information and discussion to permit Site activities to move forward with installation of the full-scale vertical barrier wall. The documents appeared technically and scientifically complete and acceptable. The reviewer concurs with the conclusion that the FDTP was successful, and that work on the full-scale vertical barrier wall can proceed. This review produced several recommendations that require clarification, but do not negatively impact the overall assessment of the reviewed documents, and will not impede work on the full-scale vertical barrier wall.

(14-R01-001)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Rasa, Ehsan (Geosyntec Consultants, Oakland, CA), Barbara A. Bekins (USGS, Menlo Park, CA), Douglas M. Mackay, Nicholas R. de Sieyes (Dept. of Land, Air, and Water Resources, University of California, Davis, CA), John T. Wilson (GWERD), Kevin P. Feris (Dept. of Biology, Boise State University, Boise, ID), Isaac A. Wood (CH2M-Hill Consultants, San Francisco, CA), and Kate M. Scow (Dept. of Land, Air, and Water Resources, University of California, Davis, CA). 2013. Impacts of an ethanol-blended fuel release on groundwater and fate of produced methane: Simulation of field observations. *Water Resources Research*, Vol. 49, 4907-4926, doi:10.1002/wrcr.20382, 2013.

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

Chen, Xiaosong (National Research Council (GWERD)), Michael C. Brooks, A. Lynn Wood (GWERD). 2014. The uncertainty of mass discharge measurements using pumping methods under simplified conditions. *Journal of Contaminant Hydrology*, 156 (2014) 16-26. <http://dx.doi.org/10.1016/j.jconhyd.2013.09.006>. www.elsevier.com/locate/jconhyd.

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



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 9, 2013**

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Su, Chunming (GWERD), Robert W. Puls (Oklahoma Water Survey, University of OK, Norman, OK), Thomas A. Krug, Mark T. Watling, Suzanne K. O'Hara (Geosyntec Consultants Inc., Guelph ON N1G 5G3, Canada), Jacqueline W. Quinn (NASA Kennedy Space Center, FL), Nancy E. Ruiz (Naval Facilities Engineering Command Engineering Service Center, Port Hueneme, CA). 2013. Travel Distance and Transformation of Injected Emulsified Zerovalent Iron Nanoparticles in the Subsurface During Two and Half Years. *Water Research* 47 (2013) 4905-4106. www.sciencedirect.com. <http://dx.doi.org/10.1016/j.watres.2012.12.042>.

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

Seymour, Megan B. (Dept. of Civil Engineering, University of Nebraska-Lincoln, Lincoln, NE), Gexin Chen (National Research Council (GWERD)), Chunming Su (GWERD), Yusong Li (Dept. of Civil Engineering, University of Nebraska-Lincoln, Lincoln, NE). 2013. Transport and Retention of Colloids in Porous Media: Does Shape Really Matter? *Environ. Sci. Technol.* 2013, 47, 8391-8398. <http://dx.doi.org/10.1021/es40161241>.

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

Liu, Xuyang, Gexin Chen (National Research Council (GWERD)), Justin G. Erwin (College of Health and Sciences, East Central University, Ada, OK), Nadia K. Adam (Dept. of Geology & Geophysics, University of Wyoming, Laramie, WY), Chunming Su (GWERD). 2013. Release of Phosphorous Impurity from TiO₂ Anatase and Rutile Nanoparticles in Aquatic Environments and Its Implications. *Water Research* 47 (2013) 6149-6156. www.sciencedirect.com. <http://dx.doi.org/10.1016/j.watres.2013.07.034>.

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

Liu, Xuyang, Gexin Chen (National Research Council (GWERD)), Justin G. Erwin (College of Health and Sciences, East Central University, Ada, OK), Chunming Su (GWERD). 2014. Silicon Impurity Release and Surface Transformation of TiO₂ Anatase and Rutile Nanoparticles in Water Environments. *Environmental Pollution* 184 (2014) 570-578. <http://dx.doi.org/10.1016/j.envpol.2013.10.011>.

(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 December 16, 2013**

TECHNICAL ASSISTANCE

Technical Assistance Region I: On November 19, 2013, Mr. Steven Acree (GWERD) and Dr. Robert Ford (LRPCD) provided technical review comments to RPMs Carol Keating and Ginny Lombardo on the “Hydraulic Gradient Analysis of Pump and Treat System Performance” for the Fort Devens Site, Shepley’s Hill Landfill, Devens, Massachusetts. The data obtained do not indicate major seasonal changes in capture effectiveness or other major failures of the system with respect to plume capture. With respect to definition of the capture zone, significant influence of extraction on groundwater elevations was observed throughout the area surrounding the extraction wells and hydraulic gradients toward the extraction wells were observed in some areas. However, the hydraulic gradient data from the current network are not sufficient to define the extent of the capture zone based solely on this line of evidence. This extensive data set should be used in conjunction with other primary lines of evidence, particularly the updated groundwater flow model, to provide a stronger and more defensible definition. Other recommendations regarding the further uses of data and improvements to both the overall assessment of the extraction system performance and the long-term monitoring program were also provided.

(14-R01-003) (S. Acree (GWERD) 580-436-8609) (R. Ford (LRPCD) 513-569-7501)

Technical Assistance Region IX: On November 26, 2013, Dr. Eva Davis (GWERD) provided technical review comments to RPM Carolyn D’Almeida on the *Draft Remedial Design and Remedial Action Work Plan (RD/RAWP) for Operable Unit 2, Revised Groundwater Remedy, Site ST012, Former Williams Air Force Base, Mesa, Arizona*, dated October 4, 2013. In general, the RD/RAWP lays out a comprehensive design for the revised groundwater remedy for Site ST012 which is consistent with the Record of Decision Amendment 2 (RODA2) signed in 2013. However, there are concerns with the amount of light nonaqueous phase liquid (LNAPL) which remains outside of the thermal treatment zone. There are also some concerns about how the criteria being proposed for determining when to terminate the steam enhanced extraction (SEE) to transition to enhanced bioremediation (EBR) are presented in the document. In addition, a number of specific comments on the RD/RAWP were provided. Some of these topics were discussed during the November 19, 2013 BCT meeting in Mesa, Arizona, and including the additional information presented on these topics during that meeting in the document will greatly help to address these comments.

(14-R09-002) (E. Davis (GWERD) 580-436-8548)

Technical Assistance Region IV: On December 2, 2013, Dr. Eva Davis (GWERD) provided technical review comments to RPM Jennifer Tufts on the *Treatability Study Work Plan for Steam Injection, Groundwater Operable Unit, Paducah Gaseous Diffusion Plant, Paducah, Kentucky*. In general, the conceptual design for the collection of field data on the flow of steam in the Regional Gravel Aquifer (RGA), as proposed in the Treatability Study (TS) work plan can be supported. A similar, although much shorter in duration, steam injection pilot is currently being implemented at another site. However, the proposed extensive data manipulation by subcontractors who have little or no experience with steam injection for remediation cannot be supported. The data from the field test should be provided to the steam injection vendors, and a bid for the remediation requested. This will provide much more reliable design and cost information on which to base decisions on the remediation of the site. It is imperative that experienced vendors of the technology be utilized both in the design and implementation of the pilot scale, and in evaluating the data to develop a conceptual full scale design and cost estimate.

(14-R04-001) (E. Davis (GWERD) 580-436-8548)