

HIGHLIGHTS

Robert S. Kerr Environmental Research Laboratory

Status Report for the Week of February 20, 1995

REGIONAL ASSISTANCE

Technical Assistance to Region I: During a telephone conversation on January 9, 1995, RPM Chet Janowski requested review comments on the "Draft Remedial Action Evaluation Study" for the Gilson Road Superfund Site in Nashua, NH. On February 8, 1995, Randall Ross (RSKERL) and Dr. Milovan Beljin (Univ. of Cincinnati) stated that the document was well written and brought together the majority of historical and recent information collected at the site. The review also discussed a few areas which were not adequately addressed, including the presence of LNAPLs at the site, the consequences of discontinuing the operation of a pump-and-treat system, and the identification of potential avenues for ground-water flow in the vicinity of the slurry wall.

(90-R01-007)

(R. Ross(RSKERL)405-436-8611)

Technical Assistance to Region IX: The J. H. Baxter site in Weed, CA, is an operating wood treating facility that has soil and ground water contaminated with creosote, pentachlorophenol, and metals. On January 24, 1995, RPM Kathy Setian requested continuing technical assistance at the facility by reviewing the "Groundwater Remedial Design Investigation Report" and the "Supplement to the 30% Soils Remedial Design." The February 9, 1995, response was prepared by Steve Acree (RSKERL) and Dr. Daniel Pope (Dynamac). Although no major concerns were noted regarding the conceptual treatment design, several recommendations were offered, including ways of dealing with soils contaminated with naphthalene, the need to determine the most efficient thickness of soil lifts for bioremediation, and sampling techniques.

(95-R09-005)

(S. Acree(RSKERL)405-436-8609)

Technical Assistance to Region IX: On December 16, 1994, RPM Matthew Hagemann requested technical assistance in reviewing the "Draft Work Plan for a Bioventing Treatability Study" at the Presidio Site in San Francisco, CA. On February 8, 1995, Dominic DiGiulio (RSKERL) provided comments on the determination of pneumatic permeability and estimation of the biodegradation rate of contaminants. A number of references were cited in order to provide the Region with additional information in these areas.

(95-R09-003)

(D. DiGiulio(RSKERL)405-436-8607)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Lyon, William G. (ManTech). "Swelling of Peats in Liquid Methyl, Tetramethylene, and Propyl Sulfoxides and in Liquid Propyl Sulfone." Environmental Toxicology and Chemistry. Vol. 14, No. 2. 1995.

(R. Cosby(RSKERL)405-436-8533)

RESEARCH IN PROGRESS

Traditional methods used to map the distribution of oily phase liquids in the subsurface are time-consuming, expensive, and often fail. Multi-sensor cone penetrometers have been developed for hazardous waste characterizations in which laser light beamed through a fiber optic cable illuminates subsurface material adjacent to the cone through a sapphire window. Under these conditions, certain oily wastes, such as TCE and naphthalene, fluoresce, and the signal is returned to the surface for analysis by a spectrophotometer. Under a cooperative agreement with RSKERL, Tufts University is developing and testing a Raman shifter which will allow multiple channel spectral analysis of the returned fluorescence. This will permit the simultaneous analysis of up to ten compounds with different fluorescence responses.

(B. Lien(RSKERL)405-436-8555)

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HIGHLIGHTS

Robert S. Kerr Environmental Research Laboratory

Status Report for the Week of February 27, 1995

REGIONAL ASSISTANCE

Technical Assistance to Region I: On July 11, 1994, RPM Mary Garren asked for a technical review of the document "Summary of Unconsolidated Deposits Investigation." The preliminary assessment of the report rejected soil vacuum extraction as a feasible option to remediate the unsaturated zone at the G&H Site in Woburn, MA. On February 15, 1995, Scott Huling (RSKERL) provided the Region with review comments as well as the written comments of Dr. Ryan Dupont (Utah State University). Each of the reviewers suggested that there was not sufficient information to indicate that soil vacuum extraction would not be effective at this site, and that a field-scale pilot study should be conducted to assess the technology. Detailed comments were provided on a wide variety of topics including the characterization of the site, modeling, the excavation of near-surface contamination, and the implementation of air sparging in the source area below the water table.

(93-R01-001)

(S. Huling(RSKERL)406-436-8610)

Technical Assistance to Region V: The Allied Chemical Site is located in Ironton, OH. The site consists of a waste disposal area, coke plant, lagoons, and tar plant. On December 4, 1994, RPM Tom Alcamo requested technical assistance regarding analyses being made at the site. On February 21, 1995, Joe Williams (RSKERL) provided the Region with detailed comments on gathering filtered versus unfiltered ground-water samples, and the analysis for TOC in lagoon material which contains coal and coke fines. The review comments questioned the rationale for selecting the GEOFLOW model for use at the site.

(94-R05-007)

(J. Williams(RSKERL)405-436-8608)

Technical Assistance to Region VI: The 9-acre PAB Oil and Chemical Services site, in Vermilion Parish, LA, is an abandoned oil field waste disposal area. On February 7, 1995, Dr. Hugh Russell (RSKERL) and Dr. Daniel Pope (Dynamac) met with RPM M.S. Ramesh, and the PRPs and their contractor to discuss a remedial design for the site. Three options for bioremediation of the site were discussed. It was decided that treatability studies should be performed to determine whether the waste should be treated in situ, in prepared bed reactors, or in a slurry reactor.

(93-R06-001)

(H. Russell(RSKERL)405-436-8612)

Technical Assistance to Region X: On February 23, 1995, Dominic DiGiulio (RSKERL) provided the Region with technical assistance regarding the Time Oil Site in Tacoma, WA. It was pointed out that if the capillary fringe exposes significantly more contaminant mass during drawdown, dewatering wells may be useful to enhance soil venting applications. Suggestions were offered as to how the distribution of VOCs could be determined. The evaluation of sparging to enhance soil venting was also discussed.

(91-R10-001)

(D. DiGiulio(RSKERL)405-436-8607)

Technical Assistance to Region X: In response to a February 2, 1995, request from RPM Sally Thomas, Dr. Hugh Russell (RSKERL) and Lowell Leach and Dr. Daniel Pope (Dynamac) provided the Region with review comments on the "Treatability Sampling Plan" for the Pacific Sound Resources Superfund Site in Seattle, WA. The comments, dated February 21, 1995, stated that extensive planning and thought had been given to the design of comprehensive laboratory studies so that they might have the highest potential for defining the capabilities and limitations of the remediation technologies proposed. A number of concerns were expressed, including the intensive sampling program, the difficulty of packing soil columns which closely compare with the natural hydraulic conductivity, and the interpretation of bench-scale studies to field-scale remediation activities.

(94-R10-007)

(H. Russell(RSKERL)405-436-8612)

RESEARCH IN PROGRESS

Working under a cooperative agreement with RSKERL, Dr. Herb Ward and Dr. Michelle Thomas (Rice Univ.) are conducting an extensive investigation of the microbial ecology of a field site undergoing nitrate-based bioremediation. Aquifer samples were aseptically collected from a shallow aquifer contaminated with JP-4 jet fuel at Eglin AFB, FL, and analyzed for different microbial populations to provide a background characterization prior to remediation. After one year of treatment using nitrate as an alternative electron acceptor, aquifer samples will again be collected to evaluate how populations respond to bioremediation under anaerobic conditions.

(S. Hutchins(RSKERL)405-436-8563)

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HIGHLIGHTS

Robert S. Kerr Environmental Research Laboratory

Status Report for the Week of March 6, 1995

REGIONAL ASSISTANCE

Technical Assistance to Region I: The Picillo Farm Site is a portion of a former 100-acre pig farm in Kent County, RI. More than 10,000 drums of hazardous wastes and an undetermined volume of liquid chemicals were disposed into several unlined trenches on an 8-acre area of the farm. On December 1, 1994, RPM Anna Krasko requested that RSKERL provide review comments on the PRP's approach to remediating the site which included thermally-enhanced soil vapor extraction. On February 27, 1995, in response to General Electric's February 15, 1995 letter of request, Dominic DiGiulio (RSKERL) provided comments on the effectiveness of thermally-enhanced vapor extraction, and the use of soil-vapor analysis in compliance monitoring.

(95-R01-002)

(D. DiGiulio(RSKERL)405-436-8607)

Technical Assistance to Region II: During February 22-24, 1995, Joe Williams (RSKERL) made a site visit to the CIBA-GEIGY Superfund Site in Toms River, NJ. During the visit a meeting was held which included representatives from Region II, and a Regional support contractor, representatives from CIBA-GEIGY and their contractor. A number of issues were discussed including methods to determine partition coefficients and ground-water modeling.

(95-R02-003)

(J. Williams(RSKERL)405-436-8608)

Technical Assistance to Region II: On February 3, 1995, RPM Jeffrey Gratz requested review comments for the "Natural Restoration Work Plan" for the Naval Air Engineering Station Lakehurst Superfund Site in Lakehurst, NJ. The February 24, 1995, response by Dr. Guy Sewell and Dr. Hugh Russell (RSKERL) stated that the work plan lacked sufficient detail for an adequate review. It was pointed out that, although biotic and abiotic processes contribute to an overall observed reduction in contaminant mass, the real argument is whether these mechanisms are protective of human health and the environment. It is the responsibility of the proponents of this remedy to prove that natural attenuation is an acceptable alternative to active remediations.

(95-R02-005)

(H. Russell(RSKERL)405-436-8612)

Technical Assistance to Region IV: On February 28, 1995, Steve Acree (RSKERL) provided the Region with an evaluation of a ground-water contour map at the Petroleum Products Corporation Site in Broward County, FL. The work was part of a continuing technical assistance effort requested by RPM Galo Jackson on October 17, 1994. In general, the capture of ground water to the extent implied on the contour map appeared to be highly questionable. It was suggested that the aquifer recovery rate is lower than it was when the potentiometric information was obtained. It was recommended that periodic ground-water elevation data be obtained to evaluate the current capture zones, identify seasonal fluctuations in capture zones, and identify areas for the installation of additional piezometers to better define the capture zones of these wells.

(95-R04-001)

(S. Acree(RSKERL)405-436-8609)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

West, Candida C. (RSKERL), and William G. Lyon, Debra L. Ross, and Lynda K. Pennington (ManTech). "Investigation of Vertical Distribution and Morphology of Indigenous Organic Matter at the Sleeping Bear Site, Michigan." Environmental Geology. Vol. 24. 1994.

(C. West(RSKERL)405-436-8551)

Puls, Robert W. and Cynthia J. Paul (RSKERL). "Low-Flow Purging and Sampling of Ground Water Monitoring Wells with Dedicated Systems." Ground Water Monitoring and Remediation. Winter 1995.

(R. Puls(RSKERL)405-436-8543)

RESEARCH IN PROGRESS

During February 14-21, 1995, the electromagnetic borehole flowmeter developed by the Tennessee Valley Authority was used at George AFB in California by Randall Ross and Steve Acree (RSKERL) in support of research activities at the site. The meter was used to better define zones of preferential ground-water flow in support of studies to characterize contaminant transport and fate processes.

(S. Acree(RSKERL)405-436-8609)

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HIGHLIGHTS

Robert S. Kerr Environmental Research Laboratory Status Report for the Week of March 13, 1995 (revised)

REGIONAL ASSISTANCE

Technical Assistance to Region II: On February 24, 1995, Dr. David Burden and James McNabb (RSKERL) and Dr. Ann Azadpour and Lowell Leach (Dynamac) provided the Region with review comments concerning the "Septic System Study in the New York Catskill-Delaware Water Supply Watershed." The request for technical assistance was made January 12, 1995, by Dennis McChesney with the Groundwater Management Section. A number of problems with the proposed study were discussed including the selection of an appropriate ground-water tracer and pathogen indicators, the need to develop testing protocols and determine analytical detection techniques prior to the initiation of the project, and the value of making a more thorough literature search before developing a detailed work plan describing scheduled events.

(Misc.)

(D. Burden(RSKERL)405-436-8606)

Technical Assistance to Region VII: On March 3, 1995, Dr. David Burden (RSKERL) and Dr. Varadhan Ravi (Dynamac) provided RPM Diane Easley with review comments of the "Sprinkler Irrigation Alternative Intermediate Design Report" for the Hastings Site in Hastings, NE. It was determined that RSKERL concerns expressed in previous review comments were not addressed. Since ground-water flow and transport modeling are the basis for the sprinkle irrigation alternative, the design will remain flawed until the conceptual model is further justified and calibrated. Details of the conceptual model discussed included the need for information on lithology, depth to aquifer, interacting water bodies, annual recharge, and TCE source conditions.

(94-R07-003)

(D. Burden(RSKERL)405-436-8606)

Technical Assistance to Region VIII: On November 17, 1994, RPM Gwendolyn Hooten requested review comments on the second iteration of the "Feasibility Study" for the Ekotek Superfund Site in Salt Lake City, UT. The review focused on those portions of the document pertaining to intrinsic bioremediation. On December 13, 1994, RSKERL stated that the revisions did not fully address previous RSKERL concerns regarding the lack of data required to evaluate the rate and extent to which the biodegradation of vinyl chloride was occurring. In another review of the document dated March 3, 1995, Steve Acree and Dr. Guy Sewell (RSKERL) noted that, as in previous drafts, the document has not been significantly revised regarding the lack of degradation data. As in previous reviews, a number of issues were addressed in detail including methods of estimating changes in contaminant mass, the measurement of transformation products, and problems associated with determining temporal trends in aqueous phase contaminant concentrations.

(93-R08-003)

(S. Acree(RSKERL)405-436-8609)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Shiau, B.J., D.A. Sabatini, and J.H. Harwell (Univ. of Okla.). "Solubilization and Microemulsification of DNAPLs Using Edible Surfactants." Ground Water. July-Aug., 1994.

(C. West(RSKERL)405-436-8551)

Rouse, Joseph D., David Sabatini, Joseph M. Suflita, and Jeffery H. Harwell (Univ. of Okla.). "Influence of Surfactants on Microbial Degradation of Organic Compounds." Critical Reviews in Environmental Science and Technology. Vol. 24, 1994.

(C. West(RSKERL)405-436-8551)

Baran, Jr., Jimmie R., William H. Wade, Vinitha Weerasooriya, and Anusha Yapa (Univ. of Texas). "Microemulsion Formation with Chlorinated Hydrocarbons of Differing Polarity." Environmental Science and Technology. Vol. 28, 1994.

(C. West(RSKERL)405-436-8551)

RESEARCH IN PROGRESS

Working under a cooperative agreement with RSKERL, Dr. George Pinder (Univ. of Vermont) is modeling the processes involved in the movement of mixtures of nonaqueous phase liquids through the vadose zone to an aquifer. The three-dimensional model, which includes vapor phase, solid phase, and nonaqueous phase contaminants, will be applicable to both DNAPLs and LNAPLs. When completed, the model will be used to evaluate experimental data being collected in an ongoing research project using one of RSKERL's large-scale physical models.

(T. Short(RSKERL)405-436-8544)

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HIGHLIGHTS

Robert S. Kerr Environmental Research Laboratory
Status Report for the Week of March 20, 1995

REGIONAL ASSISTANCE

Technical Assistance to Region II: On March 7, 1995, RSKERL participated in a conference call with representatives from Region II, including RPM Stephen Cipot, and representatives from CIBA-GEIGY to discuss the "Modeling Work Plan" for the CIBA-GEIGY Superfund Site in Toms River, NJ. On March 8, 1995, Joe Williams (RSKERL) and Brad Hill (CDSI) provided recommendations for the work plan concerning the conceptual model development, required information base for the model and data gaps, computer code selection, and modeling applications and calibration.

(95-R02-003)

(J. Williams(RSKERL)405-436-8608)

Technical Assistance to Region II: On December 28, 1995, the RSKERL Technology Support Center provided Region II with review comments on the "Remodeling of Groundwater Collection System Report" for the Colesville Landfill Superfund Site in Colesville, NY. In letters dated February 3 and February 6, 1995, a site contractor responded to those RSKERL comments. On March 6, 1995, Joe Williams (RSKERL) and Brad Hill (CDSI) provided an analysis of the contractor's response to RPM Eduardo Gonzalez. It was pointed out that some of the original concerns were not adequately addressed by the contractor but should require only a minimal effort to resolve. The fundamental concerns were the method of calibrating the MODFLOW model, and the uncertainty of the impacts the model boundaries will have on predicting the fate and transport of contaminants.

(95-R02-004)

(J. Williams(RSKERL)405-436-8608)

Technical Assistance to Region IV: On February 2, 1995, Region IV requested RSKERL to review the "Ground-Water Interim Measures Work Plan" for the Atkemix Ten Inc. Site in Louisville, KY. The facility has proposed a line of sparge wells to intercept a migrating ground-water plume. On March 6, 1995, Dominic DiGiulio (RSKERL) pointed out that a line of sparge wells would form a low permeability barrier resulting in ground-water flow around the barrier which would have the effect of laterally dispersing the plume. It was suggested that alternative technologies such as in-well and trench aeration should be considered.

(95RC04-003)

(D. DiGiulio(RSKERL)405-436-8607)

Technical Assistance in Indiana: The Marion County Health Department in Indianapolis, IN, requested review comments of the "Corrective Action Plan" for the remediation of soil and ground water at the D-A Lubricant facility in Indianapolis. In the March 10, 1995, response by Dr. Hugh Russell (RSKERL), and Dr. Daniel Pope and Jack Keeley (Dynamac), it was suggested that, while some of the reasons for selecting or rejecting various remediation options could be debated, it appeared that the remediation chain selected could provide a reasonable opportunity for success given the target contaminants and physical limitations of the site. Specific comments were offered in a number of areas including the need to remove free product as soon as possible, sampling frequencies and techniques, and the biodegradation pilot study.

(Misc.)

(H. Russell(RSKERL)405-436-8612)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

"Ground-Water Sampling - A Workshop Summary." The workshop was held in Dallas, TX, November 30 - December 2, 1993. EPA Publication EPA/600/R-94/205, 1995.

(R. Puls(RSKERL)405-436-8543)

RESEARCH IN PROGRESS

During February 22-24, 1995, Steve Acree and Scott Huling (RSKERL) used the electromagnetic (EM) flowmeter, developed by the Tennessee Valley Authority, at Edwards AFB in California to support research being conducted by Stanford University under the direction of Dr. Mark Goltz, Gary Hopkins, and Brent Leland. The field-scale study, which is funded by the Air Force through RSKERL, involves the in-situ bioremediation (co-oxidation) of TCE using a single-well injection/extraction system. The EM flowmeter was used to define ground-water flow and the vertical distribution of hydraulic conductivity in the study area. The information is being used to evaluate the transport and fate of contaminants and chemicals used in the bioremediation process.

(S. Huling(RSKERL)405-436-8610)

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HIGHLIGHTS

Robert S. Kerr Environmental Research Laboratory

Status Report for the Week of April 3, 1995

REGIONAL ASSISTANCE

Technical Assistance to Region I: During March 13-14, 1995, Scott Huling (RSKERL) attended meetings at the Regional Office to discuss the 60 percent design for a pump-and-treat system at the Resolve Superfund Site in North Dartmouth, MA. During the meetings, a number of issues comprising the DNAPL contingency plan were discussed including methods to determine whether DNAPLs are present during drilling, the delineation of risk areas subject to DNAPL remobilization, and the design of recovery wells to minimize the vertical migration of DNAPLs in the overburden and weathered/fractured bedrock. Other items of discussion were the location of extraction and monitoring wells, the frequency of ground-water sampling, and evaluating the performance of the pump-and-treat system using particle-tracking contaminant transport modeling. Attending the meetings were representatives from Region I, Massachusetts Department of Environmental Protection and their consultants, and consultants to the Resolve Superfund Site Group.
(93-R01-010) (S. Huling(RSKERL)405-436-8610)

Technical Assistance to Region V: On September 15, 1994, RPM Edward Hanlon requested continuing technical assistance at the Granville Solvents Site which is an abandoned solvent recycling facility in Granville, OH. In the March 13, 1995, review of the "Removal Action Plan," Steve Acree (RSKERL) expressed continuing concerns about the lack of information regarding the hydrology at the site as well as the distribution of contaminants. These areas were discussed in detail as were performance monitoring, ground-water flow modeling, and the interpretation of data.
(94-R05-010) (S. Acree(RSKERL)405-436-8609)

Technical Assistance to Region V: On February 6, 1995, RPM Thomas Poy requested technical assistance with respect to the integrity of a containment system, especially the slurry wall, at the Velsicol Site in St. Louis, MI. Specific questions pertained to the type of operation and maintenance normally required for slurry walls and the kinds of tests which could be done to determine their integrity. In a March 16, 1995, response, Randall Ross (RSKERL) proposed the use of short-screened nested piezometers to evaluate the complex ground-water flow regime and the potential for vertical leakage between the surficial aquifer and an underlying unit. Problems associated with tracer studies and laboratory permeability measurements were discussed and a list of specific recommendations was provided.
(95-R05-003) (R. Ross(RSKERL)405-436-8611)

Technical Assistance to Region IX: On February 21, 1995, Hydrogeologist Herbert Levine provided RSKERL with a document titled "Base Background Soil Field Sampling Plan for Anderson Air Force Base, Guam" dealing with background values for metals. The request for assistance was to evaluate the approach used to determine soil metals values. In the March 23, 1995, response, Dr. David Burden (RSKERL) stated that the statistical approach for analyzing the data from background soil sampling was good. It was suggested that geostatistical analysis also be undertaken to provide some insight into spatial variability within a given soil type as well as between soil types. Suggestions were also offered with respect to the location of sampling locations to get a better representation of background soil levels.
(95-R09-008) (D. Burden(RSKERL)405-436-8606)

TECHNOLOGY TRANSFER ACTIVITIES

During March 15-17, 1995, twenty-two students were involved in a training course at the RSKERL Mechanical Integrity Training and Testing Facility. Dr. R.M. McKinley, now retired from Exxon Production Research, conducted training on the use of temperature, radio tracer, and noise logs for determining injection well integrity. Participants represented EPA Regions III, VI, VII, and IX, the Oklahoma State Health Department, the Oklahoma Corporation Commission, Oklahoma State University, and Navajo Environmental Protection Agency. This very popular and timely training course has been presented in Denver and Austin, and will be presented in Chicago in May.
(J. Jones(RSKERL)405-436-8593)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Baran, Jimmie R., William H. Wade, Vinitha Weerasoriya, Anusha Yapa, and Gary A. Pope (Univ. of Texas/Austin). "Microemulsion Formation with Chlorinated Hydrocarbon Liquids." Journal of Colloid and Interface Science. Vol. 168, 1994.
(C. West(RSKERL)405-436-8551)

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HIGHLIGHTS

Robert S. Kerr Environmental Research Laboratory

Status Report for the Week of April 10, 1995

REGIONAL ASSISTANCE

Technical Assistance to Region V: On March 20, 1995, Steve Acree (RSKERL) made a site visit and attended a meeting with PRP representatives and State of Ohio personnel at the Granville Solvents Site in Granville, OH. The purpose of the meeting was to evaluate site characterization data and the design of a ground-water extraction system upgradient of the municipal well field. One of the primary objectives of the remedial system was to capture contaminated ground water before it entered the well field. RSKERL has also been requested to review the "Removal Action Groundwater Monitoring Program Plan."

(94-R05-010)

(S. Acree(RSKERL)405-436-8609)

Technical Assistance to Region VIII: On January 5, 1995, Project Officer Brian Antonioli (MDHES) asked RSKERL to review the "Final Remedial Design Work Plan" for the Montana Pole and Treating Plant Site in Butte, MT. The March 20, 1995, response, prepared by Scott Huling (RSKERL) and Dr. Bruce Pivetz (ManTech) stated that the work plan was generally complete in outlining the approaches, schedule, criteria, options, issues, and additional data needs to be used in the remedial design. One major concern was the lack of treatability data and information regarding degradation of the soil contaminants of concern under site-specific conditions. Detailed comments were made concerning several issues in the work plan that should be examined more carefully.

(95-R08-001)

(S. Huling(RSKERL)405-436-8610)

Technical Assistance to Region IX: During March 19-22, 1995, Joe Williams (RSKERL) attended a meeting in Las Vegas, NV, to discuss the "Guidance Demonstration Project" for the McClellan AFB Superfund Site in Sacramento, CA. Specific reports that were discussed included the "Assessment Framework for Ground-Water Modeling," "Soil Screening," and the "Data Quality Objectives" guidance documents. Others participating in the meeting included Headquarters ORD, EPA Research Laboratory in Las Vegas, Region IX, and the Sandia National Laboratory.

(92-R09-004)

(J. Williams(RSKERL)405-436-8608)

Technical Assistance to Region IX: On March 22, 1995, Steve Acree (RSKERL) attended a meeting in Santa Ana, CA, to discuss the design of an LNAPL extraction test at the Del Amo Superfund Site with representatives of Region IX and their consultants, and representatives of the PRPs and their consultants. Issues which were discussed included data presentation and conceptual model development, test objectives and measures of performance, and appropriate scales on which to monitor and analyze test results.

(94-R09-006)

(S. Acree(RSKERL)405-436-8609)

Technical Assistance to Region IX: On February 21, 1995, Hydrogeologist Herbert Levine provided RSKERL with a document titled "Naval Air Station, Agana Operable Unit-2, Site Investigation Technical Memorandum Background" dealing with background values for metals in soils at the Guam facility. The request for assistance was to evaluate the approach used to determine soil metals values. In the March 23, 1995 response, David Burden (RSKERL) expressed some concern with the selection of background sample locations and suggested taking some offsite samples if possible. Some suggestions were also offered with respect to the use of statistical parameters to strengthen the presentation of sampling results.

(95-R09-009)

(D. Burden(RSKERL)405-436-8606)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

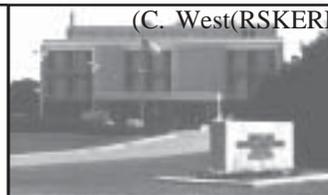
Baran, Jimmie R., William H. Wade, Vinitha Weerasoriya, and Gary A. Pope (Univ. of Texas/Austin). "Phase Behavior of Water/Perchloroethylene/Anionic Surfactant Systems." Environmental Science and Technology, Vol. 10, 1994.

(C. West(RSKERL)405-436-8551)

TECHNOLOGY TRANSFER ACTIVITIES

Drs. Candida West, Mike Jawson, and Jim Weaver (RSKERL) presented a training course March 20-22, 1995, entitled "Introduction to the Fate and Transport of Contaminants in the Subsurface" to professional scientists in Tallinn, Estonia. The course, taught in connection with an ongoing project entitled "Environmental Impact Assessment of Kurtna Lakes and Groundwater Protection," was funded by the EPA Office of International Activities in cooperation with the Estonia Ministry of the Environment.

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(C. West(RSKERL)405-436-8551)

HIGHLIGHTS

Robert S. Kerr Environmental Research Laboratory

Status Report for the Week of April 17, 1995

REGIONAL ASSISTANCE

Technical Assistance to Region II: On November 22, 1994, Joe Williams (RSKERL) provided RPM Carla Struble with estimates of cleanup levels for lead and chromium in soils at the Seneca Army Depot Superfund Site in Romulus, NY. On April 3, 1995, additional comments were requested to clarify the earlier memorandum. It was pointed out that, since field data were not available, the estimated cleanup levels were based on assumptions concerning the migration of metals, and therefore, may not be protective of ground water. Before these numbers could be accepted, the assumptions and conceptual model used in their development must be tested.

(94-R02-004)

(J. Williams(RSKERL)405-436-8608)

Technical Assistance to Region III: On March 30, 1995, Dr. Hugh Russell (RSKERL), and Dr. Daniel Pope and Dr. Ann Adzapour (Dynamac) provided RPM Melissa Whittington with review comments of a progress report on slurry tests conducted on PAH-contaminated soil from the Morgantown Ordnance Works in Morgantown, WV. The goal of the tests was to determine optimum conditions for bioremediation in order to design and implement an effective bioremediation system at the site. Although the tests were conducted in a reasonable manner, the reviewers pointed out some of the problems associated with transferring laboratory-derived data to the design of field-scale remediation systems.

(91-R03-001)

(H. Russell(RSKERL)405-436-8612)

Technical Assistance to Region VI: The 9-acre Pab Oil and Chemical Services Site, in Vermilion Parish, LA, is an abandoned oil field waste disposal area. On March 29, 1995, Dr. Hugh Russell (RSKERL) and Dr. Daniel Pope (Dynamac) provided the Region with review comments on a number of documents pertaining to the bioremediation of soil at the site. Issues which were discussed included representative materials for treatability studies, methods for detecting the endpoint of the treatment process, and the number of replications necessary to achieve statistically reliable results.

(93-R06-001)

(H. Russell(RSKERL)405-436-8612)

VISITING SCIENTIST

DNAPLs are often trapped in fine-textured, low hydraulic conductivity soils, such as clays, where extraction techniques or contaminant transformations based on fluid movement are largely ineffective. Dr. Gorm Heron, a post-doctoral environmental engineer from the Technical University of Denmark, recently joined the Laboratory as a visiting scientist. Dr. Heron will work with Dr. Carl Enfield (RSKERL) and the University of Arizona on a project designed to evaluate the ability of induced electric current to selectively heat these saturated clays and volatilize DNAPLs. Dr. Heron will be at RSKERL for 18 months.

(C. Enfield(RSKERL)405-436-8530)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Haitjema, H.M., J. Wittman, V. Kelson, and N. Bauch (Indiana Univ.). "WhAEM: Program Documentation for the Wellhead Analytic Element Model." EPA 600/R-94/210. Dec. 1994.

(S. Kraemer(RSKERL)405-436-8549)

Molz, F.J. and G.K. Boman (Auburn Univ.), and S.C Young and W.R. Waldrop (TVA). "Borehole Flowmeters: Field Application and Data Analysis." Journal of Hydrology. Dec. 1994.

(S. Acree(RSKERL)405-436-8609)

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HIGHLIGHTS

Robert S. Kerr Environmental Research Laboratory

Status Report for the Week of April 24, 1995

REGIONAL ASSISTANCE

Technical Assistance to Region II: On April 6, 1995, Joe Williams (RSKERL) and Dr. Ying Ouyang (CDSI) provided RPM Carla Struble with a detailed work plan for the determination of lead and hexavalent chromium clean-up levels in soil at the Seneca Army Depot Superfund Site in Romulus, NY. The information included an overview of contamination at the site, a discussion of the processes involved in the transport and fate of lead and chromium in the vadose zone and ground water, and a proposed general work plan. The proposed work plan included sections on model selection, input data, sensitivity analysis of input parameters, and the determination of soil clean-up levels.

(94-R02-004)

(J. Williams(RSKERL)405-436-8608)

Technical Assistance to Region II: In response to a request from RPM Jeff Gratz, Dr. Hugh Russell (RSKERL) and Jill Acree (Dynamac) provided the Region with comments on a ground-water modeling study for the Naval Air Engineering Station in Lakehurst, NJ. The RSKERL review, dated April 10, 1995, focussed on natural attenuation issues. It was pointed out that the approach appeared appropriate to design a ground-water recovery/recharge system that would allow an optimal ground-water remediation system. Although the study appeared to be appropriately executed, supporting materials were not provided for verification of the basic conceptual flow and transport models.

(95-R02-005)

(H. Russell(RSKERL)405-436-8612)

Technical Assistance to Region VI: On April 5, 1995, RPM MaryAnn Abrahamson requested review comments on the "Sampling and Analysis Plan" for the Lone Star Army Ammunition Superfund Site in Texarkana, TX. On April 14, 1995, Don Draper (RSKERL) and Jill Acree (Dynamac) stated that the proposed sampling plan was designed using generally- accepted sampling protocols. Other issues discussed included presample purging and problems associated with sample turbidity.

(95-R06-006)

(D. Draper(RSKERL)405-436-8603)

Technical Assistance to Region IX: On January 24, 1995, RPM Kathy Setian requested continuing assistance at the J.H. Baxter Superfund Site in Weed, CA, concerning the potential effectiveness and implementation of the soil remediation technology adopted in the ROD. On April 11, 1995, Steve Acree (RSKERL) and Dr. Daniel Pope (Dynamac) pointed out that, in general, the conceptual arguments regarding the potential effectiveness of the soil remedy in attaining remedial standards have merit in some areas. It was suggested, however, that the results of analyses regarding remediation times and contaminants leaching from materials in the vadose and saturated zones are based on simplifying assumptions, parameters which were poorly defined, and data which were not site specific.

(95-R09-005)

(S. Acree(RSKERL)405-436-8609)

COMMUNITY ACTIVITIES

On April 10, 1995, Dr. Steve Kraemer (RSKERL) made a presentation to the Ada Chapter of the Soroptimist International Organization concerning ground-water hydrology of the Arbuckle-Simpson Aquifer in south-central Oklahoma. The aquifer is the source of the 18 mgd Byrd's Mill Spring which provides water to the City of Ada.

(S. Kraemer(RSKERL)405-436-8549)

RESEARCH IN PROGRESS

Scott Huling (RSKERL) is conducting research to quantify the oxidative capacity of H₂O₂ decomposition in soil. The objective of this research is to evaluate and optimize parameters affecting the oxidation capacity.

(S. Huling(RSKERL)405-436-8610)

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HIGHLIGHTS

Robert S. Kerr Environmental Research Laboratory

Status Report for the Week of June 5, 1995

REGIONAL ASSISTANCE

Technical Assistance to Region II: The 80-acre Hertel Landfill site in Plattekill, NY, is an inactive waste disposal area that was established in 1967 as a municipal waste landfill. On March 1, 1995, RPM Anne Kelly requested a technical review of the MODFLOW modeling investigations which have been conducted at the site. The May 26, 1995, response, by Dr. David Burden (RSKERL) and Brad Hill (CDSI), stated that insufficient documentation was provided for an appropriate technical review. It was pointed out that the fundamental question of whether the model adequately simulated the natural hydrologic system is still uncertain. An earlier RSKERL recommendation to compare the model simulated water balance with conceptual estimates of inflow and outflow to the ground-water system had not been completely addressed. Suggestions and examples of how to correct these problems were provided.

(95-R02-006)

(D. Burden(RSKERL)504-436-8606)

Technical Assistance to Region VI: Dr. Daniel Pope (RSKERL) has completed a Site Treatability Study for the Popile Site, an inactive wood-treatment facility in El Dorado, AR. The purpose of the study was to make a preliminary determination of the feasibility of biological treatment of PAHs and PCPs found in soil at the Site. In addition to the materials and methods used, the operation of the 112 day study was described. The results of the study were provided in tabular and graphical formats. The report was provided to the Region on May 23, 1995.

(93-R06-003)

(D. Draper(RSKERL)405-436-8603)

TECHNOLOGY TRANSFER ACTIVITIES

During May 23-25, 1995, 25 students from Region V and state agencies within the Region were involved in an RSKERL training course in Chicago. Dr. R.M. McKinley, now retired from Exxon Production Research, conducted training on the use of temperature, radioactive tracer and noise logs for determining the mechanical integrity of injection wells. This very popular training course has been presented in Denver, Austin, and at the RSKERL.

(J. Jones(RSKERL)405-436-8593)

A course on subsurface modeling was presented at the RSKERL during May 23-26, 1995. The course emphasized the application of subsurface models to site specific ground-water flow and transport problems drawn from Well Head Protection, Superfund, and UST sites. During the course, in-depth presentations and hands-on training sessions were given on MODFLOW, the Wellhead Analytic Element Model (WhAEM), the Hydrocarbon Spill Screening Model (HSSM), and the Two Layer Model for free-product recovery (TWOLAY). The course was attended by 25 students from EPA, DOD, DOE, state agencies, academia, and private industry. The instructors were Dr. Jim Weaver, Dr. Steve Kraemer, Dr. Dave Burden, and Joe Williams (RSKERL), and Brad Hill (CDSI).

(J. Weaver(RSKERL)405-436-8545)

RESEARCH IN PROGRESS

Dr. James Weaver (RSKERL) is developing a visualization system for a three-dimensional display of field data which includes a quantification of the contaminant mass and geostatistical tools for selecting sampling locations. A working prototype of the graphics system has been developed and applied to data sets from St. Joseph, MI, and Hill AFB, UT. The data from St. Joseph have been analyzed for evidence of intrinsic bioremediation.

(J. Weaver(RSKERL)405-436-8545)

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HIGHLIGHTS

Robert S. Kerr Environmental Research Laboratory

Status Report for the Week of July 3, 1995

REGIONAL ASSISTANCE

Technical Assistance to Region II: On June 26, 1995, Joe Williams (RSKERL) and Bradley Hill (CDSI) provided the Region with a review of a consultant's comments concerning an earlier RSKERL critique of the MODFLOW Modeling project conducted at the Colesville Landfill Superfund Site in Colesville, NY. The primary concern was the location and type of boundaries. Since the model boundaries are located so close to the area of interest, there is a possibility that they may influence the simulation results. Specific comments focused on model calibrations and the need for input parameters used in the model to be representative of hydrogeological field conditions.

(95-R02-004)

(J. Williams(RSKERL)405-436-8608)

Technical Assistance to Region VI: On June 21, 1995, Scott Huling (RSKERL) and Dr. Bruce Pivetz (ManTech) provided RPM Glen Celerier with an evaluation of the PRP's response to earlier RSKERL comments on a sampling and analysis plan for the South Cavalcade Superfund Site in Houston, TX. Although most of the PRP's responses were found to be satisfactory, the key issue still appeared to be the calculation of a confidence level for ensuring that the remedial goals have been reached.

(95-R06-005)

(S. Huling(RSKERL)405-436-8610)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Brown, Chris L., Gary A. Pope (Univ. of Texas), Linda M. Abriola (Univ. of Michigan), and Kamy Sepehrnorri (Univ. of Texas). "Simulation of Surfactant Enhanced Aquifer Remediation." Water Resources Research, Vol. 30, Vol. 11. Nov. 1994.

(C. West(RSKERL)405-436-8551)

TECHNOLOGY TRANSFER ACTIVITIES

A training course entitled "Ground-Water Investigations" was held at the Region I Office in Boston June 20-22, 1995. Fifty-two students from the Region participated in the 2 1/2 day course. Subjects covered included vadose zone monitoring, fundamentals of ground-water hydrology, transport and fate of contaminants, ground-water quality, ground-water investigations, and ground-water remediation. Instructors were Jerry Jones (facilitator) and Dr. Candida West (RSKERL), Lowell Leach and Dr. Wayne Pettyjohn (Dynamac), and Dr. Ron Sims (Utah St. Univ.).

(J. Jones(RSKERL)405-436-8593)

Since the establishment of the Center for Subsurface Modeling Support (CSMoS) at RSKERL in the Fall of 1991, it has served as a focal point for the distribution of over 8,000 subsurface models. A function of CSMoS has been the review and evaluation of model applications at hazardous waste sites around the country. During a June 22-23, 1995, ASTM Symposium in Denver, Dr. Sang Lee (Dynamac) presented a paper which summarized model misuse at 20 sites which were reviewed through CSMoS. Model applications were graded as to their adequacy in meeting certain criteria including, the statement of objectives for model application, model conceptualization, attainment of input parameters, code selection criteria, sensitivity/uncertainty analysis, interpretation of results, and report organization. The authors found that for the 20 applications reviewed, a statement of the objectives scored highest, and the attainment and justification of input parameters scored lowest. The other authors of the report were Dr. Varadhan Ravi (Dynamac), and Joe Williams and Dr. David Burden (RSKERL).

(J. Williams(RSKERL)405-436-8608)

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HIGHLIGHTS
National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
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Status Report for the Week of July 10, 1995

REGIONAL ASSISTANCE

Technical Assistance to Region I: In response to a May 18, 1995, request, Don Draper (RSKERL), and Jill Acree and Jack Keeley (Dynamac) provided Air National Guard Program Manager Michael Minor with review comments of the "Installation Restoration Program, Plume Containment Design Data Gap Work Plan" for the Massachusetts Military Reservation in Cape Cod, MA. A September 27, 1994, RSKERL review of an earlier draft of the document contained a number of concerns including the need for additional pumping tests, an enhanced definition of contaminant plumes and hydrologic parameters, improved modeling to evaluate the regional ground-water flow, and the need to obtain additional piezometric data to better evaluate capture zones. The July 3, 1995, RSKERL review stated that an outstanding job had been done in addressing the earlier concerns and that the current plan will greatly improve the design, construction, and operation of plume containment fences at the facility.

(95-R01-001)

(D. Draper(RSKERL)405-436-8603)

Technical Assistance to Region II: On June 27, 1995, Joe Williams (RSKERL) and Bradley Hill (CDSI) provided RPM Anne Kelly with a review of comments made by Killam Associates on earlier RSKERL reviews of MODFLOW modeling at the Hertel Landfill Site in Plattekill, NY. In general, a sufficient water balance was presented along with other documentation demonstrating that the MODFLOW model simulated the hydrogeologic system in the vicinity of the landfill property. It was concluded that although Killam Associates had appropriately responded to RSKERL concerns expressed in the past, it remains important to understand the potential limitations and model simulation concerns that have been raised.

(95-R02-006)

(J. Williams(RSKERL)405-436-8586)

Technical Assistance to Region V: As part of a continuing technical assistance effort at the Granville Solvents Site in Granville, OH, Steve Acree (RSKERL) provided RPM Edward Hanlon with a review of the "Removal Action Ground-Water Monitoring Plan." The June 30, 1995, review comments stated that, although the revised plan incorporated several suggestions from a previous review, significant concerns still existed. In general, these concerns focused on the monitoring of the contaminant distribution at depths below the water table.

(94-R05-010)

(S. Acree(RSKERL)405-436-8609)

Technical Assistance to Region IX: On June 30, 1995, Steve Acree (RSKERL) provided Region IX with review comments of the "Interim Remedial Measures Study (IRMS) Waste Fluids Extraction Tests Work Plan" which was prepared for the BKK Landfill in West Covina, CA. In general, the plan appeared to be appropriate for the stated objectives. It was suggested that the proposed activities may impact the ambient air monitoring program currently in progress.

(93RC09-005)

(S. Acree(RSKERL)405-436-8609)

FY95 THIRD QUARTER REPORT

During the third quarter FY95, 13 new requests for technical assistance were received by the RSKERL Technology Support Center (TSC). In reply to these and other existing requests, the TSC provided 39 responses to the Regions, states, and military with regard to technical issues at Superfund and RCRA sites. In addition, RSKERL provided 6 training courses to over 200 students in Philadelphia, Denver, Atlanta, Boston, and Ada, in Ground-Water Investigations, Mechanical Integrity of Injection Wells, and Ground-Water Modeling. Representatives from RSKERL participated in local and state activities including addresses to the Soroptimist International Organization, serving as advisors to the City of Ada with regard to environmental issues and water resources, and advising the Oklahoma Energy Resources Board in methods of cleaning up abandoned oil field sites. RSKERL also participated in international activities during the quarter. A presentation concerning the bioremediation of hydrocarbons in the subsurface was made to the International Meeting of Microbial Ecology in Mexico City, and the Laboratory welcomed a post-doctoral engineer from the Technical University of Denmark who will be working on a research project for 18 months.

(D. Draper(RSKERL)405-436-8603)

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HIGHLIGHTS
National Risk Management Research Laboratory
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Status Report for the Week of July 17, 1995

REGIONAL ASSISTANCE

Technical Assistance to Region V: On February 21, 1995, RSKERL provided the Region with detailed comments on gathering filtered versus unfiltered ground-water samples, and the analysis for TOC in lagoon material which contains coal and coke fines at the Allied Signal Ironton Coke Plant Site in Ironton, OH. The review comments also questioned the rationale for selecting the GEOFLOW model for use at the site. On July 7, 1995, Joe Williams (RSKERL) provided RPM Thomas Alcamo with review comments concerning a site contractor's response to these earlier RSKERL comments. In general, no specific concerns were expressed with the leach test and partition coefficient determination methods except with regard to assumptions related to the estimation of organic carbon content for media that is primarily coal and coke fines. Concerns were also expressed that the modeling effort is being treated as a simple step and that this will eventually lead to a misunderstanding of processes observed at the site.

(94-R05-007)

(J. Williams(RSKERL)405-436-8608)

Technical Assistance to Region V: On June 15, 1995, RPM Anita Boseman requested review comments on a monitoring well replacement work plan for the Velsicol Site in St. Louis, MI. In a response dated July 5, 1995, Randall Ross (RSKERL) commented that the work plan appeared adequate to address several potential problems that could develop with existing wells. A number of suggestions were offered with respect to the improvement of some wells and the proper abandonment of others.

(95-R05-003)

(R. Ross(RSKERL)405-436-8611)

Technical Assistance to Region V: During June 21-22, 1995, Steve Acree (RSKERL) met in San Francisco, CA, with representatives of the Region and Regional contractors to discuss issues related to the pre-final (90%) ground-water remediation report at the J.H. Baxter Superfund Site in Weed, CA. The discussions focused on monitoring the hydraulic control system, restoration of portions of the site, and proposed methods of recovering nonaqueous phase liquids.

(95-R09-005)

(S. Acree(RSKERL)405-436-8609)

Technical Assistance to Region VI: In a continuing technical assistance effort at the Vertac Site in Jacksonville, AR, Steve Acree (RSKERL) and Dr. Charles Newell (Groundwater Services, Inc.) provided RPM Rick Ehrhart with review comments on a Feasibility Study Report for Operable Unit 3 at that facility. In the July 10, 1995, comments, it was pointed out that concerns exist regarding the extent of contamination and the effectiveness of operating remedial systems. Comments were offered in a variety of areas including the possible need for additional studies, contaminant distribution, and NAPL recovery.

(92-R06-003)

(S. Acree(RSKERL)405-436-8609)

Technical Assistance to Region IX: On July 6, 1995, Joe Williams (RSKERL) provided the Region with review comments on a document and associated appendices concerning the development of a methodology for determining primary action levels for soil and ground water. The document was prepared by the State of Hawaii.

(Misc.)

(J. Williams(RSKERL)405-436-8608)

RESEARCH IN PROGRESS

Working under a cooperative agreement with RSKERL, Dr. Mark Grismer (Univ. of California at Davis) is conducting a research project titled "Methods for Determining Multiphase Characteristic Curves for use in Designing Subsurface Bioremediation Systems." The objective of the project is to develop a technique for measuring soil hydraulic properties for use in subsurface flow, transport, and remediation models. The proposed technique is rapid and will permit the measurement of air/water, air/NAPL, and NAPL/water capillary pressure curves.

(J. Weaver(RSKERL)405-436-8545)

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HIGHLIGHTS
National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
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Status Report for the Week of July 24, 1995

REGIONAL ASSISTANCE

Technical Assistance to Region VI: On July 18, 1995, Steve Acree (RSKERL) attended a meeting at the offices of the Arkansas Department of Pollution Control and Ecology (ADPC&E) to discuss the "Feasibility Study for Operable Unit 3" at the Vertac Site in Jacksonville, AR. Also attending the meeting were representatives from Region VI, the ADPC&E, and Hercules, Inc. Discussions focused on the extent of ground-water contamination and effectiveness of the existing remediation system.

(92-R06-003)

(S. Acree(RSKERL)405-436-8609)

Technical Assistance to Region VI: On July 13, 1995, Don Draper (RSKERL) and Dr. Daniel Pope (Dynamac) provided the Region with review comments of the sampling and analysis plan for biotreatability testing of petroleum contaminated soil and sludges at the PAB Oil Site in Vermilion Parish, LA. Although the plan appeared to be reasonable, it was suggested that the treatability studies be extended in order to more accurately discern the asymptote. A number of sampling issues were discussed including losses of BTEX when samples are transferred from soil cores to the sample container.

(93-R06-006)

(D. Draper(RSKERL)405-436-8603)

Technical Assistance to Region VI: In response to a request for technical assistance from RPM Susan Webster, Dr. David Burden (RSKERL) and Dr. Varadhan Ravi (Dynamac) prepared review comments on the interim status report of ground-water flow and transport modeling at Tinker Air Force Base in Oklahoma City, OK. The July 12, 1995, comments stated that the modeling effort seemed to be progressing in the right direction, and that careful consideration appeared to be given to the most essential aspects of modeling. A number of detailed comments were made in areas such as parameter estimation, boundary conditions, flow model calibration, and solute transport.

(94-R06-002)

(D. Burden(RSKERL)405-436-8606)

Technical Assistance to Region VII: On July 17, 1995, Joe Williams (RSKERL) provided RPM Ken Rapplean with review comments of the "Draft Phase I Pre-Design Data Acquisition Report" and "Appendix I Vadose Zone Leachate Modeling Report" for the Coleman Operable Unit in Wichita, KS. The overall analysis of the reports revealed that there are questions concerning how well the model (SESOIL) flow and transport principles were understood by the users. A number of examples were offered to support this concern. Although the report did a good job of stating the objectives of the modeling activity and code selection criteria, the development of the conceptual model was not as concise in a number of areas such as the selection of recharge estimates and the vertical characterization of the soil.

(93-R07-003)

(J. Williams(RSKERL)405-436-8608)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Puls, Robert W. and Cynthia J. Paul (RSKERL), and Robert M. Powell (ManTech). "In Situ Remediation of Ground Water Contaminated with Chromate and Chlorinated Solvents Using Zero-Valent Iron: A Field Study." RSKERL progress report to the USGS. June, 1995.

(R. Puls(RSKERL)405-436-8543)

RESEARCH IN PROGRESS

Drs. K.M. Petry and M.J. McInerney (Univ. of Okla.) are working with RSKERL through a cooperative agreement on a project titled "Development of Techniques for In Situ Bioremediation of Chromium Contaminated Soil and Ground Water." While metals cannot be degraded by microorganisms, it is possible for microbial activity to alter the oxidation state of metals thereby controlling their mobility and relative toxicity in the subsurface. Further information on microbial oxidation/reduction processes is needed before efficient treatment technologies can be designed.

(G. Sewell(RSKERL)405-436-8566)

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H I G H L I G H T S
National Risk Management Research Laboratory
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Status Report for the Week of August 21, 1995

REGIONAL ASSISTANCE

Technical Assistance to Region II: On July 26, 1995, RPM Carla Struble requested review comments on documents regarding a proposal to complete additional ground-water modeling studies in order to determine if natural attenuation would be an appropriate remedial action alternative at the Ash Landfill, located at the Seneca Army Depot Site in Romulus, NY. The proposed models include MODFLOW to be used in conjunction with MT3D. The August 11, 1995, response was prepared by Joe Williams (RSKERL), and Brad Hill, Dr. Ying Ouyang and Dr. Rashid Islam (CDSI). In general, the modeling proposal was inadequate to meet the basic objectives for model applications at the site. It was suggested that the work plan address the objectives for the model application, the development of a conceptual model for the site, a selection of codes, data requirements, model calibration and sensitivity analysis, and the method of evaluating scenarios used in the model simulations. An example of a modeling work plan was provided for guidance. (95-R02-007) (J. Williams(RSKERL)405-436-8606)

Technical Assistance to Region V: On August 7, 1995, Steve Acree and Joe Williams (RSKERL) provided RPM Edward Hanlon with comments and recommendations concerning plans to remediate contaminated soil at the Granville Solvents Site in Granville, OH. In general, it appeared that the phased plan for the characterization of soil would provide better information regarding the volume of contaminated soil at the facility. Concerns were expressed with regard to obtaining sufficient information to determine the potential for contaminant sources to exist within the water table and determining the relative contribution of such sources to ground-water contamination. The proposal to replace an existing water supply well was also discussed. A number of detailed comments and recommendations regarding these and other issues were also provided. (94-R05-010) (S. Acree(RSKERL)405-436-8609)

TECHNOLOGY TRANSFER ACTIVITIES

A training course entitled "Ground-Water Investigations" was held at the Region II Office in New York City, August 8-10, 1995. Sixty students from the Regional Office participated in the 2 1/2 day course. Subjects covered included vadose zone monitoring, fundamentals of ground-water hydrology, transport and fate of contaminants, ground-water quality, ground-water investigations, and ground-water remediation. Jerry Jones and Dr. Mary Randolph (RSKERL) served as course moderators and the instructors were Dr. Candida West (RSKERL), Lowell Leach and Jerry Thornhill (Dynamac), and Dr. Ron Sims (Utah St. Univ.). (J. Jones(RSKERL)405-436-8593)

RESEARCH IN PROGRESS

Working under a cooperative agreement with RSKERL, Dr. Gary Pope (Univ. of Texas) is developing a 3-dimensional model which will describe contaminant transport and transformation characteristics in aquifers with a spatially and temporally varying hydrogeologic environment. When completed, the model will be used as a planning and design tool for subsurface remediation projects. The model will incorporate physical, chemical, and biological processes that are known to occur in the field but are not well accounted for in current transport and fate models. (J. Cho(RSKERL)405-436-8547)

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H I G H L I G H T S
National Risk Management Research Laboratory
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Status Report for the Week of August 28, 1995

REGIONAL ASSISTANCE

Technical Assistance to Region VI: On August 17, 1995, as part of a continuing technical assistance effort, Steve Acree (RSKERL) provided RPM Rick Ehrhart with review comments of the "Ground-Water Monitoring Plan" for the Vertac Superfund Site in Jacksonville, AR. General comments were that the plan did not provide sufficient activities to satisfy the overall objectives of the monitoring effort which included the detection of contaminant migration before plumes reached the site boundary. It was also suggested that information from this monitoring plan be used during the remedial design, as well as to monitor the effectiveness of remedial actions.

(92-R06-003)

(S. Acree(RSKERL)405-436-8609)

Technical Assistance to Region VIII: On August 21, as part of a continuing technical assistance effort, Steve Acree and Dr. Guy Sewell (RSKERL) provided RPM Dan Thornton with a suggested protocol for evaluating natural attenuation processes at the EKOTEK (Petroleum Plant) Superfund Site in Salt Lake City, UT. The protocol, which focused on ground water contaminated with chlorinated solvents, discussed the general requirements for demonstrating that natural attenuation is occurring at sufficient rates to achieve desired remedial objectives in reasonable time frames.

(93-R08-003)

(S. Acree(RSKERL)405-436-8609)

Technical Assistance to Region IX: In a review dated August 18, 1995, Steve Acree (RSKERL) provided RPM Kathy Setian with comments concerning the "Technical Memorandum: Evaluation of Slurry Wall" which was prepared for the J.H. Baxter Superfund Site in Weed, CA. It was suggested that the incorporation of physical containment (e.g., slurry wall) into the ground-water remediation strategy would provide several positive aspects including increased confidence in the containment of the NAPL zone, reduce the volume of extracted ground water, and provide a viable component to any future NAPL removal efforts recommended under the focused feasibility study.

(95-R09-005)

(S. Acree(RSKERL)405-436-8609)

Technical Assistance to Headquarters: On August 21, 1995, Scott Huling and Dr. Steve Schmelling (RSKERL) provided Ken Lovelace (Superfund) with review comments of a document entitled, "Draft Presumptive Response Strategy and Ex-Situ Treatment Technologies for Ground Water at CERCLA Sites."

(Misc.)

(S. Huling(RSKERL)405-436-8610)

RESEARCH IN PROGRESS

Since 1993, Dr. James Davis (USGS), working under an Interagency Agreement with RSKERL, has been conducting research aimed at developing a more complete understanding of the geochemical processes which affect metal transport in ground water and the mechanisms which couple these processes with site hydrogeology. Large-scale tracer tests using chromate, lead, nickel, copper, and zinc have been conducted at Otis Air Force Base on Cape Cod, MA, where metals, cations, and anions have been sampled numerous times from the large-scale monitoring array at the site (10,000 sampling points). Breakthrough curve sampling has been completed and the analysis and modeling of data continues in preparation for the final report which is expected this winter.

(R. Puls(RSKERL)405-436-8543)

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HIGHLIGHTS
National Risk Management Research Laboratory
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Status Report for the Week of September 11, 1995

REGIONAL ASSISTANCE

Technical Assistance to Region I: In response to a request dated August 14, 1995, Don Draper provided the Otis ARNG Base, on Cape Cod, MA, with review comments on the "Draft Design Analysis Plan, Massachusetts Military Reservation, Plume Containment Design Project." In the August 30, 1995, response, Don Draper (RSKERL) and Jack Keeley (Dynamac) pointed out that the work discussed in the documents was well organized, clearly presented, and exceptionally cogent with respect to the activities planned for the site.
(95-R01-001) (D. Draper(RSKERL)405-436-8603)

Technical Assistance to Region VIII: During August 28-29, 1995, Steve Acree and Dr. Guy Sewell (RSKERL) attended a meeting at the Petrochem/Ekotek Superfund Site in Salt Lake City, UT, to discuss issues related to potential remedial technologies. Others attending the meeting included representatives from Region VIII, Utah Department of Environmental Quality, various interested groups, and responsible parties and their contractors. Technical issues which were discussed included site hydrogeology, bioremediation of chlorinated solvents, and pump-and-treat technology.
(93-R08-003) (S. Acree(RSKERL)405-436-8609)

Technical Assistance to Region IX: During August 21-22, 1995, Steve Acree (RSKERL) and Lowell Leach (Dynamac) met at Mather AFB in Sacramento, CA, with representatives from Region IX, and the U.S. Air Force and their contractors to discuss problems with injection wells used for ground-water remediation at the facility. Discussions focused on technical issues concerning potential causes of plugging and the data required to assess these causes, potential system enhancements to reduce plugging, and an expansion of the injection system.
(95-R09-014) (S. Acree(RSKERL)405-436-8609)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Weaver, James W., John T. Wilson, and Don H. Kampbell (RSKERL). "Natural Bioattenuation of Trichloroethene at the St. Joseph, Michigan Superfund Site." EPA Project Summary. EPA/600/SV-95/001. August 1995.
(J. Weaver(RSKERL)405-436-8545)

RESEARCH IN PROGRESS

A series of studies have been carried out by RSKERL researchers to investigate the bioremediation of aquifers contaminated with fuel products, and to correlate laboratory results with field performance. The purpose of the continuing series is to determine if a denitrification process using nitrate can be used to remove residual BTEX from contaminated aquifers at Traverse City, MI; Park City, KS; and Eglin AFB, FL. The studies were designed to assess the optimum parameters required for effective bioremediation. About a dozen articles have appeared in the technical literature thus far describing the findings of this research.
(S. Hutchins(RSKERL)405-436-8563)

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REGIONAL ASSISTANCE

Technical Assistance to Region III: On September 6, 1995, Don Draper (RSKERL), and Drs. Daniel Pope and Ann Azadpour (Dynamac), provided RPM Melissa Whittington assistance in bioremediation studies at the Morgantown Ordnance Works in Morgantown, WV. The issue was whether the proposed remedy could be completed in the time allotted in the ROD which was five years or less. The PRPs have proposed to conduct laboratory studies to determine if bioremediation can reduce soil concentrations of carcinogenic PAHs to required levels. The RSKERL response included spreadsheets using several possible parameters of field conditions, and calculated the time span which will be required within each lift of soil to remediate all the contaminated soil within the allotted time. Charts were also prepared which graphically displayed the information on the spreadsheets. It was suggested that remediation could take quite a bit more than five years.

(91-R03-001)

(D. Draper(RSKERL)405-436-8603)

Technical Assistance to Region V: On August 31, 1995, Steve Acree (RSKERL) provided RPM Edward Hanlon with review comments on the "Removal Action Ground-Water Monitoring Plan," "Treatability Performance Report," and "Removal Action Workplan" which were prepared for the Granville Solvents Site in Granville, OH. In general, the documents appeared to address many of the issues raised in earlier RSKERL reviews. Some concerns were expressed with regard to the revised ground-water monitoring plan. These were discussed in detail.

(94-R05-010)

(S. Acree(RSKERL)405-436-8609)

Technical Assistance to Region IX: On September 6, 1995, Steve Acree (RSKERL) attended a meeting in the Regional Office to discuss the preliminary (30%) ground-water remediation design for the J.H. Baxter Superfund Site in Weed, CA. Also attending the meeting were representatives from Region IX and their contractors, California Department of Toxic Substance Control, and Weed Remediation Group. Discussions focused on technical issues concerning remediation objectives, proposed monitoring of hydraulic control, restoration of portions of the site, and proposed recovery of nonaqueous phase liquids.

(95-R09-005)

(S. Acree(RSKERL)405-436-8609)

TECHNOLOGY TRANSFER ACTIVITIES

A training course entitled "Ground-Water Investigations" was held at the Region IX Office in San Francisco, September 6-8, 1995. Twenty students from the Region participated in the 2 1/2 day course. Subjects covered included vadose zone monitoring, fundamentals of ground-water hydrology, transport and fate of contaminants, ground-water quality, ground-water investigations, and ground-water remediation. Dr. Mary Randolph (RSKERL) served as course moderator and the instructors were Dr. Candida West (RSKERL), Lowell Leach and Dr. Wayne Pettyjohn (Dynamac), and Dr. Ron Sims (Utah St. Univ.).

(M. Randolph(RSKERL)405-436-8616)

RESEARCH IN PROGRESS

A 16-member Committee on Innovative Remediation Technologies was established by the National Research Council to address problems of implementing innovative ground-water cleanup technologies. The Committee will focus on establishing technical protocols for hierarchical testing of these technologies as well as developing criteria for assessing claims of success of a given technology. Guidelines for administering field testing at designated sites will be developed along with guidelines for a technology certification program. The study is sponsored by EPA, DOE, and DOD.

(J. McNabb(RSKERL)405-436-8590)

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REGIONAL ASSISTANCE

Technical Assistance to Region VI: On September 15, 1995, Scott Huling (RSKERL) and Dr. Bruce Pivetz (ManTech) provided the Region with review comments on the revised Groundwater Extraction System Performance Monitoring Plan (GESPPM) which was formerly the Confirmational Sampling and Analysis Plan (CSAP) for the South Cavalcade Superfund Site in Houston, TX. The comments were provided in response to a March 13, 1995, request from RPM Glen Celerier. The purpose of the review was to determine if the revised GESPPM addressed the issues and concerns raised in previous reviews and meetings. In general, the document satisfactorily incorporated earlier concerns and there does not appear to be any substantial issues remaining. A number of specific comments and suggestions were offered.

(95-R06-005)

(S. Huling(RSKERL)405-436-8610)

TECHNOLOGY TRANSFER ACTIVITIES

On September 14, 1995, Steve Acree and Randall Ross (RSKERL) and Dr. Charles Newell (Groundwater Services, Inc.) presented a seminar entitled "Nonaqueous Phase Liquids" in the Subsurface to members of the technical staff of the Louisiana Department of Environmental Quality. Topics which were presented included NAPL transport and fate in the subsurface, NAPL site characterization, and potential remediation technologies. The seminar was well received and attended by approximately 25 State employees.

(S. Acree(RSKERL)405-436-8609)

ASSISTANCE TO AUSTRALIA

On September 14, 1995, Don Draper (RSKERL) responded to a request from Dr. Craig Blundell with the Environmental Protection Authority in New South Wales, Australia, concerning work performed at a large DNAPL site. A list of experts familiar with DNAPL contamination was provided which included scientists at RSKERL and the private sector as well. In addition, several RSKERL reports dealing with DNAPLs were provided.

(D. Draper(RSKERL)405-436-8603)

RESEARCH IN PROGRESS

Working under a cooperative agreement with RSKERL, Dr. Edward Bower (Johns Hopkins Univ.) is conducting research to develop a better understanding of the effect of oxygen alone or nitrogen alone, or in combination, on the biodegradation of selected mono- and polycyclic aromatic hydrocarbons in contaminated aquifer materials. The research is using batch reactors to assess stoichiometry and kinetics under strict aerobic or denitrifying conditions, as well as mixtures of oxygen and nitrate. Column studies are being used to simulate single continuous flow injection wells, multiple injection wells, and pulsed injection wells under mixed electron acceptor conditions.

(S. Hutchins(RSKERL)405-436-8563)

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REGIONAL ASSISTANCE

Technical Assistance to Region II: On September 29, 1995, Joe Williams (RSKERL), and Brad Hill and Dr. Rashid Islam (CDSI) provided the Region with review comments on a number of documents regarding ground-water flow modeling at the Eastman Kodak facility in Rochester, NY. In general, the modeling effort was found to be very comprehensive, well planned, and of high quality. In addition, the documentation of the modeling effort was very organized, well presented, and extremely detailed. Some concerns regarding model conceptualization were offered. (95RC02-001) (J. Williams(RSKERL)405-436-8608)

Technical Assistance to Region VI: In response to technical assistance requests dated November 10, 1994, and August 10, 1995, Scott Huling (RSKERL), Lowell Leach (Dynamac), and Dr. Birinder Shergill (ManTech) provided RPM Lisa Price with comments concerning reports prepared for the Crystal Chemical Company Superfund Site in Houston, TX. The objective of the October 2, 1995, review was to evaluate technical issues regarding whether the "Technical Impracticability (TI) of Ground-Water Remediation Report" demonstrated compliance with the intent of TI guidance information. In general, it was recommended that the TI waiver request be approved and further evaluation of alternative remedial strategies be performed. Several issues related to the TI waiver request were discussed in detail. (95-R06-001) (S. Huling(RSKERL)403-436-8610)

Technical Assistance to Region IX: On September 12, 1995, RPM Michelle Baron requested assistance with respect to the effectiveness of a carbon treatment system in removing parachlorobenzene-sulfonic acid (p-CBSA) at the Montrose Chemical Superfund Site near Los Angeles, CA. In a September 25, 1995, response, Don Draper (RSKERL) and Dr. Ann Azadpour (Dynamac) pointed out that the design of any system at this time would not be in the best interest of the Region because the data is over four years old, and there was some evidence that its value was questionable. It was suggested that there was a strong possibility that conditions at the site would be significantly different than those four years ago, particularly with respect to organic contaminants. The recommendation was made that the site should be sampled with enough frequency to assure that the normal statistical variability of water quality parameters be understood and that the contaminated ground water, as well as background quality, be adequately characterized. (95-R09-015) (D. Draper(RSKERL)405-436-8603)

Technical Assistance to Headquarters: On September 25, 1995, Joe Williams (RSKERL) provided Beverly Irla (Office of Radiation and Indoor Air) with review comments of a draft report entitled, "A Review Guide for Ground Water Model Applications at Sites Contaminated with Radioactive Substances." In addition to stating that the document was well written and presented a tremendous amount of information, the RSKERL comments pointed out that the authors had done well in presenting tables and that the document will be very useful in assisting model application reviewers in evaluating specific aspects of the modeling process. (Misc.) (J. Williams(RSKERL)405-436-8608)

RESEARCH APPLICATIONS

During September 20-29, 1995, Steve Acree and Randall Ross (RSKERL) applied the electromagnetic borehole flowmeter at the Burlington Northern Paradise Tie Treating Facility in Paradise, MT. The flowmeter was developed through a series of previous research projects conducted under Cooperative Agreements with Auburn University and an Interagency Agreement with the Tennessee Valley Authority (TVA). The study was undertaken at the request of RPM Stephanie Wallace Region VIII Montana Operations Office, to define zones of preferential ground-water flow in an area where a tracer test had previously been conducted. The survey was requested to provide information useful in the interpretation of results from the tracer test. A report detailing findings of the flowmeter survey is being prepared for Region VIII. (95RC08-001) (S. Acree(RSKERL)405-436-8609)

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REGIONAL ASSISTANCE

Technical Assistance to Region II: On September 6, 1995, RPM Sharon Trocher requested review comments on the "Modeling Work Plan" for the Carrol and Dubies Superfund Site in Port Jervis, NY. The October 2, 1995, response was prepared by Don Draper (RSKERL) and Dr. Varadhan Ravi (Dynamac). The work plan discusses modeling with "no" remediation and that with "pump-and-treat" remediation. An analytical model called TDAST and a combination of MODFLOW and MODPATH are proposed to evaluate the two scenarios. Detailed comments were offered with respect to model conceptualization and validation, and it was suggested that additional parameters be included in the sensitivity analysis.

(95-R02-009)

(D. Draper(RSKERL)405-436-8603)

Technical Assistance to Region IX: On October 10, 1995, Jerry Jones (RSKERL), and Dr. Ann Azadpour and Jack Keeley (Dynamac) participated in a conference call with Region IX staff to discuss the Montrose Chemical Superfund Site in Torrance, CA. The discussion centered on the effectiveness of using activated carbon to remove parachlorobenzene-sulfonic acid (p-CBSA) from extracted ground water. Other issues included the need for additional sampling, and the possibility of reducing p-CBSA concentrations by bioremediation. In order to address these issues in more detail, the Region is going to provide RSKERL with additional data from monitoring and activated carbon tests conducted at the site.

(95-R09-015)

(J. Jones(RSKERL)405-436-8593)

POST-BACCALAUREATE ACHIEVEMENT PROGRAM

RSKERL has played an integral part in a grant awarded to East Central University by the U.S. Department of Education. The Ronald E. McNair Post-Baccalaureate Achievement Program grant is a program designed to prepare low-income, first generation college students and students from other under-represented groups in graduate education for doctoral study. Through a competitive process, ten of the twenty McNair students are awarded internships for a summer research institute. RSKERL commits research scientists to lead these ten McNair Scholars through their summer research experience at the Laboratory. This was the fourth summer for the research institute. During the eight-week institute, the student was required to produce a research report and a poster display on the project with which they were involved. On September 27, 1995, a poster day was held at East Central University for viewing by faculty, RSKERL staff, community, and news media. Four of the students will attend the National McNair conference where they will present their research endeavors.

(D. Hutchings(RSKERL)405-436-8596)

RESEARCH APPLICATIONS

An interdisciplinary team consisting of Dr. Jim Weaver, Dr. John Wilson and Steve Acree (RSKERL), and Joe Haas (NY State Dept. of Environmental Conservation) is working on the analysis of a mile-long contaminant plume at the Hagerman Avenue Leaking Underground Storage Tank Site in East Patchogue, NY. The focus of the project is to determine the rate of natural bioattenuation of BTEX, the rate of release of contaminants to the aquifer, and the fate and transport mechanisms for BTEX and methyl t-butyl ether (MTBE). Tracers in the spilled gasoline are being sought in order to quantify the biodegradation rate constants. The work also includes the application of the Hydrocarbon Spill Screening Model (HSSM) to quantify the balance between mass flux to the aquifer and degradation rates.

(J. Weaver(RSKERL)405-436-8545)

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REGIONAL ASSISTANCE

Technical Assistance to Region I: On October 19, 1995, Scott Huling (RSKERL) provided RPM Joseph LeMay with review comments on two documents concerning the Resolve Superfund Site North in Dartmouth, MA. The reports were "Response to EPA's Comments on the 60% Design Report" and "Draft Implementation Plan Management of Migration, Remedial Design." Several comments and recommendations were made in areas such as the risk that DNAPLs may become mobilized during site characterization and remediation activities, mobility of the dissolved phase plume, and general concepts of DNAPL transport.

(93-R01-010)

(S. Huling(RSKERL)405-436-8610)

Technical Assistance to Region V: On September 12, 1995, RPM Edward Hanlon requested review comments on three documents developed for the Granville Solvents Site in Granville, OH. In a response dated October 16, 1995, Steve Acree (RSKERL) stated that the "Design Technical Memorandum for Remediation of Impacted Soils" and "Technical Evaluation of Alternatives to Reinstate Capacity of Supply Well, PW-1" reports adequately addressed issues raised in previous reviews. With respect to the "Quality Assurance Project Plan (QAPP)," several relatively minor comments were offered concerning soil sampling for the analysis of VOCs, low flow rate well purging and sampling, and field monitoring of stability indicators including redox potential, dissolved oxygen, and turbidity.

(94-R05-010)

(S. Acree(RSKERL)405-436-8609)

Scientific and Technical Publications

Ye, Ming Y., Ron G. Walkup, and Kim D. Hill (ManTech). "Separation of Octylphenol Polyether Alcohols Surfactants by Capillary Column SFC and HPLC." Journal of Liquid Chromatography, 18(12), 1995.

(R. Cosby(RSKERL)405-436-8533)

Huling, S.G. (RSKERL), D.F. Pope (Dynamac), J.E. Matthews (RSKERL), and J.L. Sims, R.C. Sims, and D.L. Sorenson (Utah St. Univ.). "Wood Preserving Waste-Contaminated Soil: Treatment and Toxicity Response." Bioremediation of Recalcitrant Organics. Battelle Press. June 1995.

(S. Huling(RSKERL)405-436-8601)

FY 1995 RSKERL TSC ACTIVITIES

During FY 1995, the RSKERL Technology Support Center (TSC) provided 143 responses to technical assistance requests at 73 CERCLA sites and 21 responses at 12 RCRA sites. These activities included the addition of 30 new CERCLA and 6 new RCRA sites to the total TSC list of technical assistance locations. Another 12 non-site specific technical assistance requests were addressed. Eighteen technology transfer activities were provided during the year in areas including: ground-water monitoring, modeling, and investigations; NAPLs; electromagnetic borehole flowmeter; mechanical integrity of injection wells; soil remediation at wood-preserving sites; contaminant transport and fate in the subsurface; land treatment systems; surfactant-based innovative technologies for aquifer remediation; and intrinsic bioremediation. In addition to participating in site specific technical assistance requests, the RSKERL Center for Subsurface Modeling Support (CSMoS) provided 4,218 copies of model software in response to 1,395 requests.

(J. Jones(RSKERL)405-436-8593)

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SCIENTIFIC AND TECHNICAL PUBLICATIONS

Hutchins, S.R., J.T. Wilson, and D.H. Kampbell (RSKERL). "In-Situ Bioremediation of a Pipeline Spill Using Nitrate as the Electron Acceptor." Book Chapter -- Applied Bioremediation of Petroleum Hydrocarbons. Battelle Press. 1995.
(S. Hutchins(RSKERL)405-436-8563)

Semprini, Lewis (Oregon St. Univ.), Peter K. Kitanidis (Stanford Univ.), and Don Kampbell and John Wilson (RSKERL). "Anaerobic Transformation of Chlorinated Aliphatic Hydrocarbons in a Sand Aquifer Based on Spatial Chemical Distributions." Water Resources Research. Vol. 31, April 1995.
(G. Sewell(RSKERL)405-436-8566)

Miller, Dennis E. (RSKERL). "Petroleum Hydrocarbon Biodegradation Under Mixed Denitrifying/Microaerophilic Conditions." Book Chapter -- Microbial Processes for Bioremediation. Battelle Press. 1995.
(D. Miller(RSKERL)405-436-8567)

Wilson John T. and Donald H. Kampbell (RSKERL), and Todd Wiedemeier and Matthew A. Swanson (Engineering Science), and Ross N. Miller and Jerry E. Hansen (Brooks AFB). "Patterns of Intrinsic Bioremediation at Two United States Air Force Bases." Book Chapter -- Intrinsic Bioremediation. Battelle Press. 1995.
(J. Wilson(RSKERL)405-436-8532)

Wilson, John T. (RSKERL), Hanadi S. Rifai and Calvin H. Ward (Rice Univ.), and Robert C. Boren (North Carolina St. Univ.). "Intrinsic Bioattenuation for Subsurface Remediation." Book Chapter -- Intrinsic Bioremediation. Battelle Press. 1995.
(J. Wilson(RSKERL)405-436-8532)

Hutchins, Stephen R., Dennis E. Miller, and Frank P. Beck (RSKERL), and Alison Thomas (Tyndall AFB), and Stephen E. Williams (Eglin AFB), and Guy D. Willis (EA Engineering). "Nitrate-Based Bioremediation of JP-4 Jet Fuel at Eglin AFB, FL: Pilot Scale Demonstration." Book Chapter -- Applied Bioremediation of Petroleum Hydrocarbons. Battelle Press. 1995.
(S. Hutchins(RSKERL)405-436-8563)

Wilson, John T. and Guy Sewell (RSKERL). "Intrinsic Bioremediation of Jet Fuel Contamination at George Air Force Base." Book Chapter -- Intrinsic Bioremediation. Battelle Press. 1995.
(J. Wilson(RSKERL)405-436-8532)

Hutchins, Stephen R. (RSKERL), and J. Michele Thomas, Virginia R. Gordy, Christin L. Bruce, and C. Herbert Ward (Rice Univ.), and James L. Sinclair (ManTech). "Microbial Activity in Subsurface Samples Before and During Nitrate-Enhanced Bioremediation." Book Chapter -- Microbial Processes for Remediation. Battelle Press. 1995.
(S. Hutchins(RSKERL)405-436-8563)

Powell, Robert M. and Sharon K. Hightower (ManTech), and Robert W. Puls (RSKERL), and David A. Sabatini (Univ. of Okla.). "Coupled Iron Corrosion and Chromate Reduction: Mechanisms for Subsurface Remediation." Environmental Science and Technology. Vol. 29, 1995.
(R. Cosby(RSKERL)405-436-8533)

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REGIONAL ASSISTANCE

Technical Assistance to Region I: Since July 3, 1995, a series of technical assistance efforts have been provided to RPM Dick Goehlert concerning the Savage Well Superfund Site in Milford, NH. On November 2, 1995, Don Draper (RSKERL), and Drs. Daniel Pope, Varadhan Ravi, and Ann Azadpour (Dynamac) provided review comments on the "Revised Scope of Work for Site-Specific Evaluation of Bioremediation" with a focus on the proposed use of natural attenuation as a remedy at the site. The comments discussed specific activities that must be required in order to demonstrate that natural attenuation is occurring. The response also discussed the possible use of microcosms in site-related investigations.

(95-R01-005)

(D. Draper(RSKERL)405-436-8603)

Technical Assistance to Region II: On October 5, 1995, RPM Rich Puvogel requested assistance in the evaluation of a ground-water model which was designed to characterize the capture zone as well as the fate and transport of contaminants outside the capture zone at the A.O. Polymer Site in Sparta Township, NJ. In a response dated November 1, 1995, Joe Williams (RSKERL) and Brad Hill (CDSI) discussed the appropriateness of the simulated boundary conditions, model input parameters, and the use of a contaminant transport code to justify that "natural attenuation" of the contaminants to below MCLs would occur outside the simulated capture zone. It was pointed out that because that material was poorly documented and difficult to follow, a thorough review of the transport modeling effort was inhibited. General comments concerning contaminant transport and ground-water flow were provided.

(96-R02-001)

(J. Williams(RSKERL)405-436-8608)

Technical Assistance to Region V: On June 13, 1995, START Leader Michael Royer requested assistance in the prediction of ground-water flow and metals transport at the Scrap Lead Superfund Site in Miami County, OH. On October 27, 1995, Dr. David Burden (RSKERL), and Dr. Ying Ouyang and Brad Hill (CDSI) commented that if subsurface fate and transport modeling is to be performed, site specific data is necessary in order to ensure that the results are sound and defensible. It was pointed out that modeling is not a linear process, but an iterative evolutionary approach to the refinement of an understanding of a natural system. Detailed information was provided as to how the needed information should be determined.

(95-R05-006)

(D. Burden(RSKERL)405-436-8606)

Technical Assistance to Region IX: On October 31, 1995, Steve Acree (RSKERL) provided continuing assistance at the J.H. Baxter Superfund Site in Weed, CA, by providing RPM Kathy Setian with review comments of the "Technical Memorandum: Interim LNAPL Removal Plan." A major concern is the proposal to install a recovery well prior to obtaining current information regarding the presence of mobile LNAPLs. Although the proposed recovery well is located in an area in which mobile LNAPLs have been observed in previous soil borings, these data are several years old. It was also recommended that a more detailed monitoring proposal be submitted for review once it is determined that recoverable quantities of LNAPL are present and the recovery system design is finalized.

(95-R09-005)

(S. Acree(RSKERL)405-436-8609)

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HIGHLIGHTS

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REGIONAL ASSISTANCE

Technical Assistance to Region III: One of the exposure routes of concern, at the Pickett Road Superfund Site in Fairfax, VA, is the migration of vapors upward, possibly reaching basements of homes overlying the plume. The responsible party has applied the VIP model to a number of phase-separated compounds to indicate that vapor transport through the vadose zone is not significant in this area. On August 26, 1995, RPM Betty Ann Quinn requested review comments of a document titled, "Simulation of the Upward Transport of Volatile Aromatic Hydrocarbons in the Unsaturated Zone." It was requested that the review comments discuss whether the responsible party used the model correctly with the appropriate inputs and whether their conclusions are valid both for the areas directly modeled as well as the other areas of the site. In a response dated November 6, 1995, Joe Williams (RSKERL), and Drs. Jin-Song Chen and Varadhan Ravi (Dynamac), and Dr. Rashid Islam (CDSI) pointed out that the selection of the VIP model was probably a good choice, given the information available and the site conceptual model. An issue of concern was that soil data collected at the site was not properly utilized when establishing parameter values for the model simulations. A number of parameters and their importance in modeling were discussed in detail including the fraction organic content of the soil, estimating the initial quantity of contaminants at the source, diffusion mechanisms, and the mass transfer coefficient.
(95-R03-008) (J. Williams(RSKERL)405-436-8608)

Technical Assistance to Region IX: On November 2, 1995, Steve Acree (RSKERL) attended a site meeting at the Sparks Solvent/Fuel Site in Sparks, NV, to assist in an evaluation of the proposed LNAPL removal system. Also attending the meeting were representatives of Region IX, State of Nevada, responsible parties, and consultants to the responsible parties. The meeting focused on proposed changes to the existing remediation system and the potential effects of these changes on site hydrology. Simulations of these effects, including capture zones of the extraction well system and effects on local ground-water elevations, were presented and discussed. Additional technical assistance will be required following the receipt of the proposed work plan for remedial system modification.
(94-R09-001) (S. Acree(RSKERL)405-436-8609)

Technical Assistance to Region X: On November 7, 1995, Joe Williams (RSKERL), and Bradly Hill, Dr. Ying Ouyang, and Dr. Rashid Islam (CDSI) provided Region X Hydrogeologist Bernie Zavala with a review of the "Technical Impracticability Waiver Petition" for the Western Processing Superfund Site in Kent, WA. The petition was very comprehensive, contained a significant amount of information, and obviously took a lot of effort to accomplish. Although the document was often difficult to follow, modeling conducted to estimate ground-water flow and contaminant fate and transport was extensive and elaborate. An issue of concern was that there was little discussion regarding the uncertainty and sensitivity of the various unknown contaminant transport model input parameters and how they might effect the estimate of degradation travel time and overall effectiveness of the ongoing and proposed remedial activities at the site. The review document discussed a number of technical issues in considerable detail. It was recommended that these issues be satisfactorily addressed in the TI petition and subsequently reviewed prior to its acceptance by EPA.
(95-R10-003) (J. Williams(RSKERL)405-436-8608)

RESEARCH IN PROGRESS

EPA has developed a screening model, the Hydrocarbon Spill Screening Model (HSSM), to investigate the contamination of an aquifer due to a release of a LNAPL. The model may be used to estimate the effects of LNAPL loading, partition coefficients, ground-water flow velocities, and other parameters on exposure levels at downgradient locations. Working under a cooperative agreement, Dr. James Weaver (RSKERL), and Dr. Randall Charbeneau and Clinton Wilson (Univ. of Texas) are developing a set of modules, consistent within the screening tool concept, that will allow a user to simulate the release and transport of a DNAPL and the subsequent contamination of the surrounding ground water. These modules simulate free phase transport through the unsaturated and saturated zones, the dissolution on DNAPL constituents into the surrounding ground water, and the miscible transport of dissolved constituents to downgradient exposure locations. The ultimate objective of the research is to incorporate these modules into HSSM, thus allowing it to simulate the release of DNAPLs.
(J. Weaver(RSKERL)405-436-8545)

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HIGHLIGHTS

**National Risk Management Research Laboratory
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Status Report for the Week of November 27, 1995**

REGIONAL ASSISTANCE

Technical Assistance to Region I: On November 13, 1995, Don Draper (RSKERL), and Drs. Daniel Pope, Varadhan Ravi, and Ann Azadpour (Dynamac) provided RPM Dick Goehlert with review comments on microcosm aspects of the "Revised Scope of Work for Site-Specific Evaluation of Bioremediation" at the Savage Well Site in Milford, NH. It was suggested that microcosm studies can distinguish biotic from abiotic effects, estimate adsorption, confirm the possibility of degradation, indicate possible microbial toxicity, identify limiting factors (electron acceptors, nutrients, desorption, etc.), and give a rough estimate of potential biodegradation rates. It was pointed out that transformation rates can be readily measured in laboratory studies but their applicability to the field is problematic. Pertinent references on the subject were provided.

(95-R01-005)

(D. Draper(RSKERL)405-436-8603)

Technical Assistance to Region II: On November 15, 1995, Dr. David Burden (RSKERL) and Brad Hill (CDSI) provided RPM Anne Kelly with the most recent review comments concerning water balance computations at the Hertel Landfill Superfund Site in Plattekill, NY. It was suggested that the site contractor had adequately addressed all previously expressed concerns regarding subsurface modeling at the site. It has been demonstrated that the model appropriately simulates the natural hydrologic system within the assumptions and limitations previously outlined.

(95-R02-006)

(D. Burden(RSKERL)405-436-8606)

Technical Assistance to Region V: On November 14, 1995, Joe Williams (RSKERL) provided the Region with review comments of a brief modeling proposal for the determination of soil cleanup levels at the Southeast Rockford Ground-Water Contamination Superfund Site in Rockford, IL. The activity is part of the assistance available through the Center for Subsurface Modeling Support (CSMoS). In general, the proposal was found to be a simple step-wise approach that is inadequate to establish its viability. The models suggested for use by the contractor were discussed in detail and comments were offered as to their lack of applicability. Specific areas that should be included as proper modeling objectives were suggested.

(96-R05-001)

(J. Williams(RSKERL)405-436-8608)

Technical Assistance to Region VII: On November 15, 1995, Joe Williams (RSKERL) provided RPM Ken Rapplean with review comments of the "Draft Remedial Design Work Plan for Interim Ground-Water Remedy" for the Coleman Operable Unit of the 29th and Meade Superfund Site, Wichita, Kansas. The date of the request for assistance was October 30, 1995. The primary issues discussed in the review were the placement of a new recovery well and the pumping rates to be utilized.

(93-R07-003)

(J. Williams(RSKERL)405-436-8608)

Technical Assistance to Region IX: On November 14, 1995, as part of a continuing technical assistance effort at the J.H. Baxter Superfund Site in Weed, CA, Steve Acree (RSKERL) and Dr. Daniel Pope (Dynamac) provided RPM Kathy Setian with review comments of the "Prefinal (90%) Remedial Design Report." The review focused on aspects of the report related to the proposed biotreatment of soils. Conceptually, the proposed land farming, bioventing, and enhanced intrinsic bioremediation combinations may be suitable for the site. Several concerns regarding certain aspects of the remedial design were noted including the leachability of arsenic, the disposition of soils containing dioxins and furans, and treatment cell designs.

(95-R09-005)

(S. Acree(RSKERL)405-436-8609)

RESEARCH IN PROGRESS

An intrinsic remediation research study has been implemented at an island airport site by Dr. Don Kampbell (RSKERL) and Jerry Hansen (AFCEE) of Brooks AFB. The fracture of a buried pipeline resulted in a jet fuel spill exceeding 100,000 gallons. The site geohydrology is a fragmented coral matrix with fresh water overlying more dense salt water. Water table fluctuations of two feet every 12 hours result from tidal action. Presently, 145,000 gallons of fuel has been removed by pumping the floating product. The research approach is to remove the remaining free product by pumping and use the natural bioventing process caused by tide oscillations to remediate the site. Initial characterization measurements determined that oxygen in the vadose zone increased as the tide dropped and carbon dioxide, along with methane, increased as the tide rose.

(D. Kampbell(RSKERL)405-436-8564)

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HIGHLIGHTS

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REGIONAL ASSISTANCE

Technical Assistance to Region I: On October 30, 1995, RPM Cheryl Sprague requested review comments on documents relating to contaminant leaching at the Fletcher's Paint Superfund Site in Milford, NH. Specific issues were in regard to the selection of SESOIL and AT123D models for simulating the unsaturated and saturated systems. Comments were also requested concerning the assumptions used by the site contractor when running the models. The November 17, 1995, response was prepared by Joe Williams (RSKERL), and Drs. Ying Ouyang and Rashid Islam (CDSI). In general, the comments stated that the use of SESOIL for the simulation of PCBs leaching from the soil would be a reasonable selection. It was also noted that time-varying boundary conditions simulated by SESOIL, resulting in varying mass leached from the vadose zone, cannot be easily handled by AT123D; therefore, a three-dimensional numerical model may be more appropriate for the proper simulation of the impact of time-varying mass loadings on ground-water concentrations.

(96-R01-001)

(J. Williams(RSKERL)405-436-8608)

Technical Assistance to Region III: On October 26, 1995, RPM Frank Klanchar requested review comments of soil vapor extraction reports which were prepared for the Centre County Kepone Site in State College, PA. The SVE system is being proposed as an alternative to soil excavation selected remedy contained in the April 1995 ROD. On November 21, 1995, Dominic DiGiulio (RSKERL) provided detailed comments and suggestions in a number of areas including pneumatic pumping tests, model calibrations, predicted zone of influence, and proposed pilot testing and analysis.

(96-R03-001)

(D. DiGiulio(RSKERL)405-436-8605)

Technical Assistance to Region IV: On October 19, 1995, Region IV requested review comments on the "Corrective Measure Study Work Plan" for the Safety-Kleen Corporation Site in Ashland, KY, with an emphasis on the proposed Biovent/Biosparge system. On November 22, 1995, Don Draper (RSKERL) and Drs. Varadhan and Daniel Pope (Dynamac) provided review comments which focused on the estimation of pneumatic permeability and its variability, modeling applications used in the study, and the biodegradation of organics in the soil. A lack of information regarding the presence of NAPLs and an effort to locate NAPLs was questioned.

(96RC04-001)

(D. Draper(RSKERL)405-436-8603)

Technical Assistance to Region V: In response to a September 12, 1995, request for continuing technical assistance at the Granville Solvents Site in Granville, OH, Steve Acree (RSKERL) reviewed responses to earlier comments on the "Quality Assurance Project Plan" which was developed for the site. The November 21, 1995, review stated that, in general, the responses appeared to address only selected portions of several of the comments. Detailed recommendations regarding the remaining concerns included indications of NAPLs, low flow rate sampling to minimize turbidity, suggested criteria to assure stabilization before sampling, and controls used in sampling.

(94-R05-010)

(S. Acree(RSKERL)405-436-8609)

Technical Assistance to Region V: On November 21, 1995, Randall Ross (RSKERL) provided RPM Beth Reiner with comments concerning discussions on October 30, November 8, and November 29, 1995, regarding Memphis Environmental Center's (MEC) responses to EPA's comments regarding documents entitled "Containment System Assessment Work Plan" and "Monitoring Well Replacement Work Plan" for the Velsicol Site in St. Louis, MI. Issues discussed in detail included the location of piezometer clusters to identify specific breaches in the containment system, the manner and frequency of making water level measurements, and a preliminary assessment of the containment system.

(95-R05-003)

(R. Ross(RSKERL)405-436-8611)

Technical Assistance to Region IX: In response to June 30, 1994, request for continuing technical assistance, Steve Acree (RSKERL) provided RPM Cynthia Wetmore with comments on a document entitled "Del Amo Superfund Site, Los Angeles, California, Report and Work Plan, MW-20 Pilot Program." The November 20, 1995, response stated that, in general, the ground-water/LNAPL extraction test appeared to be relatively well designed. Remaining issues of concern included data collection and analysis. For example, the proposed methods of analysis for data obtained to define hydraulic characteristics and, ultimately, ground-water capture zones around the extraction wells was not discussed in the report. A number of specific comments focused on the location of LNAPL extraction wells, drilling methods, well development, monitoring, and data interpretation.

(94-R09-006)

(S. Acree(RSKERL)405-436-8609)

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REGIONAL ASSISTANCE

Technical Assistance to Region II: On November 27, 1995, Don Draper (RSKERL) and Jack Keeley (Dynamac) provided Air National Guard Program Manager Mike Minor with review comments of the "Installation Restoration Program, Plume Containment System, 35% Design" for the Massachusetts Military Reservation on Cape Cod, MA. The review is a part of a continuing technical assistance effort at the site. As in reviews of other work conducted at the site, it was stated the document was very well done. Only one minor concern was expressed concerning the need to clarify data in one of the tables.

(95-R01-001)

(D. Draper(RSKERL)405-436-8603)

Technical Assistance to Region II: On November 11, 1995, RPM Eduardo R. Gonzalez requested continuing technical assistance in the review of the "Focused Feasibility Study (FFS) Report" which is associated with the Colesville Landfill Superfund Site in Colesville, NY. The objectives of the FFS are to evaluate site-related conditions and monitoring data, and to propose a more appropriate and cost-effective alternate to the collection and treatment system presented in the 1991 ROD. On November 27, 1995, Joe Williams (RSKERL) and Brad Hill (CDSI) stated that it appeared that concerns and comments detailed in earlier memoranda had not been addressed. Other issues which were discussed include input parameters used in the modeling, sensitivity analyses, and the lack of discussions on the impact of surface and ground water interactions in the North Stream area.

(96-R02-002)

(J. Williams(RSKERL)406-436-8608)

Technical Assistance to Region VIII: The Portland Cement Company Site, near Salt Lake City, UT, consists of three disposal areas which were used for the disposal of spent kiln dust and old kiln chromate bricks. The kiln dust and bricks are stored in piles on the surface, exposing them to transport by wind and water. Ground water and the nearby surface water are contaminated with heavy metals including arsenic, cadmium, chromium, lead, and molybdenum. On October 25, 1995, Project Manager Michael McCeney requested review comments on the "Remedial Investigation" and the "Focused Feasibility Study" with an emphasis on the assumptions used in modeling the fate and transport of contaminants in ground water. On November 22, 1995, Don Draper (RSKERL) and Dr. Jin-Song Chen (Dynamac) provided detailed comments on model assumptions, initial and boundary conditions, model inputs and calibration, sensitivity analysis, and geochemical modeling.

(96-R08-001)

(D. Draper(RSKERL)405-436-8603)

Technical Assistance to Region IX: The Technology Support Center (TSC) has been providing continuing technical assistance at the Del Amo Superfund Site in Los Angeles, CA, since the original request from RPM Cynthia Wetmore dated June 30, 1994. On November 29, 1995, Steve Acree and Dr. James Weaver (RSKERL) provided comments on data relative to LNAPL distribution and remediation including a proposed ground-water/LNAPL extraction test. In general, it was unfortunate that discrepancies existed in the completed data set especially after the unusual amount of effort that went into making these measurements. The measurements, including relative permeability, capillary pressure, and fluid saturations are needed for detailed characterization of multi-phase flow. Detailed comments and recommendations regarding these investigations were provided.

(94-R09-006)

(S. Acree(RSKERL)405-436-8609)

Technical Assistance to Region IX: On November 28, 1995, Steve Acree (RSKERL) provided RPM Kathy Setian with review comments on the "Focused Feasibility Study" for the J.H. Baxter Superfund Site in Weed, CA. It is part of a continuing technical assistance effort. It was suggested that the evaluations presented in the document appeared to be biased toward excavation and ex-situ treatment while the assumptions leading to the choice of alternatives were not clearly presented. Issues which were discussed include the depth of the upper aquifer, estimates of the volume of soil requiring treatment, suggested treatment alternatives, and remedial time frames.

(95-R09-005)

(S. Acree(RSKERL)405-436-8609)

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HIGHLIGHTS

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REGIONAL ASSISTANCE

Technical Assistance to Region II: On September 6, 1995, RPM Sharon Trocher provided the TSC with a copy of the "Groundwater Modeling Work Plan" for the Carroll and Dubies Superfund Site in Port Jervis, NY, requesting review comments. In a response dated December 7, 1995, Don Draper (RSKERL) and Dr. Varadhan Ravi (Dynamac) stated that flow modeling and capture zone analysis for the evaluation of the pump-and-treat scenarios were reasonably well done, but modeling for the evaluation of baseline conditions was inadequate. A number of issues were discussed in detail including the model conceptualization.
(95-R02-009) (D. Draper(RSKERL)405-436-8603)

Technical Assistance to Region V: The Amphenol Facility, in Franklin, IN, is performing corrective action under a RCRA 3008(h) Consent Order and recently submitted a second draft of a "Corrective Measures Report." On October 31, 1995, the Region requested review comments on the proposed plan, with emphasis on an evaluation of the hydrological conditions and various techniques to remediate the area. On December 5, 1995, Steve Acree (RSKERL) pointed out that, in general, site conditions necessary to evaluate contaminant transport and fate processes were not well defined. Relatively little information regarding site hydrology and the nature and distribution of contaminants appeared to be available, particularly at one of the operable units. This lack of information impacts the evaluation of applicable remedial options and technologies. Detailed comments were offered in a number of areas.
(96RC05-001) (S. Acree(RSKERL)405-436-8609)

Technical Assistance to Region VI: In response to an October 31, 1995, request from RPM Glen Celerier, Scott Huling (RSKERL) and Dr. Birinder Shergill (Mantech) provided review comments on a report entitled "North Calvacade Superfund Site, Houston, Texas." The December 6, 1995, response included detailed discussions in a number of areas including: limitations to pump-and-treat systems due to the presence of NAPLs, conceptual model of contaminant distribution, methods to quantify the presence of NAPLs, and the possible role of bioventing and vacuum extraction in reducing the mass of contaminants at the site.
(95-R06-010) (S. Huling(RSKERL)405-436-8610)

Technical Assistance to Region VIII: On September 20, 1995, the Montana Department of Health and Environmental Science requested review comments of two reports dealing with white rot fungus and ozonation. The reports were prepared for the Montana Pole Site in Helena, MT. In a response dated December 6, 1995, Scott Huling (RSKERL) and Dr. Ann Azadpour (Dynamac) pointed out a number of deficiencies associated with the white rot treatability. Among these were the lack of appropriate controls making it difficult to determine the degree of treatment since it was impossible to differentiate between PCP adsorption, humification, and biodegradation. With respect to the ozonation report, it was suggested that the use of ozone and ozone-generated hydroxyl radicals to oxidize PCP in soil and soil slurries should first be evaluated in the laboratory under ideal conditions. The focus of the study should be to determine whether these oxidants can oxidize the target compound in the presence of other contaminants and naturally occurring O_3 and OH scavengers.
(96-R08-002) (S. Huling(RSKERL)405-436-8610)

Technical Assistance to Region VII: On November 30, 1995, Joe Williams (RSKERL) provided RPM Ken Rapplean with review comments of a vadose zone modeling report for the Coleman Operable Unit of the 29th and Meade Superfund Site in Wichita, KS. The plan presented a thorough discussion of modeling activities at the site and addressed most of the concerns raised in previous reviews. That concern was with regard to the use of the total organic carbon content to represent the organic carbon fraction. This issue was discussed in detail.
(93-R07-003) (J. Williams(RSKERL)405-436-8608)

Technical Assistance to Region VIII: On August 21, 1995, as part of a continuing technical assistance effort, RSKERL provided the Region with a suggested protocol for evaluating natural attenuation processes at the Petrochem/Ekotech Superfund Site in Salt Lake City, UT. The protocol, which focused on ground water contaminated with chlorinated solvents, discussed the general requirements for demonstrating that natural attenuation is occurring at sufficient rates to achieve desired remedial objectives in reasonable time frames. On December 4, 1995, Steve Acree (RSKERL) provided RPM Gwen Hooten with analytical results for methane, ethene, ethane (ethylene), and vinyl chloride samples obtained from wells at the site. It was pointed out that the data provided little support for the assumption of natural attenuation. The possibility of further sampling using a lower quantitation limit was discussed.
(93-R08-003) (S. Acree(RSKERL)405-436-8609)

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REGIONAL ASSISTANCE

Technical Assistance to Region III: The Technology Support Center has been providing technical assistance at the Morgantown Ordnance Works in Morgantown, WV, since March 12, 1991. On December 15, 1995, Don Draper (RSKERL) and Dr. Daniel Pope (Dynamac) provided review comments on a document entitled "Length of Solid Phase Testing in Relationship to the Time Needed to Complete the Bioremediation Phase of the Project" to RPM Melissa Whittington. Generally, the document appeared to be adequate. Minor editorial suggestions were offered, as well as technical comments in areas such as statistical interpretation of data, comparison of laboratory and field degradation rates, final contaminant concentrations, and the effect of seasonal temperature changes on bioremediation.

(91-R03-001)

(D. Draper(RSKERL)405-436-8603)

Technical Assistance to Region IV: On December 11, 1995, Dominic DiGiulio (RSKERL) provided RPM Bart Reedy with comments on a feasibility (soil venting and air sparging) study for Operable Unit No. 7 at the Cecil Field Naval Air Station in Jacksonville, FL. Since there was little detail on the actual design of the systems, specific comments and recommendations could not be provided. Three publications on the design of soil venting and air sparging systems were provided.

(96-R04-002)

(D. DiGiulio(RSKERL)405-436-8605)

Technical Assistance to Region V: On December 7, 1995, as part of a continuing technical assistance effort at the Amphenol Facility in Franklin, IN, Steve Acree (RSKERL) provided RPM Bill Buller with comments on volatilization calculations used at the site. The objective of the calculations was to estimate the equilibrium concentration of TCE in a vapor phase overlying contaminated ground water. The method which was used applied Raoult's Law to describe volatilization. It was pointed out that the mole fraction of TCE in solution was very small and that Henry's Law would provide a better description of volatilization. Calculations using Henry's Law were provided.

(96RC05-001)

(S. Acree(RSKERL)405-436-8609)

Technical Assistance to Region IX: On December 12, 1995, Steven Acree (RSKERL), and Brad Hill, Dr. Ying Ouyang, and Dr. Rashid Islam (CDSI) provided the Region continuing assistance at the Sparks Solvent/Fuel Site in Sparks, NV, by providing review comments on the "Conceptual Remediation Plan" for that site. In general, the report was found to be conceptual in nature and did not adequately address concerns regarding the effect of rising ground-water elevations on ongoing product removal efforts. As with most modeling efforts, uncertainty exists in the critical input to the model and, consequently, in the results. It was suggested that monitoring data will be required to assess responses to changes in the hydrologic system, remediation effort, and other hydrologic influences.

(94-R09-001)

(S. Acree(RSKERL)405-436-8609)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Wilson, Barbara H., Stephen R. Hutchins, and Candida C. West (RSKERL). "Surfactant Use with Nitrate-Based Bioremediation." Book Chapter -- Microbial Processes for Remediation. Battelle Press. 1995.

(B. Wilson(RSKERL)403-436-8993)

RESEARCH IN PROGRESS

For a number of years, RSKERL scientists have conducted research and demonstration projects at two sites where ground water was contaminated by petroleum hydrocarbons. At Elizabeth City, NC, air injection was used to remediate jet fuel contamination caused by a broken pipeline, and at Traverse City, MI, enhanced bioremediation and bioventing were used to clean up a jet fuel spill and an aviation gasoline spill. Contaminant levels have been reduced to the point that State officials have allowed the U.S. Coast Guard to suspend active remediation at these sites and enter a phase of long-term monitoring. At Traverse City, a pump-and-treat system for ground water was supplemented with in-situ remediation at the source of contamination. The approach has been used by EPA and some States as a model for ground-water remediation.

(J. Wilson(RSKERL)405-436-8532)

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REGIONAL ASSISTANCE

Technical Assistance to Region VI: On January 25, 1996, Steven Acree (RSKERC) provided RPM Rick Ehrhart with review comments of the "Proposed Plan for Operable Unit 3" for the Vertac Superfund Site in Jacksonville, AR. The review centered on potential long-term ground-water monitoring objectives and designs to provide the necessary data for the evaluation of remedial system performance and to detect contaminant migration before it reaches site boundaries. It was suggested that all monitoring proposed in the plan be conducted. General comments and suggestions for additional ground-water monitoring were also provided based on available site data.

(92-R06-003)

(S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region VIII: On January 22, 1996, Steven Acree (RSKERC) provided the Region with review comments of calculations of geothermal upconing at the Petrochem/Ekotek Superfund Site in Salt Lake City, UT. In general, the calculations are useful at the screening level but do not address site characteristics such as the complex geology or saline/fresh water gradients. The calculations do not support a conclusion that ground-water extraction for hydraulic containment is not feasible at the site. The use of the referenced calculations with respect to site conditions and a potential ground-water extraction system design was discussed in detail.

(93-R08-003)

(S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region VIII: On January 23, 1996, the Technology Support Center provided the Region with review comments of the "Supplement to the Alternative Limit Variance Petition for the Former Surface Impoundment, Paradise, Montana," for the Burlington Northern Tie Treating Plant. The comments were prepared by Steven Acree and Randall Ross (RSKERC), Dr. Ann Azadpour (Dynamac), and Bradley Hill, Dr. Rashid Islam, and Dr. Ying Ouyang (CDSI). In general, studies conducted to date have not been fully successful in defining mechanisms and rates resulting in the apparent attenuation of contaminant concentrations at the site. Recent monitoring has not detected significant plume migration, and investigations indicate that biotransformation appears to be a significant process in mitigating additional migration. However, as dominant contaminant degradation processes and rates have not been fully defined, continued monitoring of the extent of the contamination would be required to confirm the conclusions of the report regarding the existence of steady-state conditions.

(94RC08-002)

(S. Acree(RSKERC)408-436-8609)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Cho, Jong Soo (RSKERC) and Darla Ellet (East Central Univ.). "Soil-Air Permeability Measurement with a Transient Pressure Build-Up Method." Hazardous Waste & Hazardous Materials. Vol. 12. 1995.

(J. Cho(RSKERC)405-436-8547)

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HIGHLIGHTS

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Status Report for the Week of February 19, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region I: In separate requests, both dated January 20, 1996, the Technology Support Center was asked to review the 60 percent completion and Final Draft versions of the "Plume Containment Design Analysis Plan" for the Massachusetts Military Reservation on Cape Cod. In the February 6, 1996, response by Don Draper (RSKERC) and Jack Keeley (Dynamac), it was stated that the material well was organized, well written, easily followed, and of exceptional quality. The bases for design were very well founded, and the plans themselves were presented in great detail. It was also stated that, at this point, RSKERC could offer little to improve the documents or the material contained therein.

(95-R01-001)

(D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region II: On February 9, 1996, Joe Williams (RSKERC), and Brad Hill and Dr. Rashid Islam (CDSI), provided RPM Rich Puvogel with review comments of those sections of the "Pre-design Report for the A.O. Polymer Superfund Site, Sparta, New Jersey," which concern ground-water flow modeling. In general, the report addressed concerns raised in earlier RSKERC review comments, appeared to be comprehensive and of high quality, and represented a significant improvement over previous submittals concerning ground-water modeling at the site. Concerns were expressed with respect to modeling only the transport of TCE and no other contaminants, assumptions for recharge, treatment of the source areas in the conceptual model, and the resulting simulations.

(96-R02-001)

(J. Williams(RSKERL)405-436-8608)

Technical Assistance to Region V: On February 12, 1996, Dr. David Burden (RSKERC) and Dr. Ying Ouyang (CDSI) provided RPM Anita Boseman with a mathematical plan and expected simulation results for investigating the potential migration of lead (Pb) species through the vadose zone and ground water at the United Scrap Lead Superfund Site in Troy, OH. The objectives of the mathematical modeling are to investigate the rate of Pb species migration in the vadose zone, to estimate the potential of migration of lead species into ground water, and to perform a sensitivity analysis to evaluate which input parameters are most sensitive in Pb migration at the site.

(95-R05-006)

(D. Burden(RSKERC)405-436-8606)

Technical Assistance to Region VI: On February 6, 1996, in response to a request from RPM Glen Celerier, Scott Huling (RSKERC) and Dr. Daniel Pope (Dynamac) attended a meeting in the Regional Office to discuss the treatability of contaminated soil at the Popile Superfund Site in El Dorado, AR. In addition to those from the Region, others attending the meeting were representatives from the Corps of Engineers, including the Waterways Experiment Station and the New Orleans District. The technical discussions involved a treatability study conducted at RSKERC in an effort to determine whether PAHs and pentachlorophenol (PCP) could be degraded in a high pH soil which was stabilized with fly ash during emergency removal. Results of the study indicated that PAH degradation was not affected by the high pH and that PCP did not appear to biodegrade. An additional treatability study was proposed by the Corps of Engineers to further examine why the biodegradation of PCP was limited, and to determine what could be done to make land treatment a feasible remedial technology at the site.

(93-R06-003)

(S. Huling(RSKERC)405-436-8610)

Technical Assistance to Region IX: On February 5, 1996, Steven Acree (RSKERC), and Lowell Leach and Dr. Daniel Pope (Dynamac) provided the Region with review comments on the "Overview Report" of the ICI Botany Site in New South Wales, Australia. The report described characterization studies, potential remedial technologies, and strategies for addressing contamination at the site. The review stated that, in general, the investigation appeared to have been reasonably well conducted, and that the proposed remedial strategy included appropriate investigations to allow more detailed evaluations of remedial options. It was suggested that most discussions of proposed investigations were highly conceptual and that many of these were in areas of continuing research. Several detailed comments and suggestions concerning these studies and potential remedial technologies were discussed.

(Misc.)

(S. Acree(RSKERC)405-436-8609)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Shiau, Bor-Jier, David A. Sabatini, Jeffrey H. Harwell, and De Quang Vu (Univ. of Okla.). "Microemulsion of Mixed Chlorinated Solvents by Using Food Grade Surfactants." Environmental Science and Technology. Vol. 30 1996.

(C. West(RSKERC)405-436-8551)

RESEARCH IN PROGRESS

The recently published Issue Paper, "Nonaqueous Phase Liquid Compatibility with Well Construction, Sampling, and Remediation Materials," identified a knowledge gap regarding the compatibility between NAPLs and the materials used to construct impermeable boundaries such as annular sealants in wells or grout curtains. Doug McCaulou (InterDyne Inc.), working through Dynamac in cooperation with Scott Huling (RSKERC), is currently conducting a laboratory study to evaluate the potential incompatibility between annular sealants such as bentonite and NAPLs. The potential incompatibility exists through processes such as: (1) chemical desiccation which results in the drying and shrinking caused by the replacement of water with NAPLs between clay minerals; (2) differential hydration, which is the uneven swelling response of bentonite with mixed solutions; and (3) heterogeneities from macropore development due to the presence of NAPLs. Permeability measurements are being made with two different types of commercially available bentonite in double-ring permeameters. Two nonaqueous phase liquids, two well construction techniques, and various NAPL/bentonite mixture scenarios are also being evaluated. The results of the research will provide a quantitative measure of the limitations of the permeability of bentonite in the presence of NAPLs, and estimate the magnitude of potential problems which may be occurring at a large number of hazardous waste sites.

(S. Huling(RSKERC)405-436-8610)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of February 26, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region II: On February 15, 1996, Joe Williams (RSKERC), and Brad Hill and Drs. Ying Ouyang and Rashid Islam (CDSI) provided RPM Carla Struble with review comments of the Ground-Water Modeling and Feasibility Study Reports for the Seneca Army Depot Activity (Ash Landfill) in Romulus, NY. In general, it was noted that the report was very comprehensive and detailed, which resulted in a better understanding of the approach utilized during the ground-water modeling exercise. However, while reviewing the Feasibility Study, it was often difficult to tie the modeling results with the evaluation of the remedial alternatives. Also discussed in detail were a number of apparent errors in calculations used in the water balance and recharge estimates.

(95-R02-007)

(J. Williams(RSKERC)405-436-8593)

Technical Assistance to Region II: In review comments dated February 15, 1996, Don Draper (RSKERC) and Dr. Varadhan Ravi (Dynamac) pointed out to RPM Sharon Trocher that the ground-water model derived for the Carroll and Dubies Site in Port Jervis, NY, is not correct. This observation was also made in review comments dated October 2, 1995. The mass balance equations for the derivation of first-order rate constants are not correct. The rate of contaminant mass entering the aquifer due to leaching from the overlying soil has been neglected, as well as the rate of mass entering the soil from the overlying lagoon. A better formulation, taking these items into account, was provided which could easily be incorporated into TDAST boundary conditions using the principle of superposition.

(95-R02-009)

(D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region III: On January 1, 1996, RPM Debra Rossi requested an evaluation of the conclusions presented in a report discussing the source and fate of manganese in ground water at the Chem-Solv Superfund Site in Dover, DE. On February 16, 1996, Dr. John Wilson (RSKERC) pointed out that many of the conclusions in the report were based on the false assumption that the geochemistry of water produced from monitoring wells accurately reflects the geochemistry of water in the aquifer. Many contaminant plumes appear to "dive" as they move away from their source. This results from oxidation of the uppermost part of the contaminant plume and from layering of uncontaminated recharge water on top of the plume. As a result, wells that are screened across the water table produce some water that is oxygenated and uncontaminated and some water that is anoxic and contaminated. The two waters are mixed in the well, but are physically separate in the aquifer. Various points made in the report were discussed in detail.

(96-R03-002)

(J. Wilson(RSKERC)405-436-8534)

Technical Assistance to Region VI: On February 24, 1996, Scott Huling (RSKERC) participated in a meeting at the Regional Office to discuss the potential for a technical impracticability waiver at the South Cavalcade Superfund Site in Houston, TX. Others attending the meeting were Glen Celerier and Joe Cordsi from the Region and Michael Slenska and J. Zubrow representing Beazer, Inc. Technical impracticability is currently being considered due to the large volume of contaminated material, and the long duration release of NAPLs which are poorly biodegraded, highly retarded, and only slightly soluble and volatile. The site is further complicated by the heterogeneity of the aquifer as well as its low gradient and hydraulic conductivity. Discussions primarily involved the current plans to recover LNAPLs and DNAPLs, additional information needs regarding updated plume delineation, ground-water modeling, and exposure assessment.

(95-R06-005)

(S. Huling(RSKERC)405-436-8610)

Technical Assistance to Region VI: In response to an October 31, 1995, request from RPM Glen Celerier, Scott Huling (RSKERC), and Drs. Birinder Shergill and Bruce Pivetz (ManTech), provided review comments of the draft conceptual site model statement of work for the North Cavalcade Street Superfund Site in Houston, TX. As in earlier RSKERC review comments, it was emphasized that prior to the implementation of the scope of work, it was recommended that a work plan be prepared which includes the details of the site investigation/risk assessment and a DNAPL field contingency plan. A number of specific concerns were discussed in detail, including the vertical distribution of DNAPLs and the development of a conceptual model delineating known and probable DNAPL source areas.

(95-R06-010)

(S. Huling(RSKERC)405-436-8610)

RESEARCH APPLICATIONS

During February 14-21, 1995, Steven Acree and Randall Ross (RSKERC) conducted an electromagnetic borehole flowmeter survey at George Air Force Base in Victorville, CA. The flowmeter was developed under a cooperative agreement between the TVA and RSKERC. The investigation served to both demonstrate the applicability of the instrument at field scale and provide site characterization information to the Region. A detailed report of that survey was provided to RPM Brian Swarhout on February 14, 1996, which included an overview of the methods used in the investigation, a description of the flowmeter and test design, and an analysis of the data. In general, the survey indicated the existence of significant subsurface heterogeneity near the water table. A zone characterized by relatively high hydraulic conductivity was identified near the top of the screened interval in all wells included in the survey, and the conductivity values for this interval appear to be approximately twenty times greater than the average conductivity in the screened zone.

(95-R09-007)

(S. Acree(RSKERC)405-436-8609)

(R. Ross(RSKERC)405-436-8611)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of March 4, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region III: The Butz Landfill Site is a 13-acre, privately owned landfill in Stroudsburg, PA. The Technology Support Center has been providing technical assistance at this site since August 1992. On February 21, 1996, Steven Acree (RSKERC) and Lowell Leach (Dynamac) provided RPM Victor Janosik with comments on the Remedial Design Phase Work Plan. In general, the proposed studies appeared to be appropriate to support the development of the remedial system. It was recommended that a phased approach to remediation be adopted where performance monitoring of the initial system would lead to those refinements needed to meet remedial objectives. Detailed comments and recommendations were also provided regarding several aspects of the proposed studies.
(92-R03-003) (S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region V: On February 27, 1996, as part of a continuing technical assistance effort, Steven Acree (RSKERC) provided the Region with comments on the Forsythe Street Work Plan for the Amphenol RCRA Facility in Franklin, IN. The plan proposed additional studies designed to better define potential ground-water flow directions, water quality, and hydraulic parameters along Forsythe Street. Although the scope of the plan was relatively limited, the proposed investigations appeared to be sufficient to allow a screening-level evaluation of potential remedial options in the area. Detailed recommendations were offered on a number of issues including the need for an additional monitoring well, the screening of soil samples, and the need to measure water levels in a nearby stream concurrently with ground-water elevations.
(96RC05-001) (S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region VI: On February 22, 1996, Scott Huling (RSKERC) and Dr. Daniel Pope (Dynamac) provided RPM Glen Celerier with comments on the Pilot Scale Optimization Studies for Implementation of the Land Treatment Unit at the Popile Site in ElDorado, AR. The site is an inactive wood treatment facility. This assistance stems from a meeting which RSKERC representatives attended in the Regional Office on February 6, 1996. The inherent problem is that the remediation technology (land treatment) had been specified in the ROD, yet it is unclear whether the degradation of PCP can occur or whether the clean-up concentration can be achieved. A feasibility study which demonstrates that PCP can degrade using this technology has not been performed. It was recommended that an additional study be conducted to specifically evaluate what processes or factors may be limiting PCP degradation.
(93-R06-003) (S. Huling(RSKERC)405-436-8610)

Technical Assistance to Region IX: In response to a June 30, 1994, request for continuing technical assistance, Steven Acree (RSKERC) provided RPM Cynthia Wetmore with a review of the response to earlier Technology Support Center comments on the Report and Work Plan for the Del Amo Superfund Site in Los Angeles, CA. In general, the responses to comments regarding the petrophysical data and proposed extraction test appeared to address the previous technical concerns. Specific comments and recommendations were provided in a number of areas including the use of a surrogate hydrocarbon for site LNAPLs, monitoring rate for LNAPL recovery rate, and proposed core collection and preservation techniques.
(94-R09-006) (Steven Acree(RSKERC)405-436-006)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Brown, Richard A. (Groundwater Technology), Robert Hinchee (Parsons Engineering), Robert D. Norris (Eckenfelder Inc.), and John T. Wilson (RSKERC). "Bioremediation of Petroleum Hydrocarbons: A Flexible, Variable Speed Technology." In: Proceedings of the Petroleum and Organic Chemicals in Ground Water; Prevention, Detection, and Remediation Symposium in Houston, TX. Nov. 29-Dec. 1, 1995. EPA-600-A-95-140
(J. Wilson(RSKERC)405-436-8532)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of March 18, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region I: On February 27, 1996, Dr. David Burden (RSKERC) and Brad Hill (CDSI) attended the second meeting of the Scientific Advisory Panel concerning contaminant plumes on the Massachusetts Military Reservation, Cape Cod, MA. The meeting was held at the Woods Hole Oceanographic Institute on Cape Cod and was attended by EPA Region I, the Cape Cod Commission, Woods Hole Oceanographic Institute, USGS, NOAA, and Boston University. The meeting focused on the 60% design plan for the containment of seven ground-water plumes on the site, including changes the Air National Guard proposed as a result of public comments on the plan. Discussions for the remainder of the meeting centered around ground-water modeling and the proposed risks associated with the containment of plumes by pumping.

(96-R01-007)

(D. Burden(RSKERC)405-436-8606)

Technical Assistance to Region VI: In response to a request from RPM Glen Celerier, Scott Huling (RSKERC) and Dr. Daniel Pope (Dynamac) participated in a meeting to discuss the treatability of soil contaminated with wood preserving operations at the Popple Superfund Site in El Dorado, AR. The March 8, 1996, meeting, held at the RSKERC, also included representatives from the Arkansas Department of Pollution Control and Ecology, Army Corps of Engineers Waterways Experiment Station in Vicksburg, MS, and the New Orleans District Corps of Engineers. The discussions centered on a treatability study designed to evaluate the potential bioremediation of soil contaminated with pentachlorophenol (PCP). Several soil reactors at the Laboratory and at pilot scale will be used to evaluate soil treatment options to enhance the degradation of PCP in soil. Treatment strategies include pH adjustments as well as lowering the initial concentration of PCP in the soil.

(93-R06-003)

(S. Huling(RSKERC)405-436-8610)

Technical Assistance to Region VII: On February 6, 1996, Joe Williams (RSKERC) provided RPM Ken Rapplean with review comments on the "Remedial Design Plan for Interim Groundwater Remedy" for the Coleman Operable Unit of the 29th and Meade Superfund Site in Wichita, KS. In general, the work plan appeared to be acceptable and adequately addressed review comments offered in an earlier review. Minor suggestions were made for clarity. Comments were also made concerning issues such as the actual performance of the air stripper and documentation of the ability of the system to adequately treat additional flow rates and contaminant concentrations.

(93-R07-003)

(J. Williams(RSKERC)405-436-8608)

Technical Assistance to Region VIII: On March 12, 1996, Steven Acree and Dr. Guy Sewell (RSKERC) provided RPM Gwendolyn Hooten with an evaluation of the analyses of methane, ethene, and ethane data at the Petrochem/Ekotek Superfund Site in Salt Lake City, UT. It was suggested that evidence at the site supports the conclusion that reductive biotransformation of trichloroethene and dichloroethene is occurring. However, there was no conclusive evidence that the complete dechlorination of vinyl chloride to ethene and ethane would be qualitative proof of bioremediation. In addition, there was no evidence that the processes were occurring or would continue to occur at a protective rate. This is the type of information needed to evaluate intrinsic remediation as a remedial option. The main question is whether transformation rates and other attenuation processes are sufficient to result in sustained, acceptable concentrations in ground water within acceptable time frames.

(93-R08-003)

(S. Acree(RSKERC)405-436-8609)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Sweed, H.G., P.B. Bedient (Rice Univ.), and S.R. Hutchins (RSKERC). "Subsurface Application System for In-Situ Bioremediation: Site Characterization and Modeling." *Ground Water* 34:211-222. 1996.

(S. Hutchins(RSKERC)405-436-8563)

DiGiulio, Dominic C. (RSKERC). "Use of a Combined Air Injection/Extraction (CIE) Well to Minimize Vacuum Enhanced Water Recovery." Proceedings: "1995 NGWA Outdoor Conference, May 2-4, 1995, Las Vegas, NV." May, 1995.

(D. DiGiulio(RSKERC)405-436-8607)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of March 25, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region I: On March 11, 1996, Dr. David Burden (RSKERC) and Brad Hill (CDSI) provided the Region with a list of concerns about ground-water modeling being performed at the Massachusetts Military Reservation, Cape Cod, MA. The modeling is being conducted in support of the design of pumping systems to contain seven ground-water plumes on the site. The concerns included model conceptualization and construction, sensitivity analysis, and the criteria for selecting the model FRAC3DVS. The model calibration was also discussed along with the lack of detail presented in the modeling report.

(96-R01-007)

(D. Burden(RSKERC)405-436-8608)

Technical Assistance to Region II: On March 21, 1996, Joe Williams (RSKERC), and Bradley Hill, Dr. Ying Ouyang, and Dr. Rashid Islam (CDSI) provided RPM Jonathan Gorin with review comments of the Contaminant Transport Model Work Plan and Draft Feasibility Study Work Plan for the Ciba-Geigy Superfund Site in Toms River, NJ. In general, the model work plan was very well written, organized, and comprehensive. It was obvious, due to its quality, that an extensive amount of effort was spent in developing the document. The Feasibility Study was concise; however, there were some questions regarding need to include ground-water response actions. These actions should require that alternatives address not only cleanup levels, but also provide estimates of timeframes required for the remediation.

(95-R02-003)

(J. Williams(RSKERC)405-436-8608)

Technical Assistance to Region V: On March 13, 1996, Dr. David Burden (RSKERC) and Lowell Leach (Dynamac) provided the Region with comments regarding contamination at the Metamora Landfill Superfund Site in Metamora, MI. The three site related documents, which were the focus of the review, were found to be well written and collectively provided a very thorough investigation of the contaminant species and their location in the source areas, as well as their distribution and limits of migration. The review comments suggested concurrence that the construction of a cap over the landfill and the implementation of a source area pump-and-treat system would greatly reduce the highest concentration of mass contaminants entering the shallow aquifer.

(96-R05-003)

(D. Burden(RSKERC)405-436-8606)

Technical Assistance to Region X: On March 13, 1996, Scott Huling (RSKERC), and Drs. Bruce Pivetz and Birinder Shergill (ManTech) provided RPM Bruce Long with comments on the Draft Phase I RCRA Facility Investigation Work Plan for the Taylor Lumber and Treating Site in Sheridan, OR. The document addressed most issues satisfactorily; however, there were several specific concerns which were discussed in considerable detail. These included the need to define the geometry of the siltstone and its fracture pattern, the placement of a borehole in the area of the worst DNAPL contamination, preventing the mobilization of DNAPLs, and NAPL sampling.

(96RC10-001)

(S. Huling(RSKERC)405-436-8610)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

DiGiulio, Dominic C. (RSKERC). "Water Displacement During Sparging Under Perched Water-Table Conditions." Proceedings: "In-Situ and On-Site Bioreclamation." Third International Symposium, April 24-27, 1995, San Diego, CA. April, 1995.

(D. Digiulio(RSKERC)405-436-8607)

TECHNOLOGY TRANSFER ACTIVITIES

A training course entitled "Ground-Water Investigations" was held in Little Rock, AR, March 13-15, 1996. Seventy students from a number of EPA Regional Offices, state agencies, and consultants participated in the 2 1/2 day course. Subjects covered included vadose zone monitoring, fundamentals of ground-water hydrology, transport and fate of contaminants, ground-water quality, ground-water investigations, and ground-water remediation. Dr. Mary Randolph (RSKERC) served as course moderator and the instructors were Dr. Candida West (RSKERC), Lowell Leach and Dr. Wayne Pettyjohn (Dynamac), and Dr. Ron Sims (Utah St. Univ.).

(M. Randolph(RSKERC)405-436-8616)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of April 1, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region IV: On March 18, 1996, Scott Huling (RSKERC) provided Region IV with comments and recommendations relative to a peroxide injection study at the Myrtle Beach AFB at Myrtle Beach, SC. It was suggested that the document was relatively general and did not contain a great deal of detailed information concerning the proposed study. There were also several specific concerns which should be addressed before implementing a pilot-scale study.

(96RC04-002)

(S. Huling(RSKERC)405-436-8610)

Technical Assistance to the Office of Research and Science Integration: Dr. Steve Schmelling and Joe Williams (RSKERC), along with Drs. Ying Ouyang and Rashid Islam (CDSI), participated in a review of the Hazardous Waste Identification Rule (HWIR) and the use of the EPACMTP Model in the proposed rule. Also participating in the review process was David Carson (NRMRL/LRPCD-Cinn.), and David Brown and MacArthur Long (NERL/ERD-Athens). The coordination of review comments was prepared in response to a request from Joseph Greenblott in ORD's Office of Research and Science Integration. In the review summary, it was noted that the EPACMTP Model was designed to predict contaminant concentrations in a domestic water receptor well impacted by contaminant releases from land disposal sites. The model can predict ground-water concentrations at a downstream receptor well by simulating the fate and transport of contaminants leaching from a land-based waste site through the unsaturated and underlying saturated zones. Some concerns were expressed regarding the use of selected equations, the application of the model, the selection of input data, and the clarity of certain statements in the document. It was also suggested that the model is intended for generic, nation-wide assessments, and is not intended for site-specific applications.

(Misc.)

(J. Williams(RSKERC)405-436-8608)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Sewell, Guy W. (RSKERC). "Natural Bioremediation of Chloroethene Contaminated Subsurface Soils and Ground Water." Proceedings: Bioremediation in the Saturated Subsurface, Environmental Research Group, University of New Hampshire. February 5, 1996.

(G. Sewell(RSKERC)405-436-8566)

Hutchins, Stephen R. (RSKERC), Howard G. Sweed (Exxon Res. and Eng. Co.), and Philip B. Bedient (Rice Univ.). "Surface Application System for In Situ Ground-Water Bioremediation: Site Characterization and Modeling." Ground Water, March-April/1996.

(S. Hutchins(RSKERC)405-436-8563)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of April 8, 1996**

The RSKERC is developing a document which will summarize the eight years of activities of the **Technology Support Center - Ada (TSC)** since its creation in 1988. Of its many accomplishments, one of the most significant is the 771 site-specific technical assistance responses at over 400 **CERCLA** sites, the distribution of which, by year and Region, is shown in the following table. Another 116 site-specific **RCRA** technical assistance responses were provided at over 80 sites. Miscellaneous technical assistance was provided on 59 occasions, primarily to Regions, states, municipalities, headquarters, and other federal agencies. The TSC also has the capacity, and has designed and carried out site-specific treatability studies at a number of locations.

<u>Region</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>	<u>Total</u>
I	4	3	7	12	11	26	18	13	94
II	1	3	7	6	8	7	5	21	58
III	8	4	10	8	5	11	6	10	62
IV	12	3	8	26	17	12	17	9	104
V	2	10	7	18	3	10	9	18	77
VI	6	6	4	26	14	21	11	26	114
VII	2	10	2	8	3	1	6	5	37
VIII	5	2	7	24	22	22	5	9	96
IX	3	11	6	6	10	14	19	22	91
X	2	4	3	3	1	9	6	10	38
Total	45	56	61	137	94	133	102	143	771

Since its beginning in FY 1992, the RSKERC **Center for Subsurface Modeling Support (CSMoS)** has provided over 12,000 ground-water models to a variety of users from universities, state and federal governments, and the private sector. They have also provided 14 **GIS** technical assistance responses at 8 specific sites and, in FY 1995 alone, have prepared report graphics for 22 projects. Since beginning the service in FY 1991, the TSC has sent out 35,704 **RSKERC publications** in response to 16,072 requests from other parts of EPA, all levels of government, private consultants, industry, educational institutions, and foreign countries. **Information packets** have been developed from the technical literature and are continuously updated in areas such as site characterization, remediation techniques, bioremediation, wellhead protection, and injection wells.

Over 150 **technology transfer** activities have been presented to thousands of professionals through workshops, seminars, conferences, and training courses in a plethora of areas including: contaminant transport modeling, subsurface remediation including intrinsic bioremediation, subsurface sampling, fractured media, site characterization, pump-and-treat remediation, mechanical integrity of injection wells, soil vacuum extraction, ground-water investigations, remediation of contaminated soil, transport and transformation of contaminants in the subsurface, electromagnetic flowmeter, DNAPL restoration, land treatment, soil venting, only to name a few.

The RSKERC has developed 21 **Issue Papers** and **Briefing Documents** which are designed to exchange up-to-date information related to the remediation of soil and ground water at hazardous waste sites. These are presented in a wide variety of technical areas, only to name a few: Ground-Water Sampling for Metals, Reductive Dehalogenation of Organic Contaminants in Soil and Ground Water, Dense Nonaqueous Phase Liquids, Chemical Enhancements to Pump-and-Treat Remediation, In Situ Bioremediation of Contaminated Ground Water, Evaluation of Soil Venting Application, Fundamentals of Ground-Water Modeling, and Complex Mixtures and Ground-Water Quality. In an attempt to make the content of these documents available to a wider audience, RSKERL is developing a series of **Summary Papers** which are condensed versions of the original documents including: Basic Concepts of Contaminant Sorption, In Situ Bioremediation of Ground Water, and In Situ Bioremediation of Contaminated Vadose Zone Soil.



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of April 15, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region III: On March 5, 1996, RPM Harry Harbold requested review comments on two site-related documents entitled, "Enterprise Avenue Landfill Migration Work Plan," and "Groundwater Flow Model and Recovery System Simulations for the Enterprise Avenue Landfill Site." The Enterprise Avenue Landfill is located in Philadelphia, PA. The primary interest in the review was to determine if the appropriate model was used for existing conditions at the site, if assumptions used in the model were correct, and if the proposed recovery system will be adequate to capture contaminants underneath and in the vicinity of the landfill. In a response dated April 4, 1996, Dr. David Burden (RSKERC) and Dr. Sam Lee (Dynamac) stated that the hydrogeology of the site was over-simplified by using an averaged hydraulic conductivity value for each layer while field observations show variations of more than a value of ten for each layer. Also, the sensitivity analysis should be performed with the proposed stress conditions (pumping wells) instead of excluding them. It was suggested that the conclusions presented in the modeling report should not be used for decision making until the concerns and questions presented in the review are addressed.

(96-R03-003)

(D. Burden(RSKERC)405-436-8606)

Technical Assistance to Region V: On February 27, 1996, the Region requested review comments on the revised feasibility study for the Lenz Oil Superfund Site in Lemont, IL, with emphasis on those sections of the report dealing with ground-water treatment alternatives. On April 1, 1996, Don Draper (RSKERC) and Lowell Leach (Dynamac) provided review comments on the nine remedial alternatives evaluated. The comments suggested that the most feasible alternative includes fencing and deed restrictions, ground-water and LNAPL monitoring, containment by the installation of a multilayered soil cap, LNAPL recovery, and active aquifer restoration. DNAPL recovery was discussed in considerable detail and a number of suggestions were offered in this regard.

(96-R05-004)

(D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region VI: On April 2, 1996, Dr. Mary Randolph (RSKERC) and Dr. Daniel Pope (Dynamac) provided RPM Kathleen Aisling with review comments on the land treatment field demonstration work plan for the Gulf Coast Vacuum Services Superfund Site in Vermilion Parish, LA. A number of areas were discussed including erosion from the land treatment unit, determining the number of samples to be taken, and variances that are expected in soil contamination data.

(95-R06-009)

(M. Randolph(RSKERC)405-436-8616)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Hunt, Melody J., Michael A. Bechman, Morton A. Barlaz, and Robert C. Borden (NC St. Univ.). "Anaerobic BTEX Biodegradation in Laboratory Microcosms and In Situ Columns." In *Intrinsic Bioremediation*, R.E. Hinchee, J.T. Wilson, & D.C. Downey, eds., Battelle Press, Columbus, Ohio, 1995.

(J. Wilson(RSKERC)405-436-8532)

Weisbrod, N., (Hebrew Univ. of Jerusalem), D. Ronen (Weizmann Inst. of Science), R.W. Puls (RSKERC), and R. Nativ (Hebrew Univ. of Jerusalem). "Colloidal Particles in Groundwater." Israel Geological Society Annual Meeting, 1996. Eilat, Israel.

(R. Puls(RSKERC)405-436-8543)

RESEARCH IN PROGRESS

During March 21-26, 1996, Steve Acree, Guy Sewell, Randall Ross, Frank Beck, and Mike Cook (RSKERC) conducted an electromagnetic borehole flowmeter survey on a test well in the vicinity of a bioremediation pilot study area in Pinellas Park, FL. Tests were conducted under ambient and constant-rate pumping conditions to determine the relative distribution of the hydraulic conductivity of aquifer material in the proposed test area. Two zones characterized by relatively high hydraulic conductivity were identified during the survey. Additionally, the upper portion of the surficial aquifer was identified as having significantly lower hydraulic conductivity values than originally anticipated. The results of the tests will be used to modify the proposed pilot study test design.

(R. Ross(RSKERC)405-436-8611)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of April 22, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region IV: On April 12, 1996, Scott Huling and Randall Ross (RSKERC) provided RPM Mark Fite with comments and recommendations concerning a document entitled, "Preliminary Remedial Design for Operable Unit 2 - Phase I DNAPL Recovery and Recycling at the American Creosote Works Superfund Site, Pensacola, Florida, September, 1995." A number of issues were discussed in considerable detail including the design of the NAPL removal system, drilling and well installation, interceptor trenches, collection of the extracted water and DNAPL, and the ground-water treatment system. An EPA publication, "Nonaqueous Phase Liquids Compatibility with Materials Used in Well Construction, Sampling, and Remediation," was also provided to assist in the selection of materials used in the construction of wells and trenches, and the use of pumps, lines, and sampling equipment based on their compatibility with creosote.

(94-R04-006)

(S. Huling(RSKERC)405-436-8610)

Technical Assistance to Region VI: On April 5, 1996, Scott Huling (RSKERC) and Dr. Daniel Pope (Dynamac) provided RPM Glen Celerier with review comments of the remedial action plan for the Popile, Inc. Site, an inactive wood-treatment facility in El Dorado, AR. In general, the treatability study proposed by the U.S. Army Corps of Engineers addressed most of the issues regarding PCP degradation limitations. Specific issues discussed in detail included the water content of the soil, acidification, carbon/energy sources, and limitations of using surfactants to increase the bioavailability of PCP to the microorganisms.

(93-R06-003)

(S. Huling(RSKERC)405-436-8610)

Technical Assistance to Region IX: As part of a continuing technical assistance effort, Steven Acree (RSKERC) and Dr. Rashid Islam (CDSI) provided RPM Jeff Dhont with review comments of a proposal to construct ground-water flow and contaminant transport models simulating conditions in the area of the Del Amo and Montrose Superfund Sites in Torrance, CA. The April 9, 1996, comments stated that the conceptual work plan for the joint Montrose/Del Amo modeling effort is concise and informative. The work plan appeared to be complete for its intended purpose and contained all of the major components which needed to be considered. It was also pointed out that the selection of numerical codes was not properly justified. While the selection of the initial and boundary conditions could be understood, the model calibration for steady-state simulated heads was not well supported. The procedure used to determine the initial conditions for contaminant transport is not clear. Also, a detailed description of the possible future remedial alternative simulations should be included in this work plan.

(95-R09-015)

(S. Acree(RSKERC)405-436-8609)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Lyon, William G. (ManTech), Candida C. West and Guy W. Sewell (RSKERC), and Michelle L. Osborn (ECU). "Microbial Utilization of Vadose Zone Organic Carbon for Reductive Dechlorination of Tetrachloroethene." Jnl. Environ. Sci. Health. A30(7), 1995.

(R. Cosby(RSKERC)405-436-8533)

RESEARCH IN PROGRESS

During April 1-3, 1996, Lowell Leach (Dynamac) made a site visit to the Interdyne Corporation in Tucson, AZ, to evaluate the progress of a research contract, "The Compatibility of DNAPLs and Annular Sealants." The effects of bentonite hydration in the presence of various concentrations of trichloroethylene and dichloromethane are being investigated to determine their borehole sealing capacities. Two common commercial bentonite (sodium based and calcium based) sealants, in both pellet and slurried form, are being used to isolate selected zones in well construction. The integrity of these sealants is being evaluated in the presence of DNAPLs using double-ring permeameters. Initial laboratory data indicate both types and forms of bentonite exhibit little or no sealing capacity in the presence of the DNAPLs when placed in boreholes using conventional falling-head techniques.

(S. Huling(RSKERC)405-436-8610)



HIGHLIGHTS

**National Risk Management Research Laboratory
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Status Report for the Week of April 29, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region I: On April 8, 1996, Dominic DiGiulio (RSKERC) provided RPM Elise Jakabhazy with an evaluation of the feasibility of soil venting applications at the Linemaster Switch Site in Woodstock, CT. It was pointed out that pilot studies have been conducted to evaluate the feasibility of venting applications before and after hydraulic fracturing. The limiting subsurface conceptualization for an effective venting application is that advection between induced predominately horizontal hydraulic fractures is primarily limited to natural vertical fractures with diffusion occurring within the matrix till toward natural fractures. The feasibility of successfully using soil venting at the site was discussed both with respect to the attainment of a specific concentration goal as well as the removal of a large portion of contaminant mass.

(94-R01-006)

(D. DiGiulio(RSKERC)405-436-8605)

Technical Assistance to Region I: In response to a request from RPM Michael Nalipinski dated February 27, 1996, Don Draper (RSKERC) and Lowell Leach (Dynamac) provided the Region with review comments on material implying that vinyl chloride is leaching from PVC well construction material at Loring AFB in Limestone, MN. The April 18, 1996, TSC comments stated that the information presented in support of this Loring AFB conclusion seems reasonable. However, considering the concentrations of the various organics found in the soils and the fact that 13 of 17 well systems have detectable quantities of VOCs, the vinyl chloride concentrations in individual wells could represent transformation products. The uncertainty of the findings suggests further investigations using stainless steel wells and a strongly documented quality control sampling protocol.

(96-R01-008)

(D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region IV: The 18-acre American Creosote Works site is an active wood treating facility in Pensacola, FL. On April 12, 1996, as part of a continuing technical assistance effort at the site, Scott Huling and Randall Ross (RSKERC) provided RPM Mark Fite with review comments of the preliminary remedial design for DNAPL recovery at Operable Unit 2. Detailed comments and suggestions were offered concerning various aspects of the proposal, including the basis of design, drilling and well installation, interceptor trenches, collection system for the extracted water, and ground-water treatment system.

(94-R04-006)

(S. Huling(RSKERC)405-436-8610)

Technical Assistance to EPA's Office of Radiation and Indoor Air: On April 17, 1996, Joe Williams (RSKERC), and Drs. Jin-Song Chen and Varadhan Ravi (Dynamac) provided Ron Wilhelm (ORIA/RTTC) with review comments of the PRESTO-SPA-CPG model which was developed to calculate maximum individual doses resulting from the disposal of low-level radioactive wastes to a critical population group. The review also addressed the use of various infiltration estimation methods for input parameters to the subject model.

(Misc.)

(J. Williams(RSKERC)405-436-8608)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Shiau, Bor-Jier, David A. Sabatini, and Jeffrey H. Harwell (Univ. of Okla.). "Properties of Food Grade Surfactants Affecting Subsurface Remediation of Chlorinated Solvents." Environ. Sci. and Tech. Vol. 29, No. 12, 1995.

(C. West(RSKERC)405-436-8551)

RESEARCH IN PROGRESS

During March, a bioslurper unit was installed at a 160,000 gallon jet fuel spill at Diego Garcia AFB by Jerry Hansen (Brooks AFB), Dr. Don Kampbell (RSKERC), and Jeff Kittel (Battelle). The unit is being operated to remove free-floating fuel at the water table and to aerate the subsurface. Observations of fuel accumulation in a pumped product oil-water separator showed that the bioslurper was removing fuel satisfactorily. A respiration test based on carbon dioxide and oxygen in the soil gas indicated that active biodegradation was occurring. Ground-water samples from the plume of contamination will be collected and analyzed after six months of bioslurper operation. The analyses will be used to measure the effectiveness of the bioslurper. Water table fluctuations resulting from tidal action is expected to cleanse the subsurface by natural bioventing processes.

(D. Kampbell(RSKERC)405-436-8564)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center**

Status Report for the Week of May 6, 1996

REGIONAL ASSISTANCE

Technical Assistance to Region III: On March 6, 1996, RPM Garth Connor requested review comments on a leaching and modeling study by the PRP at the Jack's Creek Superfund Site in Maitland, PA. The April 18, 1996, response, prepared by Jerry Jones (RSKERC), and Drs. Sam Lee and Jin-Song Chen (Dynamac), suggested that the report appeared to have several technical uncertainties that should be clarified before being used in decision making. Specific areas of concern included the value of distribution coefficients and assumed occurrence of defects for membrane liners. Numerous technical ambiguities, errors, and confusing statements were observed throughout the review causing the validity of the report to be uncertain. A number of detailed comments were made in the areas of leachability testing and contaminant transport modeling.

(96-R03-004)

(J. Jones(RSKERC)405-436-8593)

Technical Assistance to Region III: On March 20, 1996, RPM David Turner requested review comments on a report entitled "Evaluation of Intrinsic Remediation for the Lord-Shope Landfill Site." The site, located in Girard Township, PA, consists of a four-acre capped landfill and surrounding contaminated soil. On April 18, 1996, Dr. John Wilson (RSKERC) suggested that indications are strong that natural attenuation may be occurring and that the prospects are sufficient to justify further sampling and site characterizations to quantitatively evaluate the contribution of natural attenuation. It was further stated that there is no recent data from monitoring wells close to the landfill, and water was not analyzed for the geochemical parameters that are indicative of natural attenuation. A determination of whether biointrinsic remediation is appropriate at this site should be delayed pending results of the proposed studies.

(96-R03-005)

(J. Wilson(RSKERC)405-436-8534)

Technical Assistance to Region V: On April 24, 1996, Don Draper (RSKERC) provided RPM Pablo Valentin with a report entitled, "Evaluation of Natural Attenuation in an Aquifer Contaminated by Landfill Leachate, West KL Landfill, Kalamazoo, Michigan," which was prepared by Drs. Varadhan Ravi and Jin-Song Chen (Dynamac). The report was based on an analysis of ground-water data obtained from discrete vertical sampling locations at several soil borings and monitoring wells in the vicinity of the landfill. Natural attenuation of organic contaminants was evaluated by comparing the average concentration of an organic contaminant along the centerline of the plume to its concentration at the source. The attenuation factor for organics was contrasted with that of chlorides to assess qualitatively the impact of biological processes on natural attenuation. The analysis accounted for heterogeneities and potential variability in the flow conditions by considering a range of travel time for the organic contaminants from the source areas to the downgradient locations. The study showed that the attenuation of the organic contaminants was, in general, significantly greater than that of chlorides.

(95-R05-004)

(D. Draper(RSKERC)405-436-8603)

Technical Assistance to EPA's Office of Radiation and Indoor Air: On April 18, 1996, Joe Williams (RSKERC), and Drs. Jin-Song Chen and Varadhan Ravi (Dynamac) provided Ron Wilhelm (ORIA/RTTC) with review comments on a report entitled, "The K_d Model and its Use in Contaminant Transport Modeling." In general, the report was found to be well-written, and the content presented in a thorough manner. There was some concern with the organization of the material, such that the impact of the processes on K_d can better become the focus of the document rather than the processes themselves. Several detailed comments were offered, many of which focussed on an improvement of the presentation of the material and the readability of the document.

(Misc.)

(J. Williams(RSKERL)405-436-8608)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Zhang, Jie, Randall L. Mackie, and Theodore R. Madden (MIT). "3-D Resistivity Forward Modeling and Inversion Using Conjugate Gradients." *Geophysics*, Vol. 60, No. 5. Sept-Oct, 1995.

(C. Enfield(RSKERC)405-436-8530)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
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Status Report for the Week of May 13, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region IV: The Myrtle Beach Air Force Base is located near Myrtle Beach, SC. On March 11, 1996, the Region requested technical assistance regarding the chemical oxidation project at the site. The Air Force has proposed using hydrogen peroxide to oxidize TCE, DCE, and related chlorinated solvents in soil and ground water. On May 8, 1996, as part of a continuing technical assistance effort, Scott Huling (RSKERC) provided the Region with comments and recommendations on a proposed bench-scale plan to study peroxide oxidation of chlorinated compounds. It was pointed out that the main issues were to assure that appropriate controls be used when evaluating the role of oxidation reactions versus other sinks in the system and to evaluate the incremental benefit of ferrous sulfate addition to the reactors.

(96RC04-002)

(S. Huling(RSKERC)405-436-8610)

Technical Assistance to Region VI: In review comments dated May 9, 1996, Steve Acree (RSKERC) discussed the proposed remediation plan for Operable Unit 3 at the Vertac Site in Jacksonville, AR. Although the plan accurately reflected the results of studies conducted during the RI/FS, it appeared that statements regarding the effectiveness of an existing french drain appeared to be misleading. It was suggested that the effectiveness of the drain be assessed during the remedial design and the proposed plan be modified accordingly.

(92-R06-003)

(S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region VI: On May 1, 1996, Scott Huling (RSKERC) provided RPM Glen Celerier with comments on the "Draft North Cavalcade Street Superfund Site Conceptual Site Model Statement of Work." The 21 acre North Cavalcade Street Site is located in northeast Houston, TX. The general comments pointed out that earlier RSKERC recommendations had not been incorporated into the present scope of work, and suggested that additional methods and activities be incorporated in the geostatistical approach that is proposed for use during the study. Other areas of discussion were the technical approach to the study and the conceptual scope of work.

(95-R06-010)

(S. Huling(RSKERC)405-436-8610)

Technical Assistance to Region VIII: Since 1992, the RSKERC has been providing technical assistance at the Ekotek/Petroleum Superfund Site in Salt Lake City, UT. On May 10, 1996, Steve Acree (RSKERC) provided RPM Gwendolyn Hooten with a review of a "Responsiveness Summary" which was prepared in response to concerns expressed in public comments. In general, the summary was found to be well written and responsive. Only one minor comment regarding upconing of geothermal water resulted from the review.

(93-R08-003)

(S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region IX: The Barstow Marine Corps Logistics Base (MCLB) site covers 5,687 acres east of Barstow, CA. On March 26, 1996, RPM Dave Hodges provided RSKERC with a number of site-related documents and requested an assessment, based on a review of the documents, of the likelihood of the natural attenuation of chlorinated solvents in ground water at the site. On May 6, 1996, Don Draper (RSKERC), and Drs. Jin-Song Chen and Varadhan Ravi (Dynamac) provided the Region with a trend analysis of historical data which indicated that decreases in VOC concentrations were not significant over the period monitored. It was also stated that determining the rate and extent of natural attenuation based on available data would be doubtful. Since the site characterization efforts were not conducted with a goal of demonstrating natural attenuation, the resulting information appeared to be inadequate for the task.

(96-R09-002)

(D. Draper(RSKERC)405-436-860#)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Rathfelder, K., J Lang, and L.M. Abriola (Univ. of Mich.). "Soil Vapor Extraction and Bioventing: Applications, Limitations, and Future Research Directions." *Reviews of Geophysics* IUGG Quadrennial Report. July 1995.

(J. Cho(RSKERC)405-436-8547)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of May20, 1996**

REGIONAL ASSISTANCE

Technical Assistance to EPA's Office of Radiation and Indoor Air: On May 13, 1996, Joe Williams (RSKERC), and Drs. Jin-Song Chen and Varadhan Ravi (Dynamac) provided Ron Wilhelm (ORIA/RTTC) with review comments on a report entitled, "Methods, Issues, and Criteria for Measuring K_d Values, Subtask 1 B." Although there was some concern expressed about the organization of the material, it was pointed out that the document was quite thorough and will provide a valuable overview regarding techniques and issues involved with the measurement and selection of K_d values for use in transport codes.

(Misc.)

(J. Williams(RSKERC)405-436-8608)

Technical Assistance to Region II: Joe Williams (RSKERC), and Drs. Ying Ouyang and Rashid Islam (CDSI) provided RPM Courtney McEnery with comments on a ground-water modeling plan for the Rockaway Borough Well Field Superfund Site in Morris County, NJ. The review, dated May 15, 1996, stated that, although the hydrogeologic model conceptualization and construction is comprehensive and well described, the Preliminary (35%) Design Report is poorly organized, incomplete, and the model objectives are not clearly defined. Specific comments were offered in a number of areas including model inputs and results, calibration and sensitivity analysis, and assumptions used in site characterization.

(96-R02-004)

(J. Williams(RSKERC)405-436-8608)

Technical Assistance to Region IX: On May 13, 1996, Steve Acree (RSKERC) made a visit to the Sparks Solvent/Fuel Site in Sparks, NV, to assist in the evaluation of an LNAPL removal system and to discuss proposed studies and potential modifications to the current removal plan. Also attending the meeting were representatives from the State of Nevada, Responsible Parties, Consultants, and Region IX. The meeting focused on schedules for upcoming work plans and site investigations. Additional action by RSKERC will involve the review of a proposed in-situ bioremediation investigation.

(94-R09-001)

(S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region IX: As part of a continuing technical assistance effort at the Sparks Solvent/Fuel Site in Sparks, NV, Steve Acree (RSKERC) provided OCS Donn Zuroski with review comments of a preliminary data evaluation report. The May 15, 1996, comments stated that, in general, the report does not provide sufficient data to rigorously evaluate the effectiveness of the existing remediation system or the need for more aggressive remediation measures. Although the remedial system appeared to be removing contaminant mass at a significant rate, additional characterization will be required to estimate the degree of mass removal. These studies may include a detailed evaluation of contaminant distribution and of contaminant transport and fate.

(94-R09-001)

(S. Acree(RSKERC)405-436-8609)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Xu, Ning (NRC), Steve Vandegrift (ManTech), and Guy Sewell (RSKERC). "Determination of Chloroethenes in Environmental Biological Samples Using Gas Chromatography Coupled with Solid Phase Micro Extraction." Chromatographia. March 1996.

(G. Sewell(RSKERC)405-436-8566)

Kampbell, D.H. and J.T. Wilson (RSKERC), and C.J. Griffin (Global Engr.). "Bioventing Reclamation Pilot Project Aviation Gasoline Spill." Book Chapter 6 - Biotechnology in Industrial Waste Treatment and Bioremediation. Lewis Publishers. 1996.

(D. Kampbell(RSKERC)405-436-8564)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of May 27, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region VIII: In response to a request from Environmental Scientist Stephanie Wallace, Don Draper (RSKERC), and Lowell Leach and Dr. Dan Pope (Dynamac) provided the Region with comments and recommendations concerning the "Reconnaissance Level Microbial/Biochemical Survey Plan" for the Exxon Billings Refinery in Billings, MT. The May 17, 1996, response stated that, in general, the proposed plan would seem to be reasonable for a preliminary survey designed to assess the potential for bioremediation at the site only if additional parameters and specific contaminants were measured in the ground water, soil, and microcosms. The measurement of the indicated parameters and contaminants must be undertaken to establish actual contaminant reductions. The design of a bioremediation system and the full evaluation of the potential for natural attenuation at the site will require a much more extensive evaluation than that being considered in the "reconnaissance level survey."
(96RC08-001) (D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region X: On May 17, 1996, Randall Ross and Dr. Eva Davis (RSKERC), and Drs. Bruce Pivetz and Birinder Shergill (ManTech) provided RPM Sally Thomas with technical comments concerning bioremediation and flushing studies at the Pacific Sound Resources Superfund Site on the south shore of Elliott Bay in Seattle, WA. It was pointed out that the areal extent of the contamination, heterogeneity of the subsurface, and other factors will limit the effectiveness of hot water flushing. It was also suggested that bioremediation may be effective at certain locations within the site, but there are a number of issues that must be resolved, and follow-up treatability studies must be conducted before this remediation technology can be justified.
(94-R10-007) (R. Ross(RSKERC)405-436-8611)

Technical Assistance to OSWER: On May 17, 1996, Randall Ross (RSKERC) provided Supervisory Environmental Scientist Amy Mills (TIO) with review comments of a draft report entitled "Evaluation of Subsurface Engineered Barriers at Waste Sites." Although the project appeared to offer a good beginning into the evaluation of subsurface barrier systems, there were several items that should be given additional consideration. It was suggested, for example, that the literature search be expanded from that expressed in the report (from 1990 to the present) to include the installation of barrier systems constructed between 1980 and the present. It was also suggested that it is more important to have a wide range of geologic settings reflected in the report than to dwell extensively on the geographic distribution of sites.
(Misc.) (R. Ross(RSKERC)405-436-8611)

Technical Assistance to OSW: On May 16, 1996, Dr. John Wilson (RSKERC) provided National Modeling Expert Dr. Zubair Saleem with review comments on a report entitled "Investigation of the Anaerobic Biodegradability of Pentachlorophenol."
(Misc.) (J. Wilson(RSKERC)405-436-8534)

Technical Assistance to DOD: On April 26, 1996, Joe Williams (RSKERC), and Drs. Rashid Islam and Ying Ouyang (CDSI) provided Jim Gonzales (Brooks AFB) with comments on the model BIOSCREEN and its associated Users Manual. BIOSCREEN is a screening model for use in simulating ground-water plume migration while taking into account the effects of natural attenuation and biodegradation of dissolved hydrocarbons at petroleum fuel release sites. Consideration was given to using the Laboratory's Center for Subsurface Modeling Support (CSMoS) as a distribution point for the model. In doing so, the model and its documentation was assessed for its ability to stand alone, which encompassed an evaluation of its technical adequacy, usefulness, capabilities, and ease-of-use characteristics. A number of general and specific comments were offered.
(Misc.) (J. Williams(RSKERC)405-436-8608)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Puls, Robert W. and Cynthia J. Paul (RSKERC), and Robert M. Powell (ManTech). "In Situ Immobilization and Detoxification of Chromate-Contaminated Ground Water Using Zero-Valent Iron: Field Experiments at the USCG Support Center, Elizabeth City, North Carolina." Proceedings of the Fourth Great Lakes Geotechnical and Geoenvironmental Conference: In-Situ Remediation of Contaminated Sites. Univ. of Chicago. May 17, 1996.

(R. Puls(RSKERC)405-436-8543)



HIGHLIGHTS

**National Risk Management Research Laboratory
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Status Report for the Week of June 3, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region II: On May 22, 1996, Joe Williams (RSKERC) and Brad Hill (CDSI) participated in a technical meeting at the Ciba-Geigy Superfund facility in Toms River, NJ, to discuss a partition coefficient (K_d) study and modeling activities being conducted at the site. RSKERC has been actively participating in the planning and development of these investigations for a number of months. Also attending the meeting were representatives from Ciba-Geigy, ENVIRON, CDM Federal Programs, and Region II.

(95-R02-003)

(J. Williams(RSKERC)405-436-8608)

Technical Assistance to Region VI: In response to a March 13, 1996, request from RPM Glen Celerier, Scott Huling (RSKERC), and Drs. Birinder Shergill and Bruce Pivetz (ManTech) reviewed and commented on the technical approach to a ground-water exposure assessment at the South Cavalcade Superfund Site in Houston, TX. The May 24, 1996, review comments stated that the use of "Quick Model" appeared to be appropriate based on existing site conditions. It was suggested that a sensitivity analysis would help evaluate the worst and best case scenarios, and subsequent simulations could be refined assuming compliance problems occurred with the worst case scenario. If, during the sensitivity tests, it was determined that greater accuracy was desired or if the simulation indicated that ground-water concentrations at compliance points was unacceptable, the "Full Numerical Model," as described in the document, could be used. Several recommendations were provided which would improve the overall technical quality of the proposed modeling exercise.

(95-R06-005)

(S. Huling(RSKERC)405-436-8610)

Technical Assistance to Region VII: On May 23, 1996, Dr. David Burden (RSKERC) and Dr. Varadhan Ravi (Dynamac) provided the Region with review comments concerning a modeling study performed in support of Non-Endangerment and No-Migration Petitions for underground injection of chemical wastes into Class I wells at the Abbott Laboratories facility in Wichita, KS. Even though the overall quality of the modeling effort is high, there were two issues of concern which needed additional explanation including the use of reasonably conservative inputs in the mathematical models, and the impact of parameter uncertainty. Specific comments were offered with respect to values of permeability, porosity, and dispersivity.

(Misc.)

(D. Burden(RSKERC)405-436-8606)

Technical Assistance to Region IX: On May 22, 1996, as part of a continuing technical assistance effort, Steve Acree (RSKERC) and Dr. Daniel Pope (Dynamac) provided OSC Donn Zuroski with review comments of a biorespiration study plan at the Sparks Solvent/Fuel Site in Sparks, NV. In general, the plan appeared to be appropriate for estimating gross potential biorespiration rates in the vadose zone. Several recommendations were offered including the need to determine site specific values of the gas filled pore space, oxygen content, mass ratio of hydrocarbons to the oxygen required for mineralization, and soil bulk density. A number of other issues were discussed including the effect of annual fluctuations in soil temperature on biodegradation rates, the design of monitoring wells, and data acquisition intervals.

(94-R09-001)

(S. Acree(RSKERC)405-436-8609)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Knox, R.C. and L.W. Canter (Univ. of Okla.). "Prioritization of Ground Water Contaminants and Sources." Water, Air, and Soil Pollution. 1996 Kluwer Academic Publishers. Printed in The Netherlands.

(D. Burden(RSKERC)405-436-8606)

Shen, Hai (NRC), Guy Sewell (RSKERC), and Parmely H. Pritchard (EPA Gulf Breeze). "Microbial Reduction of Cr(VI) During Anaerobic Degradation of Benzoate." Environ. Sci. & Technol. Vol. 30, Number 5. 1996.

(G. Sewell(RSKERC)405-436-8703)



HIGHLIGHTS

**National Risk Management Research Laboratory
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Status Report for the Week of June 17, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region I: On May 16, 1996, RPM Bob Leger requested technical assistance at the Hocomonco Pond Superfund Site located in Westborough, MA. The TSC was requested to review and evaluate the PRP work plan to characterize ongoing "iron problems" in the Kettle Park area of the site and a proposal to remediate the situation. In comments dated June 4, 1996, Don Draper (RSKERC) and Lowell Leach (Dynamac) stated that the concept proposed for evaluating iron transformations resulting from air sparging is generally sound. However, the monitoring plan to evaluate the effects of sparging on iron precipitation and aquifer plugging are probably inadequate. It was suggested that a series of pump tests be conducted to evaluate changes in hydraulic conductivity due to plugging. In the final analysis, it may be more cost effective to treat the extracted water at the surface to remove iron before reinjection.
(96-R01-010) (D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region II: On June 3, 1996, Don Draper (RSKERC) and Dr. Ann Azadpour (Dynamac) provided RPM Douglas Pocze with review comments regarding the "Treatability Study in Support of Intrinsic Remediation for Pumphouse 5" at Griffiss AFB in Rome, NY. In general, it appears that the approach to the study associated with intrinsic bioremediation is reasonable regarding the major problem at the site. The results from ground-water, sediment, and surface-water sampling, field monitoring activities, and contaminant modeling are adequate for characterizing the geochemistry of the site and evaluating the effectiveness of intrinsic remediation. Specific suggestions were provided in a number of areas including cost savings in comparison with other treatment alternatives, sampling frequency, and the role of microcosm studies to confirm that remediation can be expected to occur in the future, and that conditions at the site are not inhibitory to the microbial populations.
(96-R02-003) (D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region III: On June 5, 1996, Dominic DiGiulio (RSKERC) provided RPM Frank Klancher with technical comments on the soil vacuum extraction study at the Centre County Kepone Site in State College, PA. It was pointed out that the dip and lateral propagation of hydraulic fractures should always be confirmed in the field with soil borings because of the importance in numerical airflow modeling. It was also stated that the estimation of remediation time appeared to be optimistic because mass transfer limitations such as sorption kinetics, and immiscible phase dissolution and volatilization limit mass removal. Additional comments were concerned with the evaluation of venting performance.
(96-R03-001) (D. DiGiulio(RSKERC)405-436-8605)

RESEARCH IN PROGRESS

Much of the current research on ground-water remediation has focused on the removal of contaminated water from the subsurface and treating it at the surface. While the removal of contaminants is desirable, the costs are often prohibitive and contaminant concentrations are rarely lowered to the required levels. In-situ chemically reactive permeable walls or treatment zones are being considered as a low-cost and effective alternative for the treatment of waste sites contaminated with metals. In these cases, the chemical form of the contaminant in question is transformed through reduction and/or precipitation reactions to an immobilized or non-toxic form. Dr. Robert Puls, Cindy Paul, Susan Mravik, Frank Beck, Dr. Guy Sewell, and Dr. James Weaver (RSKERC), and Robert Powell (ManTech) are conducting a research project which is designed to expand upon current developments of appropriate laboratory techniques for the assessment of in-situ metals remediation in ground water and soil, and demonstrate these innovative techniques at pilot and full scale. A pilot field test, initiated in September 1994, was completed in April 1996, and successfully reduced chromate levels to < 0.1 mg/L in ground water at the U.S. Coast Guard Support Center at Elizabeth City, North Carolina. A full-scale demonstration of the technology is slated for installation June 22, 1996. This will be a 150 ft. long, 24 ft. wide iron wall projected to remediate both chromate and chlorinated organics plumes at the USCG site.
(R. Puls(RSKERC)405-436-8543)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of June 24, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region I: On June 19, 1996, Dominic DiGiulio (RSKERC) and Dr. Varadhan Ravi (Dynamac) provided RPM Elise Jakabhazy with a detailed geostatistical analysis of TCE concentration data at the Linemaster Switch Site in Woodstock, CT. Kriging was used to delineate soil isopleths at the site. It was evident that there are areas of high uncertainty with respect to the estimation of soil concentrations. It was suggested that a few more samples be collected in specific locations to greatly reduce the uncertainty and lend more credibility to decisions regarding the definition of soil remediation areas.

(94-R01-006)

(D. DiGiulio(RSKERC)405-436-8605)

Technical Assistance to Region I: On June 19, 1996, in response to a May 6, 1996, request from RPM Michael Nalipinski, Don Draper (RSKERC), and Lowell Leach and Ann Azadpour (Dynamac) provided review comments on the "Preliminary Loring Air Force Base Intrinsic Bioremediation Evaluation Summary." The reviewed material consisted of a series of bullets, topic areas, chemical data tables, a map of the site, and three small maps showing the location of wells in the selected flow field used for the study. It would have been extremely helpful if a written text describing the site had been available. A number of concerns were discussed including the location of screens in monitoring wells, the number and location of monitoring locations, the need to sample additional parameters, tracer tests, and methods to determine the amount of contaminant removal.

(96-R01-003)

(D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region III: On March 20, 1996, RPM David Turner requested RSKERC to review a report entitled "Evaluation of Intrinsic Remediation for the Lord-Shope Landfill Site." The site is located in Girard Township, PA. The responsible party is proposing to use biointrinsic remediation on a portion of the plume, and the request for assistance was to assist in determining if this is the appropriate technology. In review comments dated June 10, 1996, John Wilson (RSKERC) stated that, in general, the plan would be adequate to evaluate the contribution of intrinsic remediation at the site. Specific comments were directed toward field versus laboratory analysis, the need for an accurate water table map, sampling frequency, well construction, and sampling methodology.

(96-R03-005)

(J. Wilson(RSKERC)405-436-8534)

Technical Assistance to Region V: In response to a December 11, 1995, request from RPM Edward Hanlon, Steven Acree and Dominic DiGiulio (RSKERC) provided review comments on the vacuum enhanced ground-water extraction pilot test work plan for the Fields Brook Superfund Site in Ashtabula County, OH. The June 12, 1996, comments pertained to the Detrex Facility at the Fields Brook Site. The system involves the application of a vacuum to the extraction well to increase the effective pressure difference between the well bore and the aquifer. Although the technique has been successfully applied to ground-water recovery systems at many sites, several aspects of the proposed test design were of concern. A number of issues related to the recovery well and monitoring probe installation, as well as the DNAPL and ground-water recovery pilot tests, were discussed in detail.

(96-R05-002)

(S. Acree(RSKERC)405-346-8609)

RESEARCH IN PROGRESS

There are no acceptable techniques for in-situ remediation of subsurface environments which are highly contaminated by NAPLs. Dr. Lynn Wood and Susan Mravik (RSKERC) are conducting a research project designed to address this problem by examining the use of chemically enhanced flushing techniques for NAPL extraction. The focus will be on the use of alcohols and alcohol/surfactant mixtures for dissolution and mobilization of residual or free-phase organic contaminants from soil and ground water. Physical models will be used to investigate the role of properties of fluids on NAPL removal. Field tests of in-situ NAPL extraction will be conducted to evaluate the efficacy of the techniques for subsurface remediation. Laboratory results and mathematical simulations will facilitate design of the field tests.

(L. Wood(RSKERC)405-436-8552)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
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Status Report for the Week of July 1, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region II: In response to a June 6, 1996, e-mail request from Jon Josephs, Steven Acree (RSKERC) provided the Region with information regarding capture zone delineation, and discussed ongoing research in this area. It was pointed out that a number of techniques for evaluating capture zones at field scale are available. It was suggested that additional practical research concerning the application and effectiveness of these techniques is warranted. One recent field study conducted by investigators from the New Mexico Institute of Mining and Technology was discussed and a report of that study was provided to the Region.

(Misc.)

(S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region V: On December 11, 1995, RPM Edward Hanlon requested a technical review of the "Comment Response Report" and "DNAPL Contingency Plan" for the Detrex Facility, Fields Brook Superfund Site in Ashtabula County, OH. The January 16, 1996, RSKERC response focused on those chapters concerning the "Remedial Investigation" and "Draft Feasibility Study." On June 20, 1996, Steve Acree (RSKERC) provided comments on the "Comment Response Report." In general the responses appeared to address major issues identified in previous comments. Two minor areas of concern included the need to install surface casing through the zone of mobile DNAPL in order to prevent additional migration, and the possible need of additional laboratory analyses to aid in the evaluation of the extent of the DNAPLs.

(96-R05-002)

(S. Acree(RSKERC)405-436-8609)

VISITING SCIENTISTS

On June 10 and 11, 1996, the RSKERC hosted two visiting scientists from Lithuania. The visit was at the request of the Office of International Activities, Region V, through the United States Agency for International Development Participant Training Program. The Lithuanian scientists were Mr. Julius Sivickis, Head of the Soil Protection Division, Environmental Ministry, and Bernardas Paukstys, Head of the Hydrogeological Division, GROTA, a private Lithuanian hydrogeological company. The visit to Ada was part of a month long stay in the United States that, in addition to visiting EPA research laboratories and Regional Offices, included two subsurface remediation training courses and observations of research and remediation activities at actual field research sites and hazardous waste sites.

(J. Jones(RSKERC)405-436-8593)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Ye, Ming-Yu, Ron G. Walkup, and Kim D. Hill (ManTech). "Determination of Alkylated and Sulfonated Diphenyl Oxide Surfactant by High Performance Liquid Chromatography." Journal of Liquid Chromatography and Related Technologies. 19(8), 1996.

(R. Cosby(RSKERC)405-436-8533)

RESEARCH IN PROGRESS

During May 8-10, 1996, Scott Huling (RSKERC), and Dr. Bruce Pivetz and Renae Cochran (ManTech) participated in a poster session with a presentation entitled "Phytoremediation of Soil Contaminated by Pentachlorophenol at a Wood Preserving Waste Site" at the Phytoremediation Symposium in Arlington, VA. Phytoremediation of contaminated soil is a low maintenance technology that enhances and minimizes leachate concentrations and exposure pathways. Preliminary results from a laboratory and field germination study indicate that grasses can be established in PCP and PAH contaminated soil. Seed germination and sustained plant growth could only be established in soils with PCP contamination levels below 180 mg/kg. Fescues and wheatgrasses had overall better germination and growth than Little Bluestem, Indiangrass, and Switchgrass with Fescues having the most dense growth. Contaminant concentrations and microbiological changes which occur as a function of plant growth will also be determined.

(S. Huling(RSKERC)403-436-8610)



HIGHLIGHTS

**National Risk Management Research Laboratory
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Status Report for the Week of July 8, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region II: On July 1, 1996, Don Draper (RSKERC) and Dr. Ann Azadpour (Dynamac) provided the Region with review comments on a feasibility study for the Carroll and Dubies Superfund Site in Port Jervis, NY. The comments were in response to a request for technical assistance from RPM Maria Jon dated June 24, 1996. Although there were some areas that needed fundamental improvements, the general approach to a study associated with intrinsic bioremediation appeared reasonable. Issues discussed in the review included the selection of site specific parameters, indicators of degradation, and the effect of the site's geochemistry on microbial metabolism. (96-R02-005) (D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region IX: On July 1, 1996, as part of a continuing technical assistance effort, Steven Acree (RSKERC) and Dr. Daniel Pope (Dynamac) provided OSC Donn Zuroski with comments on the "In-Situ Biorespiration Test Results" and the "Intrinsic Bioremediation Sampling Work Plan" for the Sparks Solvent/Fuel Site in Sparks, NV. In general, the discussion of the biorespiration test results appeared to be a realistic interpretation of the data. It was pointed out, however, that the proposed objectives of evaluating the biodegradation capacity of the aquifer and determining whether natural attenuation processes are sufficient to reduce contaminant levels may be difficult to achieve. (94-R09-001) (S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region IX: In response to an April 22, 1996, request from RPM Rachel Simmons, Dominic DiGiulio and Scott Huling (RSKERC) commented on a contaminant source treatment plan document for the Marine Corps Air Station in Yuma, AZ. The June 28, 1996, response stated that the document was relatively general without much detail concerning the proposed pilot study. The duration of the study was not specified, the monitoring system used to evaluate the performance of the oxidation processes of the system was inadequate, and the design of the sparge points appeared to have significant limitations. Detailed comments in a number of areas were offered including the oxidation efficiency of TCE by O₃. (96-R09-001) (D. DiGiulio(RSKERC)405-436-8605)

INTERNATIONAL TRAVEL

During June 3-7, 1996, Dr. Steve Kraemer (RSKERC) participated in a five-day short course on Applied Ground-Water Modeling at the Geological Survey of Latvia in Riga. Other instructors were from the Wisconsin Geological Survey and the U.S. Geological Survey. Twenty students participated in the class with about half from Latvia and the rest from Estonia, Lithuania, and Denmark. A number of topics were addressed including modeling concepts, fracture flow, wellhead protection, and transport processes. About three-quarters of the course consisted of lectures with the remainder involving hands-on computer exercises. The participants are interested in follow-up courses in contaminant transport and remediation design. (S. Kraemer(RSKERC)405-436-8549)

During June 11-14, 1996, Dr. Robert Puls (RSKERC) visited the University of Waterloo in Ontario, Canada, to discuss research being conducted by the University in cooperation with EPA and the U.S. Coast Guard. The research involves laboratory and field experiments to evaluate the potential of an in-situ reactive barrier wall, comprised of elemental iron, to abiotically transform inorganic and organic contaminants to a non-toxic form or be remediated. In addition to visiting ongoing field experiments at the Canadian Forces Borden Site, Dr. Puls made an informal presentation on passive ground-water sampling to professors and students at the University. (R. Puls(RSKERC)405-436-8543)



HIGHLIGHTS

**National Risk Management Research Laboratory
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Status Report for the Week of July 15, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Regions I and VI: On May 8, 1996, Dr. Robert Puls (RSKERC) provided technical assistance on the subject of low-flow ground-water sampling at the Region VI RCRA Inspector Workshop in Fort Worth, TX. More than 100 EPA and State personnel were in attendance. During May 29-30, 1996, Dr. Puls and Dr. Mike Barcelona (Univ. of Mich.) presented a workshop on low-flow sampling and other ground-water sampling topics in Portland, ME. The workshop, which was sponsored by the State of Maine, was attended by more than 200 participants.

(R. Puls(RSKERC)405-436-8543)

Technical Assistance to Region IX: On July 3, 1996, Steven Acree (RSKERC) and Bradley Hill (CDSI) provided OSC Donn Zuroski with a technical review of the "Ground-Water Flow and Contaminant Transport Modeling Work Plan" which was developed for the Sparks Solvent/Fuel Site in Sparks, NV. Certain sections of the work plan were found to be vague, and details regarding the proposed studies were not provided. It was not clear that the site was characterized in sufficient detail to allow reliable simulation modeling. It was suggested that, although additional studies are proposed, a relatively high degree of uncertainty will probably exist in the results of the modeling. A number of issues were discussed including the evaluation of ground-water capture zones, the effects of LNAPL smear zone submergence on ground-water quality, and model calibration and sensitivity analysis.

(94-R09-001)

(S. Acree(RSKERC)405-436-8609)

INTERNATIONAL TRAVEL

Dr. Robert Puls (RSKERC) was an invited speaker at a scientific workshop in Dresden, Germany, May 2-3, 1996, entitled "Passive Systems for In-Situ Remediation of Contaminated Groundwater and Soil." He presented the results of recent research involving the application of in-situ permeable reactive barriers at the U.S. Coast Guard Site in Elizabeth City, NC. The title of the presentation was "The Application of Passive Groundwater Remediation Technologies in the U.S." The aim of the workshop was to promote increased technical exchange on the topic with representatives of industry, and the scientific and regulatory communities of the U.S. and Europe.

(R. Puls(RSKERC)405-436-8543)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Puls, Robert W. (RSKERC). "Assessment of Colloidal Transport in Ground Water, Pinal Creek Basin, Arizona." U.S. Geological Survey Water-Supply Paper 2466. 1996.

(R. Puls(RSKERC)405-436-8543)

Luther, Kenneth H. and Henk M. Haitjema (Indiana Univ.). "An Analytic Element Solution to Unconfined Flow Near a Partially Penetrating Well." EOS. April 23, 1996.

(S. Kraemer(RSKERC)405-436-8549)

RESEARCH IN PROGRESS

A full-scale permeable reactive wall composed of elemental iron was recently installed at the U.S. Coast Guard research site in Elizabeth City, NC. The project is ongoing cooperative research between the USCG, RSKERC, and the University of Waterloo. This was the first iron wall installed using a continuous trenching machine which excavated and backfilled soil in one step to a depth of 24 feet. The wall is two feet wide and 150 feet long. It intercepts and remediates two overlapping plumes of chromate and chlorinated solvents. Intensive post installation performance monitoring is scheduled for a minimum of two years.

(R. Puls(RSKERC)405-436-8543)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of July 22, 1996**

REGIONAL ASSISTANCE:

Technical Assistance to Region IV: On July 3, 1996, as part of a continuing technical assistance effort, Steven Acree (RSKERC) provided RPM Galo Jackson with review comments on the "Remedial Action Plan Modification II" for the Petroleum Products Corporation Superfund Site in Broward County, FL. Generally, it appeared that the use of large diameter wells for dual extraction of ground water and LNAPLs would improve the recovery rate of the nonaqueous plume. A number of specific concerns were expressed, including the selection of well screen material and sand pack, well development methods, and the possible need for additional wells.

(95-R04-001)

(S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region IX: The original request for assistance, with respect to the final remedial design at the J.H. Baxter Superfund Site in Weed, CA, was dated January 24, 1995. On July 5, 1996, as a part of this continuing technical assistance effort, Steven Acree (RSKERC) provided RPM Kathy Setian with review comments on the design. In general, the proposed remediation technologies appeared to be appropriate for the stated objectives. Several specific concerns regarding the proposed remedial system and monitoring program were identified and discussed in detail.

(95-R09-005)

(S.Acree(RSKERC)405-436-8609)

SCIENTIFIC RECOGNITION

During July 8-9, 1996, Dr. David Burden (RSKERC) attended the EPA Ground-Water Protection Technical Forum (GWPTF) annual meeting in Irvine, CA, at the National Academy of Science. The GWPTF is composed of representatives from each EPA Region and the Ada, Athens, and Las Vegas ORD Research Laboratories. At this year's meeting the Forum recognized outstanding contributions to ground-water protection by initiating the James F. McNabb Ground-Water Award. A plaque was presented to James McNabb (retired RSKERC) this first year to honor him for the work he has put forth in establishing the GWPTF.

(D. Burden(RSKERC)405-436-8606)

At a luncheon of the Great Plains/Rocky Mountain Hazardous Substance Research Center in Manhattan, KS, Director Larry Erickson presented the Karen Morehouse Best Paper Award to C.J. Hurst, R.C. Sims, J.L. Sims, D.L. Sorenson, and J.E. McLean (Utah State Univ.) and Scott Huling (RSKERC). The award recognized the team of researchers who had the best technical paper at the previous year's conference. The paper was titled "Polycyclic Aromatic Hydrocarbon Biodegradation as a Function of Oxygen Tension in Contaminated Soil."

(C. West(RSKERC)405-436-8551)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Fuller, Christopher C., James A. Davis, Jennifer A. Coston, and Eleanor Dixon (USGS). "Characterization of Metal Adsorption Variability in a Sand and Gravel Aquifer, Cape Cod, Massachusetts, U.S.A." *Journal of Contaminant Hydrology*. Vol 22. 1996.

(R. Puls(RSKERC)405-436-8543)

Brown, Richard A. (Groundwater Technology), Robert Hinchee (Parsons Engineering Science), Robert D. Norris (Eckenfelder Inc.), and John T. Wilson (RSKERC). "Bioremediation of Petroleum Hydrocarbons: A Flexible, Variable Speed Technology." *Remediation/Summer 1996*.

(J. Wilson(RSKERC)405-436-8534)

Bakker, Mark (Univ. of Minn.) and Stephen Kraemer (RSKERC). "Analytic Element Modeling of Groundwater Flow in Coastal Aquifers." *EOS*. April 23, 1996.

(S. Kraemer(RSKERC)405-436-8549)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
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Status Report for the Week of July 29, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region II: On June 25, 1996, Region II requested technical assistance from Joan Mattox (NRMRL-CIN) in reviewing the treatability study work plan for the Nepera Chemical Superfund Site in Orange County, NY. The request was referred to RSKERL. In review comments dated July 17, 1996, Don Draper (RSKERC) and Dr. Daniel Pope (Dynamac) stated that site investigation sampling may be inadequate specifically with respect to the methods for taking samples for the analysis of volatiles, the proposed number of samples, composite sampling, and the failure to include proposed sludge sampling methods in the work plan. Others areas of concern included the biological treatment of sludges, and the susceptibility of the contaminants of interest to bioremediation.

(96-R02-006)

(D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region III: On July 19, 1996, Dr. Guy Sewell (RSKERC) provided RPM Steve Donohue with review comments concerning work plan modifications for the Saegertown Industrial Area site in Saegertown, PA. It was pointed out that if the focus of the remedial design is the natural attenuation of chlorinated solvents, the parameters selected to adequately characterize the attenuation processes should be carefully considered. TOC is a cumulative or generalized measurement of the concentration of potential electron donors. If it is not present, no significant reductive transformation will occur and the conceptual model of biotransformation leading to intrinsic remediation at the site may be incorrect. Also discussed was the role of nitrate and its daughter products as site characterization parameters.

(95-R03-005)

(G. Sewell(RSKERC)405-436-8566)

Technical Assistance to Region VI: Following a July 12, 1996, meeting with RPM Beth Reiner concerning the Velsicol Site in St. Louis, MI, Randall Ross (RSKERC) provided the Region with numerous water level versus time graphics from ground-water monitoring data at the site. Based on water level trends over time, as determined from monitoring wells within the containment system, there was evidence that leakage into and out of the system was occurring. In addition to the review comments, a number of Ground-Water Issue Papers on pertinent topics were made available to the RPM.

(95-R05-003)

(R. Ross(RSKERC)405-436-8611)

Technical Assistance to Region VIII: The TSC has been providing technical assistance at the Champion International (wood-preserving) Superfund Site in Libby, MT, since September 5, 1989. On July 17, 1996, Scott Huling (RSKERC) continued assistance at this site by providing review comments on a site-related document entitled "Expanded Landfarm - Conceptual Design, Libby Superfund Site, June, 1996." The study was designed to evaluate whether leachate could contaminate underlying soil. Results of the laboratory study contained in the report, previous results from the bioremediation performance evaluation study, and theoretical calculations based on equilibrium sorption kinetics indicated that the underlying soil would not be significantly affected by the leachate. An analysis of the potential impact of leachate on ground water was performed using site specific monitoring data, several simplifying assumptions, and a conceptual model.

(88-R08-002)

(S. Huling(RSKERL)405-436-8610)

Technical Assistance to Region IX: As part of a continuing technical assistance effort at the J.H. Baxter Superfund Site in Weed, CA, Steve Acree (RSKERC) provided RPM Kathy Setian with review comments of the "Final Ground-Water Remedial Design Drawings." The July 22, 1996, response stated that in general, the locations of proposed extraction wells appeared appropriate. It was noted, however, that the appropriate locations for the phase two wells may vary from the proposed locations depending on the results of the Phase I investigation. Other issues receiving comment included the need for additional monitoring to better define particular sections of the plume, and the design of well screens in terms of improving the quality of monitoring data.

(95-R09-005)

(S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region IX: On July 13, 1996, Dominic DiGiulio (RSKERC) provided RPM John Lucey with comments on proposed work at the Modesto Superfund Site in Modesto, CA. Concerns were expressed that the proposed work plan activities for Phase 3 would not be adequate in describing the vertical delineation of pneumatic and hydraulic characteristics or the distribution of contaminants. Detailed comments were offered in areas such as the proper length of well screens, the need for continuous split-spoon samples, the proper location of vapor probes, and hydraulic conductivity testing.

(95-R09-013)

(D. DiGiulio(RSKERC)405-436-8605)



HIGHLIGHTS

**National Risk Management Research Laboratory
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Status Report for the Week of August 12, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region V: The Amphenol Facility, in Franklin, IN, is performing a corrective action under a RCRA 3008(h) Consent Order and recently submitted a second draft of a Corrective Measures Report. The report defines three "operable areas." Area 3 delineates a contaminated off-site area apparently caused by a leaky sanitary sewer. On October 31, 1996, the Region requested an evaluation of the hydrological conditions and various technologies which have been proposed to remediate the area. On August 2, 1996, as part of a continuing technical assistance effort, Steven Acree (RSKERC) provided review comments on the "Report of Additional Corrective Measures Studies." Although the studies provided additional data regarding ground-water flow directions, water quality, and hydraulic parameters, significant uncertainty concerning contaminant distribution, transport, and fate still existed. A number of detailed comments were offered relative to hydraulic gradients, pump tests, ground-water quality, and potentiometric surface information.

(96RC05-001)

(S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region IX: The Sparks Solvent/Fuel Site is located in southern Sparks, NV, about one mile from the Truckee River. On August 1, 1996, as part of a continuing technical assistance effort at the site, Steven Acree (RSKERC), Dr. Daniel Pope (Dynamac), and Bradley Hill (CDSI), provided OSC Donn Zuroski with review comments concerning proposed contaminant migration studies at the site. Although it appeared that the proposed study was appropriate, some comments and recommendations were offered in areas such as ground-water discharges to a nearby lake, and the radius of influence of SVE wells.

(94-R09-001)

(S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region X: The Pacific Sound Resources Site is a 25-acre wood-treating facility located on the south shore of Elliott Bay in Seattle, WA. On July 31, 1996, in response to a June 28, 1996, request from Project Manager Sally Thomas, Randall Ross (RSKERC), and Drs. Bruce Pivetz and Birinder Shergill (ManTech) provided review comments on a treatability testing report for the site. It appeared that most of the major points of concern and suggested modifications identified in an earlier review of the proposed investigation were incorporated into the current report. It appeared that there were no substantial issues that needed to be addressed before accepting the revised report.

(94-R10-007)

(R. Ross(RSKERC)405-436-8611)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Haitjema, H.M. (Indiana Univ.). "On the Residence Time Distribution in Idealized Groundwatersheds." Journal of Hydrology, 172(1995), Elsevier Science B.V., Printed in the Netherlands.

(S. Kraemer(RSKERC)405-436-8549)

RESEARCH IN PROGRESS

Scientists from NRMRL-Ada, USGS, University of Oklahoma, and Oklahoma State University met at the continuing Education Center at the University of Oklahoma July 11-12, 1996, for the first annual Norman Landfill Research Investigation Meeting to present preliminary research results related to work at the Norman landfill site. This facility recently became a new USGS Toxics Hydrology Program site, and collaborative research is under way among these research institutions to study the natural migration of a leachate plume in an area affected by ground-water/surface-water interactions. The study of this landfill offers an opportunity to observe the interactions between the hydrologic and biogeochemical processes controlling contaminant distribution and migration. The results of this research will provide insight into the factors responsible for the observed variability in chemical concentrations and microbial responses in the leachate plume, and assist in the development of a conceptual model of the relations between biogeochemistry and geohydrology in determining contaminant migration in a complex alluvial ground-water system.

(R. Puls(RSKERC)405-436-8543)



HIGHLIGHTS

**National Risk Management Research Laboratory
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Status Report for the Week of August 19, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region I: On July 3, 1996, RPM Sheila Eckman requested a review of the Sampling and Analysis Plan for the Solvents Recovery Services of New England (SRSNE) Site in Southington, CT. The PRPs are conducting additional remedial investigation work focused on ground-water migration in bedrock and the delineation of the NAPL zone. Specifically, the request was for a review of the parameters proposed for the evaluation of natural and enhanced attenuation. On August 5, 1996, Don Draper (RSKERC) and Dr. Ann Azadpour (Dynamac) suggested that, even though the document failed to provide reasons for the selected parameters, the proposed list appeared reasonable as it contained the targeted contaminants, electron acceptors, daughter products, mineralization endpoints, and nutrients. It was pointed out that each of these classes of parameters is necessary when evaluating the aerobic or anaerobic processes which drive and limit biodegradation.

(96-R01-011)

(D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region VI: The Ross Incineration Services Site is located in Grafton, OH. On June 20, 1996, the Region requested assistance by providing review comments of the ground-water modeling section of the RCRA Facility Investigation Report. The objectives of the modeling were to simulate the migration of contaminants to the nearest off-site downgradient well and the nearest point of surface water discharge. On August 6, 1996, Don Draper (RSKERC) and Dr. Jin-Song Chen (Dynamac) provided review comments which focused on issues related to model conceptualization, selection of input parameters, modeling interpretation, and sensitivity analysis. It was recommended that, since the model study did not account for variabilities in the input data, and the uncertainty of the modeling results is not known, the model outputs be used cautiously in decision making until further justification of the selection of input parameters is provided.

(96RC05-002)

(D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region VIII: On July 30, 1996, Scott Huling (RSKERL) and Dr. Bruce Pivetz (ManTech) provided RPM Jim Harris with technical comments concerning the use of patented soil treatment amendments at the Montana Pole Treating Plant in Butte, MT. On August 14, 1996, additional comments were provided to the Region based on a review of supplementary documents related to a treatability study conducted at the site. The comments focused on elements of the design and operation of the investigations as well as the interpretation of its results.

(95-R08-001)

(S. Huling(RSKERC)405-436-8610)

RESEARCH IN PROGRESS

Two field sites have been selected for a mixed solvent/fuel co-metabolic bioventing study. Treatability studies using microcosms were carried out to provide information to design the field remediation systems. One treatment site consists of an enclosed cell which contains jet fuel and TCE. The performance of this system is being evaluated by monitoring changes in the concentrations of TCE vapor, fuel vapor, oxygen consumption, and carbon dioxide or methane generation. The second site is being monitored to evaluate the natural remediation of TCE contamination in the subsurface. The only addition at both sites is vented air. The two-year project is being carried out under the direction of Dr. Don Kampbell in cooperation with personnel from Tyndall AFB.

(D. Kampbell(RSKERC)405-436-8564)



HIGHLIGHTS

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Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of August 26, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region V: On August 15, 1996, in a continuing technical assistance effort, Steven Acree (RSKERC) provided RPM Edward Hanlon with comments concerning a DNAPL and ground-water recovery pilot test work plan for the Detrex Facility at the Fields Brook Superfund Site in Ashtabula County, OH. In general, the revised plan appeared to address most of the comments made in an earlier review. Several minor suggestions were made in areas including the installation of well screens, soil sampling and DNAPL evaluation, geologic logging, and the installation of neutron probe access tubes for monitoring changes in water content in the vadose zone. It was recommended that the pilot test proceed following the incorporation of these comments.

(96-R05-002)

(S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region VI: The Mobil Oil Corporation recently submitted a "Draft Description of Current Conditions Report" and a "Draft Facility Investigation Work Plan" for their refinery in Chalmette, LA. Within these documents, Mobil is proposing to utilize natural attenuation as a conditional remedy for the site. On July 23, 1996, the Region requested technical assistance in evaluating whether the PROPOSED procedures are adequate to determine if natural attenuation is a viable option at the facility. On August 19, 1996, Don Draper (RSKERC) and Dr. Daniel Pope (Dynamac) provided the Region with a detailed discussion of the items required to show that natural attenuation is a significant factor for remediation at the site.

(96RC06-001)

(D. Draper(RSKERC)405-436-8603)

TECHNOLOGY TRANSFER ACTIVITIES

A course on subsurface modeling was presented at the RSKERC during August 13-16, 1996. The course emphasized the application of subsurface models to site specific ground-water flow and transport problems drawn from Wellhead Protection, Superfund, and UST sites. During the course, in-depth presentations and hands-on training sessions were given on MODFLOW, the Wellhead Analytic Element Model (WhAEM), the Hydrocarbon Spill Screening Model (HSSM), and the Two Layer Model for free-product recovery (TWOLAY). The course was attended by 25 students from EPA, state government, academia, and private industry. The instructors were Dr. Jim Weaver, Dr. Steve Kraemer, Dr. Dave Burden, and Joe Williams (RSKERC), and Brad Hill (CDSI).

(J. Weaver(RSKERC)405-436-8545)

RESEARCH IN PROGRESS

Microcosms have been used to simulate the subsurface environment so that biological processes can be evaluated for either intrinsic or active bioremediation of contaminated sites. Although microcosms have often been used to predict rates of remediation, there are few data on whether these rates could have been affected by the specific method of microcosm preparation. Research is in progress at RSKERC to determine how two such parameters, initial concentration and solid/liquid ratio, can affect the rate of biodegradation of a model contaminant (toluene) under specific (denitrifying) conditions for two different aquifer materials. Results show that varying these parameters by two to three orders of magnitude resulted in a half-life variation of only a factor of two. This is not what one would expect, and may account for some of the observed overestimates of biological rates in the field, since investigators often use low solid/liquid ratios in microcosm studies and extrapolate the results to more realistic solid/liquid ratios for the aquifer. This research indicates that the approach may not be correct, possibly because the increase in active biomass is partially negated by increased mass transport limitations. A manuscript of this research has been prepared and submitted to the Journal of Industrial Microbiology.

(S. Hutchins(RSKERC)405-436-8563)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of September 2, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region V: On August 19, 1996, Steven Acree (RSKERC) provided RPM Bill Miller with technical comments on data from the "Corrective Measures Study Report" and the "Report of Additional Corrective Measures Studies" at the Amphenol Facility in Franklin, IN. The comments focused on the delineation of capture zones caused by pumping from wells located on the property. It was pointed out that sufficient hydraulic head data to evaluate a capture zone for a predetermined contaminant limit was not available. It was also noted that relatively few data, particularly current data, are available to define the extent of the area to be contained. Issues and recommendations for the resolution of these data deficiencies were discussed in detail.

(96RC05-001)

(S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region V: On July 15, 1996, RPM Thomas Alcamo requested review comments on a lagoon material leach testing program designed for the Allied Chemical Site in Ironton, OH. The response, dated August 26, 1996, was prepared by Joe Williams (RSKERC), and Drs. Ying Ouyang and Rashid Islam (CDSI). It was difficult to make an assessment of the validity of the results of the investigation without considering the procedures presented in the reviewed documents. The documents were prepared with the intention of presenting the results of a ground-water and lagoon-water quality analysis. The analysis should also have included an evaluation of the migration potential of contaminants to ground water. Concerns with issues such as dilution attenuation factors, or subsurface impacts on contaminant transport and fate were not addressed in the reviewed documents.

(96-R05-007)

(J. Williams(RSKERC)405-436-8608)

Technical Assistance to Region VI: On August 15, 1996, Steven Acree (RSKERC) provided RPM Philip Dellinger with comments concerning a "Technical Impracticability Waiver Request for the Vertac Site in Jacksonville, AR." In general, the document was found to be relatively weak in the discussion of site conditions that could render subsurface restoration technically impracticable in a reasonable time frame. However, the conclusions in the document regarding the low potential for restoration of those areas contaminated with DNAPLs were supported by site data and industry experience. Several specific suggestions for improving the technical analyses and quality of the document were provided.

(92-R06-003)

(S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region VIII: On July 31, 1996, RCRA Project Manager Corbin Darling requested technical assistance in evaluating the feasibility of the biotreatment of oily pond sediments at the Weld County Waste Disposal Site in Fort Lupton, CO. The draft "Pond C Bottoms Sludge Bioreclamation Workplan" was provided for review. On August 20, 1996, Don Draper (RSKERC) and Dr. Ann Azadapour (Dynamac) commented that, although the wastes at that site are generally amenable to bioremediation, there was considerable concern that the degree of treatment expressed in the work plan will far exceed that which will be realized at field scale. Detailed comments were given on data analysis, selected operating parameters, and monitoring. Some suggestions were offered with respect to pilot scale investigations and the possibility of developing a contingency plan.

(96RC08-004)

(D. Draper(RSKERC)405-436-8603)

TECHNOLOGY TRANSFER ACTIVITIES

During August 20-22, 1996, Dr. Stephen Kraemer (RSKERC) provided a training course on "Wellhead Protection: Delineation Modeling" to approximately 20 state and local government representative at the EPA Region VIII Office in Denver. Course instruction focused on the new EPA capture zone delineation software WhAEM. The course was coordinated by Regional employees Jennifer Harris and Mike Wireman. Similar courses have been presented at other Regional Offices over the past 15 months including Region III (John Graves), Region V (Bill Ryan), Region VI (Mike Bechdol), Region VII (Bob Dunlevy), and Region IX (Wendy Melgin).

(S. Kraemer(RSKERC)405-436-8549)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
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Status Report for the Week of September 9, 1996**

REGIONAL ASSISTANCE

Technical Assistance to NRMRL: On August 24, 1996, Joe Williams (RSKERC) provided Scott Minamyer (NRMRL) with comments on a strategic plan for managing ORD Internet activities. The review stated that the plan accurately represented the discussions and conclusions from a June 18-20, 1996, meeting of the Internet Team. Some points were suggested that needed to be addressed, and others were suggested which needed further clarification.

(Misc.)

(J. Williams(RSKERC)405-436-8608)

Technical Assistance to Region IV: On July 26, 1996, RPM Galo Jackson requested review comments on a document discussing an evaluation of the intrinsic bioremediation of ground water at the Sydney Mine NPL Site in Brandon, FL. The comments are to be used by the PRP's contractors in developing a work plan for the proposed study. On September 3, 1996, Steven Acree (RSKERC) and Dr. Daniel Pope (Dynamac) suggested that, in general, it appeared from the available contaminant data that significant degradation of the chlorinated solvents has already taken place, assuming that DCE and VC are products of degradation and not part of the original contaminant source. A number of specific comments and suggestions were offered along with a detailed treatise on natural attenuation.

(96-R04-003)

(S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region VIII: On July 18, 1996, the Region requested review comments on a report summarizing the operation of an air sparging/soil venting system at the Conoco Refinery in Denver, CO. The focus of the request was to determine whether any remediation value exists from the continued operation of the system. The August 27, 1996, response was prepared by Don Draper (RSKERC) and Dr. Vraradhan Ravi (Dynamac). The main concern regarded the oxygen utilization rate obtained from in-situ respirometer tests. It appeared that even though several wells were monitored for oxygen and carbon dioxide, only three produced data which were suitable for analysis. Another concern focused on the estimation of hydrocarbon removal rates due to volatilization and biodegradation.

(96RC08-002)

(D. Draper(RSKERC)405-436-8603)

TECHNOLOGY TRANSFER ACTIVITIES

On August 15, 1996, Dr. Robert Puls (RSKERC) made a presentation on low-flow sampling at the Region IX office. EPA personnel from RCRA, Superfund, and the Offices of Quality Assurance and Analytical Support were in attendance. Similar presentations have been made in Regions I, II, and VI to provide the transfer of technology on this method of ground-water sampling which provides more representative samples and generates less purged water requiring costly disposal at hazardous waste sites. The method was presented in a Superfund Issue Paper titled "Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures." (EPA 540/S-95/504).

(R. Puls(RSKERC)405-436-8543)

RESEARCH IN PROGRESS

An interagency agreement between EPA and DOE has been initiated to expand research into the application of permeable barriers for in-situ treatment of ground water contaminated by metals, radionuclides, and chlorinated organic compounds. Personnel from NRMRL (Ada and Cincinnati), Sandia National Laboratory, and Rocky Flats are involved in the project. Site characterization activities commence September 17, 1996, with a field pilot test scheduled in 1997 at Rocky Flats, CO.

(R. Puls(RSKERC)405-436-8543)



HIGHLIGHTS

**National Risk Management Research Laboratory
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Status Report for the Week of September 16, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region III: On September 4, 1996, Don Draper (RSKERC), and Drs. Ann Azadpour and Varadhan Ravi (Dynamac) provided RPM Melissa Whittington with a review of the natural attenuation and remedial design work plans for the Buckingham County Landfill Site in Virginia. A number of issues were discussed in detail including the estimated migration distance of the plume, the need for additional wells, the possible existence of NAPLs, and the potential for the biodegradation of chlorinated hydrocarbons.

(96-R03-007)

(D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region VIII: On September 4, 1996, Scott Huling (RSKERC) and Dr. Bruce Pivetz (ManTech) commented on the use of a patented soil treatment amendment at the Montana Pole Treating Plant in Butte, MT. Overall, insufficient information had been provided to evaluate whether the benefits of the soil amendment warrant the additional costs. Specifically, inadequate information was provided regarding controls used in this study, so that a direct comparison between the controls and the amended reactors could not be made.

(95-R08-001)

(S. Huling(RSKERC)405-436-8610)

Technical Assistance to Region VIII: On August 20, 1996, Don Draper (RSKERC) and Dr. Ann Azadpour (Dynamac) provided the Region with assistance in evaluating the feasibility of the biotreatment of oily pond sediments at the Weld County Waste Disposal Site in Lupton, CO. On September 9, 1996, follow-up comments were given to RCRA Project Manager Corbin Darling. The technical assistance consisted of addressing 12 specific questions which were prepared as a result of the original review comments. The questions spanned a variety of areas including treatability test results, the relative importance of operating parameters, monitoring locations, and the availability of equipment capable of tilling 20 inches of oily sludge. A list of relevant literature was suggested.

(96RC08-004)

(D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region IX: On September 3, 1996, as part of a continuing technical assistance effort, Steven Acree (RSKERC) and Bradley Hill (CDSI) provided OSC Donn Zuroski with review comments of "Technical Memoranda No. 6" which was developed for the Sparks Solvent/Fuel Site in Sparks, NV. In general, it was concluded that the use of regression analyses to predict contaminant concentrations in ground water at various water table elevations did not appear to be appropriate.

(94-R09-001)

(S. Acree(RSKERC)405-436-8609)

RESEARCH IN PROGRESS

A meeting of the Remediation Technology Development Forum (RTDF) was held at Hill AFB, UT, to select a demonstration site for a study on co-metabolic bioventing of mixed fuel/chlorinated solvents. Attendees were from Hill AFB, State of Utah, EPA Region VII, and the RTDF committee members including Greg Sayles (EPA-Cincinnati), Dave Ellis (Du Pont), Don Kampbell (RSKERC), Lori Moser (Zeneca), and Dick Woodworth (Tyndall AFB). The RTDF is a working group consortium from private industry and government agencies whose mission is to accelerate cost effective in-situ bioremediation processes for degrading chlorinated solvents in the subsurface. Hill AFB site OU-1, a former fire training location, was selected by the group and approved by Hill AFB personnel as the research field site.

(D. Kampbell(RSKERC)405-436-8564)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
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Status Report for the Week of September 23, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region IV: On September 18, 1996, Scott Huling (RSKERC) provided the Region with review comments of the draft work plan for bench-scale testing of the injection of hydrogen peroxide to oxidize chlorinated compounds at Myrtle Beach Air Force Base near Myrtle Beach, SC. Scientific comments were offered in a number of areas including sample receipt and storage, sample characterization, bench-scale peroxide treatment testing, and H₂O₂ analyses.

(96RC04-002)

(S. Huling(RSKERC)405-436-8610)

TECHNOLOGY TRANSFER ACTIVITIES

During September 11-13, 1996, a "Symposium on Natural Attenuation of Chlorinated Organics in Ground Water" was held in Dallas, TX. It was sponsored by EPA, the U.S. Air Force Armstrong Laboratory's Environics Directorate at Tyndall Air Force Base, FL, and the U.S. Air Force Center for Environmental Excellence at Brooks Air Force Base, TX. The symposium featured invited presentations covering both microcosm studies and field demonstrations conducted in support of natural attenuation at government and industry sites. Presentations covered the theory and principles of methods for assessing the potential for natural attenuation at contaminated sites and for confirming the efficacy of the process. Helpful and practical overviews of natural attenuation were presented along with the requirements needed for its documentation, and specific case studies. Feedback was also solicited from the regulatory and industrial communities on the appropriate application of these processes. Over 700 participants registered for the symposium. The proceedings will be published.

(J. Wilson(RSKERC)405-436-8534)

RESEARCH IN PROGRESS

An analytical method to measure methane and ethylene dissolved in ground water has been developed by Steve Vandegrift, Bryan Newell, and Jeff Hickerson (ManTech), and Dr. Don Kampbell (RSKERC) using a headspace equilibrium technique and gas chromatography. The data acquired from field sites are being used to demonstrate that the presence of methane and/or ethylene is a mode of assimilative capacity for natural attenuation. Ground-water samples collected at sites contaminated with fuels and chlorinated solvents are now being analyzed on a routine basis for these parameters.

(D. Kampbell(RSKERC)405-436-8564)

Several NRMRL-Ada researchers recently participated in a site characterization study at a railroad engine repair depot on Hill AFB in Utah. They are Dr. Don Kampbell and Mike Cook (RSKERC), and Bryan Newell (ManTech). Runoff from degreasing operations has contaminated underlying ground water with petroleum hydrocarbons and chlorinated solvents. The information obtained will be used to support the implementation of a natural remediation initiative for the organic contaminants dissolved in the ground water.

(D. Kampbell(RSKERC)405-436-8564)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
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Status Report for the Week of October 7, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region V: On September 25, 1996, Steven Acree (RSKERC) met with representatives from Region V and the PRPs and their contractor to discuss the performance of a ground-water capture system at the Granville Solvents Site in Granville, OH. The purpose of the system is to intercept contaminant migration from the site to the Village of Granville well field. Also discussed was the installation of a new production well for the Village, the results of a soil contaminant investigation, and proposed contaminant transport/fate modeling. In general, it appeared that the ground-water remediation system was performing as designed and that the modeling effort could provide a useful means of evaluating various remedial options and designs for addressing contaminated soil.

(94-R05-006)

(S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region VII: On August 7, 1996, RPM Pauletta R. France-Isetts requested technical assistance to evaluate the Performance Standard Verification Plan (PSVP) at the McGraw-Edison Site in Centerville, IA, in terms of its adequacy. The September 25, 1996, review comments, prepared by Don Draper (RSKERC) and Lowell Leach (Dynamac), pointed out that the PSVP proposes mechanisms to ensure both short-term and long-term performance of soil and ground-water remedial actions are met with soil vacuum extraction (SVE) and vacuum ground-water recovery (VGR) systems. In general, it appeared that the performance verification plan will be functional and that the data generated will be of sufficient quality to provide a proper assessment of the remedial systems selected for this site. It was further noted, however, that the actual capability of SVE and VGR to attain the remedial goals may be extremely difficult to achieve because of the low permeability of the interbedded clays, silts and fine sands, and the lateral heterogeneity of the sediments in both the vadose and saturated zones.

(96-R07-002)

(D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region VII: On August 7, 1996, the Region requested review comments for portions of the RCRA Corrective Action and the Corrective Measure Study Report at the 3M Company in Columbia, MO. It was requested that the reviews focus on those sections of the reports dealing with phytoremediation and enhanced passive bioremediation. On October 2, 1996, Scott Huling (RSKERC) and Dr. Bruce Pivetz (ManTech) pointed out that intrinsic bioremediation of chlorinated solvents is an emerging technology which requires a greater level of research, planning, and site characterization. One of the problems discussed was the possible formation of vinyl chloride. Questions related to phytoremediation included the release of contaminants to the environment by trees, production of more hazardous metabolites, and performance evaluation of the phytoremediation system.

(96RC07-001)

(S. Huling(RSKERC)405-436-8610)

Technical Assistance to the Office of Radiation and Indoor Air: During September 22-26, 1996, Joe Williams (RSKERC) met with the ORIA to discuss an in-house research project on infiltration estimation methods and modeling review and modeling applications at the Yucca Mountain Site. A meeting was also held with GeoTrans personnel and Dr. David Burden (RSKERC) for training on the utilization of the MapInfo/Site GIS package, and on the Intrinsic Remediation evaluation package which is being developed.

(Misc.) (J. Williams(RSKERC)405-436-8608)

TECHNOLOGY TRANSFER ACTIVITIES

A training course entitled "Ground-Water Investigations" was held in Oklahoma City, OK, September 10-12, 1996. Twenty one students from the Oklahoma Department of Environmental Quality (DEQ) participated in the 2 1/2 day course. Subjects covered included vadose zone monitoring, fundamentals of ground-water hydrology, transport and fate of contaminants, ground-water quality, ground-water investigations, and ground-water remediation. Dr. Mary Randolph (RSKERC) served as course moderator and the instructors were Lowell Leach, Dr. Wayne Pettyjohn and Dr. Daniel Pope (Dynamac), and Dr. Ron Sims (Utah St. Univ.).

(M. Randolph(RSKERC)405-436-8616)



HIGHLIGHTS

**National Risk Management Research Laboratory
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Status Report for the Week of October 14, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region I: Subsurface contaminant transport modeling at the Pine Street Canal Superfund Site in Burlington, VT, suggested that the potential for significant migration of NAPLs was very low. In the October 7, 1996, review comments of these modeling activities, Steven Acree (RSKERC) agreed with the contaminant transport conclusion based on hydraulic conditions of the site. There were, however, several issues associated with the modeling effort where significant uncertainty exists because of subsurface heterogeneity and a lack of detailed studies to define subsurface processes and their rates. Comments regarding these areas of uncertainty as well as other concerns were discussed in detail.

(94-R01-001)

(S. Acree(RSKERL)405-436-8609)

Technical Assistance to Region I: On August 23, 1996, RPM Cheryl Sprague requested a review of the bioremediation demonstration proposal and work plan for the Dover Municipal Landfill located in Dover, NH. The October 7, 1996, response, prepared by Don Draper and Dr. Guy Sewell (RSKERC) and Dr. Daniel Pope (Dynamac), discussed in some detail the processes which govern bioremediation, including the distribution of contaminants in the subsurface, the need for a three-dimensional conceptual model of the site, the location of monitoring points, sample variability, and those parameters which should be collected in order to evaluate the success of bioremediation.

(96-R01-012)

(D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region II: On October 7, 1996, Joe Williams (RSKERC) and Drs. Ying Ouyang and Rashid Islam (ManTech) provided RPM Courtney McEnery with a technical review of the remedial design for the Rockaway Borough Well Field Site in Morris County, NJ. Emphasis of the review was on the hydrogeologic modeling and the response to previous comments. In general, the hydrogeologic modeling was found to be comprehensive and well documented. The conceptual model was properly described and the grid location, and initial and boundary conditions were carefully selected. In addition, most of the earlier comments had been addressed. There was some confusion about the location of one of the extraction wells in the various scenarios which were presented.

(96-R02-004)

(J. Williams(RSKERC)405-436-8608)

Technical Assistance to Region IX: On October 2, 1996, Steven Acree (RSKERC) met with representatives of the Region and their contractors, and the PRP and their contractors to discuss simulations of contaminant transport at the Montrose and Del Amo Superfund Sites in Los Angeles, CA. It appeared that the proposed modeling efforts will provide a useful means of evaluating various remedial options and designs.

(94-R09-006)(95-R09-015)

(S. Acree(RSKERC)405-436-8609)

RESEARCH IN PROGRESS

A microbial culture capable of rapidly dechlorinating tetrachloroethene (PCE) to ethene with efficient use of electron donors has been isolated at Cornell University. Dr. Guy Sewell (RSKERC) is working with a consortia of scientists at the Naval Air Station near Fallon, NV, in an effort to utilize indigenous bacteria and the addition of various electron donors to stimulate the degradation of PCE to ethene. Dechlorination will also be investigated through natural attenuation and the use of iron electrodes. The project is designed to achieve a rigorous mass balance on the electron donors, electron acceptors, and microbial carbon/energy sources.

(G. Sewell(RSKERC)405-436-8566)



HIGHLIGHTS

**National Risk Management Research Laboratory
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Status Report for the Week of October 21, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region II: On September 4, 1996, Hydrogeologist Ruth Izraeli requested review comments of the ground-water flow and transport modeling reports for the Vega Alta public water supply wells in Vega Alta, Puerto Rico. The purpose of the request was to verify that the PRP's revised pumping scheme was technically sound. In a response dated October 11, 1996, Joe Williams (RSKERC) and Dr. Rashid Islam and Brad Hill (ManTech) discussed three general areas relating to the presentation of the modeling effort that might be helpful in evaluating the success of the solute transport simulations. It was suggested that the use of the term "validation" provided a false sense of truth and accuracy since ground-water models cannot be validated in an absolute sense. It was also pointed out that presenting model simulation data to 5 significant digits implies that the model is more accurate than the initial measured contaminant concentrations. Suggestions were made concerning the use of different types of diagrams to assist in the evaluation of model simulations.

(96-R02-007)

(J. Williams(RSKERC)405-436-8608)

Technical Assistance to Region IV: On September 26, 1996, RPM Brad Jackson requested technical assistance in investigating the presence of DNAPLs at the Florida Petroleum Reprocessor Site in Davie, FL. On October 10, 1996, Don Draper (RSKERC) and Lowell Leach (Dynamac) provided review comments on the field operations plan for the remedial investigation. The review comments focused on discretionary procedures for investigating the location and characterization of DNAPLs in the unique geological setting at the site. Some of the problems associated with DNAPL investigations are the depth of unconsolidated aquifer material, lenses of solution limestone, and the lack of confining beds which could trap DNAPL. It was pointed out that an important consideration in conducting investigations at DNAPL sites is the risk of expanding the zone of contamination by creating pathways for migration as a result of drilling.

(96-R04-004)

(D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region V: On October 9, 1996, in response to a request for continuing assistance dated September 12, 1996, Steven Acree (RSKERC) provided RPM Diane Spencer with comments on three documents prepared for the Granville Solvents Site in Granville, OH. The reviewed documents were concerned with monitoring well installation, soil data, and a description of contaminant fate and transport modeling in the subsurface. It appeared that the plume capture system encompassed ground water within the known extent of contamination by chlorinated solvents. The soil data report presented very little interpretation of the physical and chemical data obtained during a recent investigation, but this information would be discussed as part of a proposed contaminant fate and transport modeling study. The description of the proposed contaminant transport and fate modeling effort was not sufficiently detailed at this time to allow for an adequate review.

(94-R05-010)

(S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region IX: On October 8, 1996, Steven Acree (RSKERC) provided RPM Kathy Setian with continuing technical assistance at the J.H. Baxter Superfund Site in Weed, CA. The comments focused on the response to an earlier review of the final draft ground-water remedial design. In general, the responses addressed some of the concerns and uncertainties regarding the design and operation of the ground-water remediation system. Detailed comments and recommendations were provided, particularly with regard to the construction of the proposed slurry wall.

(95-R09-005)

(S. Acree(RSKERC)405-436-8609)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Committee on Fracture Characterization and Fluid Flow, Jane C.S. Long, Committee Chair "Rock Fractures and Fluid Flow: Contemporary Understanding and Applications." National Research Council. National Academy Press. 1996.

(S. Schmelling(RSKERC)405-436-8540)



HIGHLIGHTS

**National Risk Management Research Laboratory
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Status Report for the Week of October 28, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region IV: On October 11, 1996, as part of a continuing technical assistance effort, Steven Acree (RSKERC) provided RPM Galo Jackson with comments on the U.S. Navy and U.S. Air Force Position Paper for the Petroleum Products Corporation Superfund Site in Broward County, FL. The document described potential data gaps regarding contaminant transfer and fate characterization and developed a case for evaluating the use of naturally occurring attenuation processes as the selected remedy for Operable Unit No. 2. In general, several of the expressed concerns were potentially valid. The contaminants of concern are potentially attenuated by natural processes within relatively short distances downgradient from the sources. It was pointed out, however, that data were not available to independently evaluate the individual hypothesis and claims proposed in the document. Detailed discussions and specific comments regarding these and other issues and concerns were provided.
(95-R04-001) (S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region VI: On October 16, 1996, Scott Huling (RSKERC), and Dr. Birinder Shergill and Bruce Pivetz (ManTech) provided RPM Glen Celerier with review comments of the Technical Approach to Groundwater Assessment at the South Cavalcade Street Superfund Site in Houston, TX. The work plan was found to be satisfactory, and the use of the Ogata-Banks equation was appropriate for the contaminant transport purposes described in the document. It was also found that suggestions made during a previous review of the ground-water exposure plan had been incorporated into the proposal. There were several specific concerns that were discussed in detail including source concentrations, model simulations and their comparison to health-protective criteria, and the evaluation of reasonable potential exposure points.
(95-R06-005) (S. Huling(RSKERC)405-436-8610)

Technical Assistance to Region IX: In a continuing technical assistance effort, Scott Huling (RSKERC) provided RPM Rachel Simmons with review comments on a position paper addressing the problems associated with a proposed air/ozone sparging system at the Marine Corps Air Station in Yuma, AZ. The October 16, 1996, comments recommended that this technology should not be implemented prior to a more complete evaluation of its feasibility. Based on the limitations identified in the position paper and those discussed in the review comments, it appeared doubtful that significant injection and circulation of air/ozone could be achieved.
(96-R09-001) (S. Huling(RSKERC)405-436-8610)

Technical Assistance to Region IX: On October 15, 1996, Steven Acree (RSKERC), and Dr. Ann Azadpour and Jack Keeley (Dynamac) provided Hydrogeologist Chris Prokop with comments of the Corrective Action Plan for the Phoenix Goodyear Airport in Phoenix, AZ. The RCRA site is composed of four acres of soil and ground water contaminated by the release of aviation fuel surrounded by 500 acres of soil and ground water contaminated with chlorinated organic compounds. The review discussed pump-and-treat, dewatering with soil vapor extraction, and air sparging technologies while focusing on intrinsic remediation which was the proposed remediation choice. It suggested that intrinsic remediation may be a sensible approach, given the nature of the contaminants and that the small plume is dwarfed by the 500-acre VOC plume. Issues such as monitoring parameters, source terms, and potential migration distances were discussed in detail.
(96RC09-001) (S. Acree(RSKERC)405-436-8609)

TECHNOLOGY TRANSFER ACTIVITIES:

On October 16, 1996, Joe Williams (RSKERC) provided the Region with a draft copy of the VLEACHSM user's manual and a diskette containing the Beta version of the code. The model was developed by Dr. Sam Lee (Dynamac) based on combining the VLEACH model and the Summers mixing model approach. The Region agreed to review the code which will eventually be made available through the RSKERC Center for Subsurface Modeling Support (CSMoS). When the Region's suggested modifications have been addressed, an external peer review of the model and user's manual will be undertaken.
(J. Williams(RSKERC)405-436-8608)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Sims, Ronald C., Judith L. Sims, Darwin L. Sorensen, and Joan E. McLean (Utah St. Univ.). "Champion International Superfund Site, Libby, Montana: Bioremediation Field Performance Evaluation of the Prepared Bed Land Treatment System, Volumes I and II." EPA/600/R-95/156. August 1996.

(Technical Manager, S. Huling(RSKERC)405-436-8610)
(Project Officer, D. Burden(RSKERC)405-436-8606)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of November 4, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region I: In response to a September 18, 1996, request from RPM Sheila Eckman, Don Draper (RSKERC) and Dr. Ann Azadpour (Dynamac) provided the Region with comments on the Sampling and Analysis Plan for the Solvents Recovery Services of New England (SRSNE) Site in Southington, CT. The October 21, 1996, review focused on the proposed data quality objectives. In general, the practical quantitation limits were found to be within EPA's guidelines and the quality assurance project plan provided adequate measures for data quality and the criteria for determining data acceptability. However, in practice, the criteria for acceptability should be based on the intended use of data to assure that it is good enough to support the project's conclusions. A number of points were discussed in detail including the format of the document, statistical validation of data, field sampling, the level of tolerance in aqueous and solid samples, sampling parameters, the determination of water levels, monitoring for the presence of nonaqueous phase liquids, and hydraulic conductivity testing.

(96-R01-011)

(D. Draper(RSKERC)405-436-8603)

Technical Assistance to the Office of Radiation and Indoor Air: On October 16, 1996, Joe Williams (RSKERC) and Drs. Jin-Song Chen and Sam Lee (Dynamac) provided Ron Wilhelm (ORIA/RTTC) with review comments on a recent report by the Pacific Northwest National Laboratory concerning geochemical processes affecting the sorption of selected contaminants on subsurface materials. The document was found to be quite thorough and provided a valuable overview of this scientific area; however, a number of specific recommendations were suggested.

(Misc.)

(J. Williams(RSKERC)405-436-8608)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Wiedemeier, Todd H., Matthew A. Swanson, and R. Todd Herrington (Parsons Engineering Science, Inc.), Dr. John T. Wilson and Dr. Donald H. Kampbell (RSKERC), and Lt. Col. Ross N. Miller and Jerry E. Hanson (Brooks AFB). "Approximation of Biodegradation Rate Constants for Monoaromatic Hydrocarbons (BTEX) in Ground Water." Ground Water Monitoring and Remediation. Summer, 1996.

(D. Kampbell(RSKERC)405-436-8564)

Paul K.M. van der Heijde (Colorado School of Mines). "Compilation of Saturated and Unsaturated Zone Modeling Software." EPA/800/SR-96/009. 1996.

(J. Williams(RSKERC)405-436-8608)

FY 1996 RSKERC TSC ACTIVITIES

During FY 1996, the RSKERC Technology Support Center (TSC) provided 141 responses to technical assistance requests at 82 CERCLA sites and 22 responses at 13 RCRA sites. These activities included the addition of 56 CERCLA facilities to the TSC tracking system, of which 28 were new sites. There were 11 RCRA facilities entered into the system including 10 new sites. Fifteen miscellaneous technical assistance activities were provided to Headquarters, Regions, states, and other countries in areas such as ground-water modeling, remediation technologies, Class I Injection Wells, capture zone delineation, and ground-water sampling. Eight technology transfer activities were provided during the year in areas including NPLs, ground-water investigations, subsurface modeling, wellhead protection, low-flow sampling, and natural attenuation. In addition to participating in site specific technical assistance requests, the RSKERC Center for Subsurface Modeling Support (CSMoS) provided 31 major modeling reviews and 6,688 copies of model software, and the Subsurface Remediation Information Center (SRIC) provided 4,559 RSKERC publications to all levels of government, private consultants, industry, educational institutions, and a variety of entities in foreign countries.

(J. Jones(RSKERC)405-436-8593)



H I G H L I G H T S

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of November 11, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region IX: On October 28, 1996, in a continuing technical assistance effort at the J.H. Baxter Superfund Site in Weed, CA, Steven Acree (RSKERC) provided RPM Kathy Setian with review comments of the "Focussed Feasibility Study - Section 5." In general, the document provided a reasonable analysis of potential risks and alternative remedial strategies for that portion of the site where restoration to ROD standards is considered to be technically impracticable. Some suggestions were offered for consideration, including the removal of near-surface hot spots, the validity of those contaminant concentrations used in principal threat assessment, and landfarming practices.

(95-R09-005)

(S. Acree(RSKERC)405-436-8609)

Technical Assistance to the Office of Radiation and Indoor Air: On October 24, 1996, Joe Williams (RSKERC), and Drs. Jin-Song Chen and Varadhan Ravi (Dynamac) provided Ron Wilhelm (ORIA) with review comments of a report entitled "Application of Chemical Reaction Codes, Subtask 3," prepared by the Pacific Northwest National Laboratory. The report provided a brief overview of the MINTEQA2 chemical reaction code and a useful discussion of its database for code users as well as those utilizing the report to evaluate other reaction codes. As with previous documents reviewed by RSKERC, the objectives of the work were not stated in the report. These objectives should emphasize that chemical reaction codes cannot be used to estimate K_d , but are designed to assist in addressing the quality assurance and the technical defense of issues related to the estimation of K_d .

(Misc.)

(J. Williams(RSKERC)405-436-8608)

Technical Assistance to Region IX: On May 13, 1996, the Technology Support Center (TSC), through the Center for Subsurface Modeling Support (CSMoS), provided review comments of the ground-water modeling aspects of the Aquifer Protection Permit application for BHP Copper's Florence In-Situ Copper Project in Florence, AZ. The TSC received BHP Copper's response to those comments October 7, 1996. On October 23, 1996, Joe Williams (RSKERC), and Bradley Hill and Dr. Ying Ouyang (ManTech) provided the Region with an assessment of that response. The contractor for the BHP Copper's project essentially addressed the four primary areas of concern expressed in the CSMoS review; however, it was suggested that some clarification should be included in the final report. In general, the modeling exercise should provide a significant resource in determining whether hydraulic control could be established at the site to prevent acid from migrating off site or from the region of hydraulic control.

(Misc.)

(J. Williams(RSKERC)405-436-8608)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Hai Shen (RSKERC/NRC), P. Hap Pritchard (EPA Gulf Breeze, FL), Guy W. Sewell (RSKERC). "Kinetics of Chromate Reduction During Naphthalene Degradation in a Mixed Culture." *Biotechnology and Bioengineering*, Vol. 52. John Wiley & Sons, Inc. 1996.

(G. Sewell(RSKERC)405-436-8566)

INTERNATIONAL ACTIVITIES

Dr. Robert Puls (RSKERC) traveled to Israel October 5-12, 1996, to continue collaborative research on innovative ground-water sampling and site characterization techniques. This research was initiated in 1995 on an informal basis between RSKERC and Weizmann Institute research personnel in Rehovot, Israel. Discussions were also held with personnel in the Israeli Water Commission in Jerusalem on the topics of ground-water sampling and remediation research. A visit was made to the National Hazardous Waste Site of Israel near Ramat Hovav to observe and discuss ongoing site characterization research by researchers from the Hebrew University and Ben Gurion University. Informal meetings were also held with personnel from Margan Ltd. on the status of current ground-water sampling and site characterization tool development activities.

(R. Puls(RSKERC)405-436-8543)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of November 18, 1996**

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Leij, Feike J., William J. Alves, and Martinus van Genuchten (USDA). "The UNSODA Unsaturated Hydraulic Database, User's Manual Version 1.0." EPA/600/R-96/095.

(J. Williams(RSKERC)405-436-8608)

Kampbell, Don H. (RSKERC), T.H. Wiedemeier (Parsons Engineering), and J.E. Hansen (U.S. Air Force). "Intrinsic Bioremediation of Fuel Contamination in Ground Water at a Field Site." Journal of Hazardous Materials. 49(1996).

(D. Kampbell(RSKERC)405-436-8564)

TECHNOLOGY TRANSFER ACTIVITIES

The appropriate use of *natural attenuation* has allowed the U.S. Air Force and U.S. Coast Guard to meet their goals for risk management at many of their hazardous waste sites and to develop programs for the use of this remediation alternative. These programs build on research carried out over the past 15 years at the Robert S. Kerr Environmental Research Center by Dr. John Wilson, Dr. Don Kampbell, and Barbara Wilson (RSKERC). RSKERC is currently working with the Air Force and Coast Guard to develop detailed protocols for the evaluation of *natural attenuation*. Due to a reduction in the United States military presence in Europe, many U.S. military facilities are being returned to the countries in which they are located. The Germans are unfamiliar with recent developments in *natural attenuation* in the United States, and as a result, are requiring site remediation approaches that are more costly and less effective than some current practices in America. At the invitation of the U.S. Air Force, Dr. John Wilson participated in the "General Environmental Technology Data Exchange Meeting" between the U.S. Department of Defense and the German Federal Office for Defense Technology & Procurement during October 8-10, 1996, in Koblenz, Germany. Dr. Wilson made a presentation on the appropriate use of *natural attenuation* to control the risk associated with fuel spills and hazardous industrial chemicals in ground water. Along with other participants in the meeting, he visited and reviewed progress on a joint German/American field demonstration of in-situ bioremediation at Rhine-Main AFB near Frankfurt. He discussed future strategy with staff of the Battelle Memorial Institute who will carry out a demonstration of *natural attenuation* at a fuel spill at Rhine-Main AFB. Following the site visits Dr. Wilson met with several key German scientists who will develop or approve German policy for *natural attenuation*. He also made a series of recommendations to the Air Force to facilitate their negotiations with the Germans. EPA/ORD has developed a training course on *natural attenuation* for EPA Region and state regulators. Dr. Wilson recommended that the Air Force have the training material translated into German.

(J. Wilson(RSKERC)405-436-8534)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of December 9, 1996**

Regional Assistance

Technical Assistance to Region II: Joe Williams (RSKERC), and Brad Hill, Drs. Ying Ouyang and Rashid Islam (METI) provided RPM Eduardo Ganzales with a technical review of the Revised Focused Feasibility Study for the Colesville Landfill Superfund Site in Colesville, NY. The review comments were dated November 27, 1996. In general, the report was found to be well written and of good quality. The conceptual model, in terms of the boundary conditions and initial conditions for ground-water flow modeling, was clearly presented. Calibration criteria were identified and achieved within reasonable limits and sensitivity analyses were conducted. It was pointed out that this modeling effort was a substantial improvement over previous efforts which had been reviewed by the RSKERC TSC.

(96-R02-002)

(J. Williams(RSKERC)405-436-8608)

Technical Assistance to Region II: In a continuing technical assistance effort at the EWAN Properties Superfund Site in Shamong, NJ, Joe Williams (RSKERC) provided RPM Stephen Cipot with review comments concerning ongoing unsaturated zone modeling. The December 2, 1996, comments focused on the applicability of the VLEACHSM model for simulating contaminant fate and transport, and the estimation of cleanup levels for various site-related contaminants. It was pointed out that the VLEACHSM model is currently undergoing peer review for eventual publication as an EPA model and report. It is considerably more adept to the problems described for the EWAN site than its predecessor, VLEACH, which did not consider first-order degradation. The VLEACHSM model will be made available through the Agency's Center for Subsurface Modeling Support (CSMoS) at RSKERC. Some site-specific concerns of the model's application were provided.

(97-R02-001)

(J. Williams(RSKERC)405-436-8608)

Technical Assistance to Region V: On November 4, 1996, RPM Tim Prendiville requested a technical review of "Stable Isotope Investigations of Multiple Carbon Components at a Landfill Site and Their Biochemical Implications." The PRPs are interested in the possible use of the methods described in the paper to differentiate their plume from those emanating from adjacent industrial properties. In a response dated December 2, 1996, Don Draper (RSKERC) and Dr. Jin-Song Chen (Dynamac) stated that the report presented sound work on a modified technique for selecting suitable sampling and dissolved inorganic carbon extraction techniques to overcome problems associated with more traditional methods. It was suggested, however, that without supporting geochemical and hydrogeologic data, some concerns exist about the use of this methodology alone in plume identification.

(97-R05-001)

(D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region IX: On November 25, 1996, Dominic DiGiulio (RSKERC) provided RPM Rachel Simmons with a series of comments and recommendations on air sparging for use at the Marine Corps Air Station in Yuma, AZ. It was pointed out that the document would continue to be augmented and modified in the future. The results of an air sparging study by Mr. DiGiulio at Pauls Valley, OK, were also provided.

(96-R09-001)

(D. DiGiulio(RSKERC)405-436-8605)

STAFF ACHIEVEMENTS

Scott Huling (RSKERC) recently completed the requirements for the Doctor of Philosophy Degree in Environmental Engineering at the University of Arizona. Working under the direction of Dr. Robert G. Arnold in the Department of Chemical and Environmental Engineering, Dr. Huling conducted research leading to a dissertation titled, "Microbial and Peat Effects on the Oxidation of -(4-pyridyl-1-oxide)-N-tert-butyl-nitron by Hydroxyl Radicals in Soil." The results of this research contribute to the available arsenal of cost-effective remedial alternatives at sites where the soil and ground water are contaminated with organic compounds.

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Sabatini, David A., Robert C. Knox, and Jeffrey H. Harwell (Univ. of Okla.). "Surfactant-Enhanced DNAPL Remediation: Surfactant Selection, Hydraulic Efficiency, and Economic Factors." EPA Environmental Research Brief. EPA/600/S-96/002. August 1996.

(C. West(RSKERC)405-436-8551)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of December 16, 1996**

REGIONAL ASSISTANCE

Technical Assistance to Region III: In response to an October 15, 1996, request from RPM Melissa Whittington, Dr. Mary Randolph (RSKERC) and Dr. Ann Azadpour (Dynamac) provided the Region with review comments on a proposed treatability study work plan for the Standard Chlorine of Delaware Site in Delaware City, DE. The December 3, 1996, transmittal stated that, in general, it appeared that the technical approach for the remedial design of the Treatability Study Work Plan was reasonable. Concerns were expressed about the number of ambiguities in the text, the manner in which clean-up criteria were established, experimental design, the required number of field samples and their collection procedure, and the sampling and analysis program.

(96-R03-008)

(M. Randolph(RSKERC)405-436-8616)

Technical Assistance to Region VII: On October 28, 1996, RPM Victor Lyke requested review comments of a draft Feasibility Survey at the Ogallala Ground-Water Contamination Site in Ogallala, NE. The response, dated December 4, 1996, was prepared by Don Draper (RSKERC), and Lowell Leach, Dr. Jin-Song Chen, and Jack Keeley (Dynamac). The document was appropriately developed using EPA CERCLA documents for guidance. Concerns were expressed about the conclusions reached through modeling exercises, possible artifacts in field data, and the basic conditions required to confirm that processes of natural attenuation were taking place.

(97-R07-001)

(D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region VII: On December 2, 1996, Joe Williams (RSKERC) provided the Nebraska Department of Environmental Quality with an outline of the fundamental steps required in conducting and documenting subsurface modeling applications. The information was provided to guide in the development of a ground-water modeling work plan at the Hastings Ground-Water Contamination Site in Hastings, NE. The fundamental components of ground-water modeling were discussed including the conceptual model, required information base, definition of data gaps, code selection, model construction, model calibration, and sensitivity and uncertainty analyses. Documents relating to model applications from the RSKERC Center for Subsurface Modeling Support (CSMoS) were also provided.

(97-R07-002)

(J. Williams(RSKERC)405-436-8608)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Wiesner, M.R. and M.C. Grant (Rice Univ.), and S.R. Hutchins (RSKERC). "Reduced Permeability in Groundwater Remediation Systems: Role of Mobilized Colloids and Injected Chemicals." Environ. Sci. Technol. Vol. 30. 1996.

(S. Hutchins(RSKERC)405-436-8563)

The following were published in the Proceedings of the ASCE Conference on NAPLs in Subsurface Environments: Assessment and Remediation. Nov. 1996. Washington DC.

Weaver, James W. (RSKERC). "Application of the Hydrocarbon Spill Screening Model to Field Sites."

Weaver, James W. (RSKERC), Joseph E. Haas (St. of NY), and John T. Wilson (RSKERC). "Analysis of the Gasoline Spill at East Patchogue, New York."

Cho, Jong Soo (RSKERC). "Air Sparging Experiments on a Two Dimensional Sand Box with DNAPLs: Multiphase Investigation with Electrical Impedance Tomography."



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of March 3, 1997**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: In response to a request for technical assistance from RPM Deborah Goldman, Don Draper (RSKERC) and Dr. Ann Azadpour (Dynamac) provided the Region with review comments of the "Enhanced Pilot Study Workplan" for the ITT Night Vision Site in Roanoke, VA. The February 18, 1997, review was confined to the feasibility of the study, QA/QC protocols, appropriateness of the parameters being evaluated, and the time frames for the study. It was the reviewers' opinion that there was not enough evidence to make an informed judgment on the significance of enhanced biodegradation of chlorinated solvents at the site. Although a fair amount of data had been collected, its value was questioned because the sampling events were sporadic and inconsistent.

(97RC03-001)

(D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region V: Dr. David Burden (RSKERC) and Dr. Ying Ouyang (ManTech) provided RPM Beth Reiner with review comments of the "Draft Engineering Evaluation/Cost Analysis Support Sampling Plan" for the Lead Battery Recycler Site in Toledo, OH. The technical assistance was provided by the Center for Subsurface Modeling Support (CSMoS) at RSKERC. The review, dated February 19, 1997, stated that in general, the document was well written, however, some concerns were expressed relating to sampling locations and the lack of lead partitioning coefficient measurements. Also discussed in the review were the data assessment procedures which appeared to be in order.

(97-R05-003)

(D. Burden(RSKERC)405-436-8606)

Technical Assistance to Region IX: On February 19, 1997, Steven Acree (RSKERC), and Jack Keeley and Lowell Leach (Dynamac) provided the Region with review comments of those portions of the "Remedial Investigation Report" concerning discussions, supporting data, and conclusions regarding the potential for the biotransformation of benzene in ground water at the Del Amo Superfund Site in Torrance, CA. In general, the document provided a good review of the processes involved in contaminant mobility and fate. Lines of specific evidence of intrinsic bioremediation presented in the document were contaminant mass reduction at field scale, laboratory studies, and geochemical data. These lines of evidence indicated that the advective transport of benzene is balanced by natural attenuation resulting in contaminant loss downgradient from the source. It was pointed out that continued monitoring would be required to determine the effectiveness of these processes in controlling plume migration.

(94-R09-006)

(S. Acree(RSKERC)405-436-8609)

TECHNOLOGY TRANSFER ACTIVITIES

On February 7, 1997, at the request of Hydrogeologist Eric Trinkle, Dr. John Wilson (RSKERC) made two presentations to twelve environmental professionals at the State of Delaware Department of Natural Resources and Environmental Control in Dover, DE. The presentations focused on the natural attenuation of chlorinated solvents and ground-water contaminant plume development.

(J. Wilson(RSKERC)405-436-8534)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of March 10, 1997**

TECHNICAL ASSISTANCE

Technical Assistance to Region VI: On February 28, 1997, Don Draper (RSKERC), and Brad Hill and Dr. Rashid Islam (ManTech) provided RPM Chris Villarreal with review comments on the "Soil Criteria Assessment Report" for the Petro-Chemical Systems (Turtle Bayou) Superfund Site in Liberty, TX. The use of a one-dimensional vertical transport model (SESOIL) for the unsaturated zone suggested that soil cleanup criteria for benzene could be raised significantly above the values in the ROD without significantly impacting the quality of ground water beneath the site. The review comments stated that to justify this increase, the modeling effort and report needed to be well documented and justified. However, the report was found to be brief and often difficult to follow. For example, several of the mathematical relationships are presented without any derivations or references to the equations for the mixing of chemicals in ground water and the infiltration rate through a clay layer. It was suggested that one section be completely re-written to better clarify the equations used and a step-by-step calculation presented on how the proposed soil cleanup criteria were estimated.

(97-R06-001)

(D. Draper(RSKERC)405-436-8603)

INTERNATIONAL ACTIVITIES

A return field research site visit to the Diego Garcia Air Force Base was made by Dr. Don Kampbell (RSKERC) and Jerry Hansen (Brooks AFB) during January 18-28, 1997. Seven additional bioslurper wells were installed in the area where a 1991 pipeline fracture occurred. About 5,000 gallons of jet fuel product were removed from the subsurface during the first two weeks of operating the new wells. Ground water was sampled and analyzed for natural attenuation parameters. High bioremediation activity was detected as indicated by considerable concentrations of volatile fatty acids as indices of microbial respiration processes. The Project Manager is Mano Husain of HQ Pacific Air Force at Hickam AFB, HI.

(D. Kampbell(RSKERC)405-436-8564)

TECHNOLOGY TRANSFER ACTIVITIES

During February 19-20, 1997, Dr. John Wilson (RSKERC) participated in the "USEPA Region 4 Natural Attenuation of Chlorinated Solvents Conference" in Atlanta, GA. Dr. Wilson's presentation centered on the state of the science of natural attenuation. Other discussions included redox geochemistry, ground-water modeling, and a number of case studies. The conference was attended by approximately 200 scientists and engineers.

(J. Wilson(RSKERC)405-436-8534)

RESEARCH IN PROGRESS

A Remediation Technologies Development Forum (RTDF) project update meeting in Dover, DE, during February 5-7, 1997, was attended by Drs. Don Kampbell and John Wilson (RSKERC). RTDF is a program for public/private partnerships to conduct laboratory and field research on innovative remediation technologies. Consortium members presented information on three on-going RTDF projects at Dover Air Force Base. The projects are cometabolic bioventing, intrinsic bioremediation, and accelerated anaerobic biodegradation.

(D. Kampbell(RSKERC)405-436-8564)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of March 17, 1997**

TECHNICAL ASSISTANCE

Technical Assistance to Region II: On March 5, 1997, Steven Acree (RSKERC) provided Region II with review comments concerning a proposed conceptual plan for the installation of two horizontal wells located hydraulically upgradient and downgradient from the spent fuel canal beneath the High Flux Beam Reactor at the Brookhaven National Laboratory in Upton, NY. In general, it appeared that the proposed wells may provide information required to determine whether the spent fuel canal was the source of a tritium plume. Other comments focused on proposed drilling locations, problems associated with subsurface features such as structures and pipes, and the advantages of horizontal versus vertical drilling at these types of facilities.

(97-R02-004)

(S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region III: Ground water at the Babcock & Wilcox RCRA Facility in Lynchburg, VA, is contaminated with TCE. On November 21, 1996, RPM Michael Jacobi requested technical assistance in reviewing the "Phase I RCRA Corrective Measures Study" with emphasis on natural attenuation as a remediation alternative. On March 3, 1997, Randall Ross (RSKERC) and Dr. Daniel Pope (Dynamac) provided review comments to the Region which generally reflected verbal comments made during a February 13, 1997, conference call. A number of issues were discussed including the discharge of contaminated ground water into a nearby river, problems associated with identifying NAPLs in core samples, the potential for the existence of NAPLs in the subsurface, and data requirements to demonstrate the natural attenuation of chlorinated solvents at the site.

(97RC03-002)

(R. Ross(RSKERC)405-436-8611)

Technical Assistance to Region X: On January 31, 1997, the TSC provided Region X with review comments concerning the proposed use of natural attenuation at the Rhone-Poulenc Facility in Seattle, WA. On February 26, 1997, Don Draper (RSKERC), and Dr. Sam Lee and Jack Keeley (Dynamac) discussed those comments with RPM Sylvia Burges and Hydrologist Rene Fuentes during a conference call. Among the issues of concern were the effects of daily tides on the dilution and biodegradation of toluene, the source of the contaminant, parameters needed to demonstrate that attenuation processes are occurring, and contaminant transport and fate modeling.

(97RC10-01)

(D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region X: The Van Waters and Rogers Facility in Portland, OR, is an active RCRA site which had several spills over the years. On January 31, 1997, Hydrologist Rene Fuentes requested a review of a report entitled "Evaluation of Intrinsic Bioremediation of Volatile Organic Compounds at the VW&R's Facility, Portland, Oregon." On March 4, 1997, Don Draper (RSKERC) and Dr. Daniel Pope (Dynamac) provided comments which discussed a number of relevant issues including the stability of the plumes, apparent decrease in contaminant concentrations, degradation compounds in relation to natural attenuation, the acceptability of evidence in the report which suggests natural attenuation is taking place, and the effect of pump-and-treat activities on degradation processes.

(97RC10-002)

(D. Draper(RSKERC)405-436-8603)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Paul, Cynthia J. and Robert Puls (RSKERC). "Impacts of Turbidity on TCE and Degradation Products in Ground Water." Ground Water Monitoring and Remediation. Winter 1997.

(R. Puls(RSKERC)405-436-8543)

TECHNOLOGY TRANSFER ACTIVITIES

A training course entitled "Ground-Water Investigations" was held in Seattle, WA, March 4-6, 1997. Over sixty students from the Region, State, DOE, and DOD participated in the three-day course. Subjects covered included vadose zone monitoring, fundamentals of ground-water hydrology, transport and fate of contaminants, ground-water quality, ground-water investigations, and ground-water remediation. Dr. Mary Randolph (RSKERC) served as course moderator. Instructors were Dr. Candida West (RSKERC), Lowell Leach, Dr. Wayne Pettyjohn and Dr. Daniel Pope (Dynamac), and Dr. Ron Sims (Utah St. Univ.).

(M. Randolph(RSKERC)405-436-8616)



HIGHLIGHTS

**National Risk Management Research Laboratory
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Status Report for the Week of March 24, 1997**

TECHNICAL ASSISTANCE

Technical Assistance to Region VIII: On August 20, 1996, the Technology Support Center provided RCRA Project Manager Corbin Darling with comments on proposed data analysis, operating parameters, and monitoring at the Weld County Waste Disposal Site in Fort Lupton, CO. On March 10, 1997, in a follow-up review of a remediation work plan, Don Draper (RSKERC), and Dr. Ann Azadpour and Jack Keeley (Dynamac) discussed the use of compost and manure as bulking agents for the oily waste, the need for bench and pilot scale studies, and the effects of the proposed remediation on the area's wildlife. On March 11, 1997, these comments were further discussed with the RPM during a conference call.

(96RC08-004)

(D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region IX: On March 7, 1997, the Technology Support Center (TSC), through the Center for Subsurface Modeling Support (CSMoS), provided the Region with review comments of the "Draft UIC Area Permit for Class III In-Situ Copper Production, BHP Copper, Florence, Arizona." The reviewers, Joe Williams (RSKERC) and Bradley Hill (ManTech), suggested that requiring the modeling post-audit in the permit was a prudent and conservative approach. At the time of the post audit, the conceptual and numerical model could subsequently be modified to reflect any changes deemed necessary through an evaluation of on-site data. The only concern that the TSC might have was that a follow-up post audit later in the 15-year life of the mine might be appropriate.

(Misc.)

(J. Williams(RSKERC)405-436-8608)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Ambrose, Robert B., Jr., Thomas O. Barnwell, Jr., and Steve C. McCutcheon (EPA NERL, Athens), and Joseph R. Williams (RSKERC). "Computer Models for Water-Quality Analysis." Water Resources Handbook. McGraw-Hill. 1996.

(J. Williams(RSKERC)405-436-8608)

TECHNOLOGY TRANSFER ACTIVITIES

A Ground-Water Modeling training course was presented by Dr. Henk Haitjema and Vic Kelson (Univ. of Indiana) to the EPA staff and technical support contractor staff during February 24-25, 1997, at the RSKERC. The mathematical basis and numerical implementation of the analytic element method was presented. Specialized techniques were discussed, including ground-water/surface-water interactions, transient flow, imbedding local scale MODFLOW solutions within regional-scale analytic element solutions, and modeling impermeable and low permeable walls.

(J. Jones(RSKERC)405-436-8593)

Dr. Steve Kraemer (RSKERC) presented a one-day workshop on "Wellhead Protection Zone Delineation" at the EPA Region 9 Wellhead Conference on February 28, 1997, in San Francisco. The hands-on computer workshop was attended by about 20 local and state government representatives.

(J. Jones(RSKERC)405-436-8593)



HIGHLIGHTS

**National Risk Management Research Laboratory
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Status Report for the Week of March 31, 1997**

TECHNICAL ASSISTANCE

Technical Assistance to Region II: On January 22, 1997, RPM Angela Carpenter requested a review of a "Technical Memorandum" evaluating the viability of remediation of ground water by natural attenuation at the Maywood Chemical Facility in Maywood, NJ. The March 13, 1997, response was prepared by Don Draper (RSKERC) and Lowell Leach (Dynamac). In summary, the review stated that the data indicated the presence of natural attenuation in all three of the delineated plumes. However, protocol of the investigation appeared to be inadequate and too generic to provide sufficient evidence of unrefutable natural attenuation. There were too few wells located in each zone and those selected were sampled too infrequently and at undocumented depths to strongly support the viability of natural attenuation as a remedial alternative.
(97-R02-003) (D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region VII: On December 11, 1996, RSKERC provided RPM Ken Rapplean with review comments on the "Draft Phase 3 Pre-Design Acquisition Report" for the Coleman Operable Unit/29th and Mead Site in Wichita, KS. Among the issues discussed was the need for a better visualization technique to illustrate the horizontal distribution of contaminants. On March 21, 1997, Joe Williams (RSKERC) provided the RPM with examples of contamination contour plots which could be used to provide a basis for the initial layout of remediation zones. The demonstrations were prepared using a MapInfo and Surfer combination through a package known as SurfLink.
(93-R07-002) (J. Williams(RSKERC)405-436-8608)

Technical Assistance to Region IX: On March 24, 1997, Steven Acree (RSKERC) and Dr. Daniel Pope (Dynamac) provided continuing technical assistance at the J.H. Baxter Superfund Site in Weed, CA, by providing RPM Kathy Setian with comments on the status of a project to landfarm contaminated soil at the site. Comments focused on the procedures for obtaining soil samples, the analysis of aqueous leachate to evaluate landfarm performance, and the possibility of ground-water contamination resulting from high rates of fertilization.
(95-R09-005) (S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region IX: On March 27, 1997, Steven Acree (RSKERC) and Dr. Rashid Islam (ManTech) provided RPM Jeff Dhont a review of the "Proposed Scope of Modeling Sensitivity Analysis" at the Montrose and Del Amo Superfund Sites in Torrance, CA. The proposed scope for the model sensitivity analysis appeared to be adequate for the chlorobenzene plume delineation and remediation. However, the plan indicated that the impact of the model parameters will predominantly be evaluated based on the projected performance of the chlorobenzene remedial well field. While this evaluation may be appropriate for the transport parameters, variations of hydraulic conductivities should be carefully evaluated in terms of the effects on model calibration.
(95-R09-015)(94-R09-006) (S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region IX: On February 10, 1997, Region IX requested review comments on a feasibility study at the Modesto Ground-Water Contamination Site in Modesto, CA, with an emphasis on evaluating the applicability of air sparging at the site. In a response dated March 19, 1997, Dominic DiGiulio (RSKERC) generally agreed with the recommendations of the study that the technology may not be appropriate. It was pointed out that, with sparging, the technology cannot be evaluated until actual field testing is conducted, and that such tests are time consuming, require a fairly high degree of experience and knowledge of subsurface physics, and can be expensive.
(97-R09-001) (D. DiGiulio(RSKERC)405-436-8605)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of May 5, 1997**

TECHNICAL ASSISTANCE

Technical Assistance to Region II: On April 22, 1997, the TSC Center for Subsurface Modeling Support (CSMoS) provided RPM Stephen Cipot with review comments on the "Modeling Report for Operable Unit Two" for the Ewan Property Superfund Site in Shamong, NJ. The comments, which were prepared by Joe Williams (RSKERC), and Brad Hill, Dr. Ying Ouyang and Dr. Rashid Islam (ManTech), stated that, in general, the report was a substantial improvement over a previous version and provides a more comprehensive understanding of the modeling that has been conducted at the site. More specific comments were offered in a variety of areas including model boundary conditions, input parameters, infiltration rate, and the biodegradation term.

(97-R02-001)

(J. Williams(RSKERC)405-536-8608)

Technical Assistance to Region IV: On March 6, 1997, RPM Ramona McConnery requested technical assistance in determining the origin of a TCE plume beneath the Eltech Systems/Tri Cities facilities in Tuscumbia, AL. There is a PCE plume beneath both sites that is known to originate from Eltech. Part of the plume is composed of TCE and Eltech is alleging that TCE is coming from a source at Tri-Cities. Based on ground-water data from the Alabama Department of Environmental Management, the April 22, 1997, response from Don Draper (RSKERC) and Dr. Jin-Song Chen (Dynamac), suggested that the two plumes did not have the same origin. The conclusion was based on an analysis of composition patterns, especially the TCE/PCE ratio.

(97RC04-002)

(D. Draper(RSKERC)405-436-8603)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Hurst, Jestin C., Ronald C. Sims, Judith L. Sims, Darwin L. Sorensen, and Joan E. McLean (Utah St. Univ.), and Scott Huling (RSKERC). "Soil Gas Oxygen Tension and Pentachlorophenol Biodegradation." J. Env. Eng. April 1997.

(S. Huling(RSKERC)405-436-8610)

Thomas, J.M., C.L. Bruce, V.R. Gordy, K.L. Duston, and C.H. Ward (Rice Univ.), and S.R. Hutchins (RSKERC), and J.L. Sinclair (ManTech). "Assessment of the Microbial Potential for Nitrate-Enhanced Bioremediation of a JP-4 Fuel Contaminated Aquifer." J. Indust. Microbiol. 18 (1997).

(S. Hutchins(RSKERC)405-436-8563)

RESEARCH APPLICATIONS

Microcosms have been used to simulate the subsurface environment, so that biological processes can be evaluated for either intrinsic or active bioremediation of contaminated sites. Although microcosms have often been used to predict rates of remediation, there are few data on whether these rates could have been affected by the specific method of microcosm preparation. This research describes how two such parameters, initial concentration and solid/liquid ratio, can affect the rate of biodegradation of a model contaminant (toluene) under specific (denitrifying) conditions for two different aquifer materials. Results show that varying these two parameters by two to three orders of magnitude resulted in a half-life variation of only a factor of two, with most of the differences occurring at the extreme ranges of the test variables. This is not what one would expect, and may account for some of the observed overestimates of biological rates in the field, since investigations often use low solid/liquid ratios in microcosm studies and extrapolate the results to more realistic solid/liquid ratios for the aquifer. This research indicates that this previous approach may not be correct, possibly because the increase in active biomass is partially negated by increased mass transport limitations.

(S. Hutchins(RSKERC)405-436-8563)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of May 12, 1997**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: The USGS is recommending that natural attenuation be employed as the final remedy for three operable units at Dover Air Force Base in Dover, DE. On February 10, 1997, RPM Nicholas DiNardo requested review comments on the USGS natural attenuation report. On April 30, 1997, Jerry Jones (RSKERC), and Dr. Ann Azadpour and Jack Keeley (Dynamac) provided detailed comments in a number of areas including the conditions required to confirm that natural attenuation processes are taking place. In general, it appeared that there was little evidence that natural bioremediation was occurring except at one location, however, it is probable that other natural attenuation processes such as dilution and volatilization will continue to reduce both the concentration and mass of contaminants in ground water.

(97-R03-002)

(J. Jones(RSKERC)405-436-8593)

Technical Assistance to Region VI: As part of a continuing technical assistance effort at the Vertac Site in Jacksonville, AR, Steven Acree (RSKERC) provided RPM Philip Allen with review comments of the "Pre-Final Remedial Design" for the site. The April 23, 1997, TSC response stated that, in general, the remedial system design appeared to be adequate for the stated containment purpose along the eastern site boundary. As with any subsurface remediation system, monitoring information will be required to evaluate the effectiveness of the systems and make modifications if necessary. Several comments and recommendations regarding the short-term and long-term monitoring system were discussed.

(92-R06-003)

(S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region VI: On April 28, 1997, the Center for Subsurface Modeling Support (CSMoS) provided RPM Chris Villarreal with review comments on the "Revised Soil Criteria Assessment Report" for the Petro-Chemical Systems (Turtle Bayou) Superfund Site in Liberty, TX. The technical assistance response was prepared by Don Draper (RSKERC), and Bradley Hill, Dr. Rashid Islam and Dr. Ying Ouyang (ManTech). One area of concern was the way in which the infiltration rate was determined. Suggestions were made as how to prove this low rate actually exists. Other areas of concern centered on the assumptions used in the natural attenuation of benzene, and the manner in which the maximum soil concentration was calculated.

(97-R06-001)

(D. Draper(RSKERC)405-436-8603)

Technical Assistance to the Office of Science Policy: On May 1, 1997, Jerry Jones (RSKERC) and Jack Keeley (Dynamac) provided review comments on a proposed Lead-Based Paint Debris Rule to the Pesticides/Toxics Team of the EPA Office of Science Policy. The comments were confined to that part of the proposed rule which was concerned with lead leaching and the risk associated with the movement of lead to and through ground water. In an August 21, 1995, review of an earlier draft of the document, the reviewers were critical of the modeling exercise used to predict lead concentrations in ground water resulting from the disposal of lead-paint debris. It was suggested that modeling in the revised document was scientifically even less acceptable.

(Misc.)

(J. Jones(RSKERC)405-436-8593)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

National Research Council. "Valuing Ground Water: Economic Concepts and Approaches." National Academy Press. 1997

(S. Schmelling(RSKERC)405-436-8540)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of May 19, 1997**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: On November 11, 1996, RPM Steven Donohue requested a review of data collected during pre-design studies at the Saegertown Area Superfund Site in Saegertown, PA, and guidance on assessing whether natural attenuation is remediating VOCs in ground water. In a response dated May 7, 1997, Dr. Guy Sewell (RSKERC), and Dr. Ann Azadpour and Jack Keeley (Dynamac) stated that, in general, the report did a good job of outlining the processes involved in natural attenuation, and presenting that information needed to demonstrate that those processes are occurring. A number of specific concerns of the Region were addressed such as the evidence for complete dechlorination of PCE and TCE to ethene, a screening procedure to ascertain if natural attenuation is taking place, the value of microcosm studies, and the determination of half lives of contaminants at the site.

(97-R03-003)

(G. Sewell(RSKERC)405-436-8566)

Technical Assistance to Region VI: On May 9, 1997, Dr. Scott Huling (RSKERC), and Drs. Birinder and Bruce Pivetz (ManTech) provided RPM Glen Celerier with a technical review of the Groundwater Extraction System Performance Monitoring Plan for the South Calvacade Superfund Site in Houston, TX. A number of questions were discussed in detail including the location of DNAPLs, the mass flux of contaminants, the assumed age of the contaminant source, and analytical model simulations.

(95-R06-005)

(S. Huling(RSKERC)405-436-8610)

Technical Assistance to Region VII: During May 6-7, 1997, Joe Williams (RSKERC) met in Wichita, KS, to provide technical assistance at the Coleman Operable Unit at the 29th and Mead Superfund Site. Attending the meeting were representatives of Region VII, NRMRL-Cinn., State of Kansas, Coleman, and consultants. The purpose of the meeting was to discuss the presentation of information related to the selection of remediation zones in the Phase 3 Pre-Design Data Acquisition Report. Additional discussions centered on the use of modeling results as cleanup levels.

(93-R07-002)

(J. Williams(RSKERC)405-436-8608)

Technical Assistance to the National Park Service: On December 11, 1997, Eva Davis (RSKERC) provided Charles Rafkind (National Park Service) with review comments on a supplemental site characterization and a pilot study report for the Yorktown Defense Fuel Supply Point in Yorktown, VA. The site contains an estimated 1.6 million gallons of Naval special fuel that leaked from underground storage tanks. On May 14, 1997, Dr. Davis provided additional comments on several issues including the relative effectiveness of using hot water versus steam in a recovery system, the use of electrical resistivity tomography in obtaining additional site characterization information, the use of appropriate models, and the role of microorganisms in degrading petroleum hydrocarbons at the site.

(Misc.)

(E. Davis(RSKERC)405-436-8548)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Bales, Roger C., Shimin Li, T.C. Yeh, Melissa E. Lenczewski, and Charles P. Gerba (Univ. of Arizona). "Bacteriophage and Microsphere Transport in Saturated Porous Media: Forced-Gradient Experiment at Borden, Ontario." Water Resources Research. April 1997.

(G. Sewell(RSKERC)405-436-8566)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of May 26, 1997**

TECHNICAL ASSISTANCE

Technical Assistance to Region IV: Following an April 14-15, 1997, site visit and meeting, Dr. Scott Huling (RSKERC) and Dr. Bruce Pivetz (ManTech) provided Region IV with technical comments concerning the Precision Fabricating and Cleaning Site in Cocoa, FL. The comments were based on issues and observations made during the meeting. These included a wide variety of topics including the need to compile site data from various reports and correspondence into one document, the extent and complexity of the site, the need for additional site characterization data, analytical results and reporting, and potential remediation scenarios.
(97RC04-001) (S. Huling(RSKERC)405-436-8610)

Technical Assistance to Region VII: On May 12, 1997, Joe Williams (RSKERC) and Dr. Rashid Islam (ManTech) presented RPM Victor Lyke with a status report of modeling support activities for the Ogallala Water Supply NPL Site in Ogallala, NE. The work is being performed by the TSC Center for Subsurface Modeling Support (CSMoS). The overall objectives of the Ogallala Water Supply modeling effort are to develop a comprehensive ground-water and contaminant transport model to predict the fate and transport of contaminants in ground water. The modeling effort will include the development of a steady state ground-water model, a transient ground-water model, and a transient contaminant transport model.
(97-R07-003) (J. Williams(RSKERC)405-436-003)

Technical Assistance to NRMRL-Cinn.: On May 16, 1997, Dr. Scott Huling (RSKERC) and Dr. Bruce Pivetz (ManTech) provided Environmental Engineer Douglas Grosse (NRMRL-Cinn.) with technical review comments on a revised draft of a Wood Preserving Technology Guide. In general, the document will help provide an understanding of the significance of the wood preserving waste issue, and help establish a communication network between RPMs, researchers, and private and public staff who work in the area. Detailed comments and recommendations were offered for each section of the document, and it was suggested that the "Limitations" section of each technology description be expanded, when applicable, to include case histories where the technology did not perform as well as expected.
(Misc.) (S. Huling(RSKERC)405-436-8610)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Miller, Dennis (RSKERC), and Jim Spain and Catherine Vogel (AL/EQ). "Chlorobenzene Bioreactor Demonstration." USAF Armstrong Lab. Envirionics. AL/EQ-TR-1993-008.
(D. Miller(RSKERC)405-436-8567)

TECHNOLOGY TRANSFER ACTIVITIES

A training course entitled "Ground-Water Investigations" was held in Atlanta, GA, May 13-15, 1997. Eighteen students from Region IV and the States of Georgia and Kentucky participated in the three-day course. Subjects covered included vadose zone monitoring, fundamentals of ground-water hydrology, transport and fate of contaminants, ground-water quality, ground-water investigations, and ground-water remediation. Dr. Mary Randolph (RSKERC) served as course moderator. Instructors were Dr. Candida West (RSKERC), Lowell Leach, Dr. Wayne Pettyjohn and Dr. Daniel Pope (Dynamac), and Dr. Ron Sims (Utah St. Univ.).
(M. Randolph(RSKERC)405-436-8616)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of June 9, 1997**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: On May 27, 1997, Dr. Eva Davis visited the Missouri Electric Works Superfund Site in Cape Girardeau, MO. At this site, Terra Therm Environmental Services, Inc. is carrying out a demonstration of their Thermal Blanket and Thermal Wells technologies. Preliminary results show that the soil is heating at the predicted rates, and PCB concentrations close to the heat source have generally been reduced to below the cleanup criteria. The soil will be sampled to determine if PCDD/PCDFs or other products of incomplete combustion are formed.

(Misc.)

(E. Davis(RSKERC)405-436-8548)

Technical Assistance to Region IV: On June 5, 1997, Steve Acree (RSKERC) and Dr. Daniel Pope (Dynamac) provided RPM Galo Jackson with review comments on the Phase II Natural Attenuation Evaluation Work Plan for the Sydney Mine NPL Site in Brandon, FL. In general, the revised work plan for the evaluation of natural attenuation processes had incorporated many recommendations discussed in previous comments and was significantly improved. It was pointed out, however, that this is an area of continuing research and additional data may ultimately be required to fulfill the objectives of the plan. Detailed comments and recommendations were offered in a number of areas including the construction of potentiometric surface maps, borehole flowmeter studies, the possible need for additional sampling locations, and cone penetrometer investigations.

(96-R04-003)

(S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region V: In a continuing technical assistance effort at the Velsicol Site in St. Louis, MI, Randall Ross (RSKERC) and Dr. Milovan Beljin (Dynamac/Univ. of Cinn.) provided RPM Beth Reiner with a technical review of the Interim Containment System Assessment Report which was prepared for the site. The June 3, 1997, comments stated that, in general, the report presented no major surprises. It confirmed suspicions that leakage around monitoring wells contributed only a small fraction of the overall flux of water into the containment system. Recommendations were made concerning downgradient containment wall piezometer pairs, water level recorders, and possible repair strategies for the cap.

(95-R05-003)

(R. Ross(RSKERC)405-436-8611)

Technical Assistance to Region IX: On June 3, 1997, in a continuing assistance effort at the Montrose Superfund Site in Torrance, CA, Steven Acree (RSKERC) provided RPM Jeff Dhont with review comments on a work plan for additional DNAPL testing and evaluations at the site. In general, the proposed studies will provide useful information for performance screening level evaluations of DNAPL removal technologies. It was suggested that the analyses to determine the distribution of DNAPLs may provide results which are highly uncertain and additional data may eventually be required to make a detailed evaluation of the feasibility and cost of proposed removal technologies.

(95-R09-015)

(S. Acree(RSKERC)405-436-8609)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of June 16, 1997**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: On June 5, 1997, Dr. David Sabatini (RSKERC) provided RPM David Turner with review comments on the Long Term Monitoring and Intrinsic Remediation Report for the Lord-Shope Landfill Site in Girard Township, PA. It was pointed out that, in general, the data suggested that contaminant levels have decreased, but that these reductions are likely due to a combination of factors. The collection of additional data was encouraged to help quantify the effects of natural attenuation. In addition to discussing the difficulty of predictive modeling at the site, general comments on the natural attenuation of chlorinated solvents were presented. Detailed comments were offered in a number of areas.

(96-R03-005)

(D. Sabatini(RSKERC)405-436-8605)

Technical Assistance to Region IV: In a continuing technical assistance effort at the Sydney Mine NPL Site in Brandon, FL, Steven Acree (RSKERC) made review comments on the Bone Valley Water Bearing Remediation Evaluation for RPM Galo Jackson. The June 9, 1997, comments stated that, in general, the available data indicate that the downgradient extent of the contamination is not fully captured and that data is not available to fully evaluate capture in other zones. More detailed comments were made in areas including problems in measuring ground-water levels, calculating the pore volume flushing rate, and estimations of subsurface contaminant mass.

(96-R04-003)

(S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region V: On May 22, 1997, RPM Mary Tierney requested a review of several documents prepared for the Tar Lake Site in Mancelona, MI. The focus of the request was for the Predesign Report from the standpoint of technical accuracy, data gaps, and validity of analysis. The June 9, 1997, response, prepared by Dr. David Jewett (RSKERC), expressed concerns about indicators for biodegradation, above ground bioreactor for treating contaminated soil, problems associated with a residual tar cap, and modeling the potential biodegradation of contaminants in soil and ground water. Additional comments were related to the delineation of the lateral extent of tar contamination, water quality in an unconfined aquifer downgradient of Tar Lake, and interim ground-water containment.

(97-R05-005)

(D. Jewett(RSKERC)405-436-8560)

TECHNOLOGY TRANSFER ACTIVITIES

The Technology Support Center (TSC) is providing a series of courses on the Natural Attenuation of chlorinated solvents and petroleum hydrocarbons in soil and ground water which has been given high priority by the Regions. The course offers a three-day discussion of natural attenuation processes including sorption, dilution, volatilization, and biodegradation. The students are also involved with hands-on experience using BIOSCREEN as a decision support system in reviewing natural attenuation proposals. The classes usually include 30-50 representatives from state agencies, technical support contractors, and Regional RPMs. Instructors for the series are Dr. John Wilson, (RSKERC), Dr. Daniel Pope (Dynamac), and Dr. Ron Sims (Dynamac/Utah St. Univ.). The course schedule includes: Region X (May 6-8), Region IX (June 3-5), Region X (June 10-12), Region VIII (August 26-28), and Region V (to be announced). A special presentation will be provided to a joint meeting of the Ground-Water, Engineering, and Federal Facilities Forums during July 28-31, 1997.

(J. Wilson(RSKERC)405-436-8534)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of June 23, 1997**

TECHNICAL ASSISTANCE

Technical Assistance to Region II: In a November 27, 1996, technology transfer effort at the Colesville Landfill Superfund Site in Colesville, NY, the TSC Center for Subsurface Modeling Support (CSMoS) provided RPM Eduardo Gonzales with review comments on the site's Revised Focused Feasibility Study. On May 16, 1997, the Region requested a review of the responses to those comments by the PRPs consultant. The June 12, 1997, response by Joe Williams (RSKERC), and Brad Hill and Dr. Ying Ouyang (ManTech) stated that the concerns expressed in the earlier review had been addressed, particularly with respect to additional documentation and figures which provided a better illustration of model calibration efforts and the distribution of hydraulic conductivity. Other minor issues requiring clarification were discussed.

(96-R02-002)

(J. Williams(RSKERC)405-436-8608)

Technical Assistance to Region IV: On May 7, 1997, RPM Terry Tanner requested technical review comments on feasibility and treatability studies at the Calhoun Park Site in Charleston, SC, for overall completeness. The June 12, 1997, response, which was prepared by Don Draper (RSKERC) and Lowell Leach (Dynamac), stated that the two documents were very thorough in evaluating remedial alternatives including soil capping and natural attenuation.

(97-R04-002)

(D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region VI: The Technology Support Center has been providing technical assistance at the Vertac Site in Jacksonville, AR, since April 13, 1992. On June 9, 1997, as a part of this continuing effort, Steven Acree (RSKERC) provided RPM Philip Allen with responses to previous comments on the pre-final design for Operable Unit 3. In general, the responses addressed earlier comments with the notable exception that discussions regarding long-term sampling were vague. Detailed suggestions were made concerning the evaluation of ground water/surface water interactions. In another response on the same date, the TSC discussed a report on studies undertaken to evaluate the recoverability of LNAPLs.

(92-R06-003)

(S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region VI: On June 11, 1997, Dr. Scott Huling (RSKERC) and Dr. Bruce Pivetz (ManTech) provided RPM Glen Celerier with review comments on the variability of contaminant concentrations, sampling protocol, and moisture content of the Land Treatment Unit at the North Cavalcade Superfund Site in Houston, TX. The technical assistance effort contained detailed discussions and recommendations in a number of areas including data interpretation and potential limitations on biodegradation, as well as general soil sampling and moisture content information.

(95-R06-010)

(S. Huling(RSKERC)405-436-8610)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Davis, Eva L. (RSKERC). "How Heat Can Enhance In-Situ Soil and Aquifer Remediation: Important Chemical Properties and Guidance on Choosing the Appropriate Technique." EPA Issue Paper. EPA/540/S-97/502. April 1997.

(E. Davis(RSKERC)405-436-8548)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of June 30, 1997**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: On April 29, 1997, the TSC provided RPM Nicholas DiNardo with an assessment of a report on the natural attenuation of ground water at Dover Air Force Base in Dover, DE. Subsequently, the TSC was requested to comment on a critique of that assessment by the USGS dated May 27, 1997. In a June 17, 1997, response, Jerry Jones (RSKERC) stated that, in general, most of the items within the critique were found to be positive and served well in addressing the earlier RSKERC questions and comments. Parts were made concerning the use of downgradient monitoring locations in demonstrating natural attenuation, the prevalence of anaerobic conditions, the availability of a primary carbon source, and the contribution of natural attenuation processes other than bioremediation. (97-R03-002) (J. Jones(RSKERC)405-436-8593)

Technical Assistance to Region IV: On June 16, 1997, Dr. Scott Huling (RSKERC) and Dr. Bruce Pivetz (ManTech) give RPM Gieselle Bennett review comments on a ground-water bioremediation treatability study work plan for the GE/Shepard Farm NPL Site in East Flat Rock, NC. In general, there did not appear to be any problems with the work plan that would prevent its implementation. Suggestions were made concerning a clarification of some points made in the document, proposed parameters to be monitored, and interpreting the results of the investigation. (97-R04-001) (S. Huling(RSKERC)405-436-8610)

Technical Assistance to Region V: The Techalloy Facility in Union, IL, is performing a corrective action under a RCRA 3008(h) Consent Order. The facility recently submitted a report which presented an interpretation of the zone of capture created by an extraction well. On May 20, 1997, the Region requested an evaluation of this report. On June 20, 1997, Dr. David Jewett (RSKERC) provided a response to the RCRA Enforcement Branch which included detailed comments and recommendations concerning the proposed ground-water capture and extraction system at the site. Based on a different approach to calculating the hydraulic conductivity, gradient, and pumping efficiency, it was suggested that the capture zone simulated by the PRP's consultant may be significantly overestimated. (97RC05-002) (D. Jewett(RSKERC)405-436-8560)

Technical Assistance to Region VI: On June 10, 1997, in a continuing technical effort at the North Cavalcade Street Superfund Site in Houston, TX, Dr. Scott Huling (RSKERC), and Drs. Birinder Shergill and Bruce Pivetz (ManTech) provided RPM Glen Celerier with comments on the "Work Plan for Supplementary Site Characterization." In general, the work plan addressed most RSKERC comments on an earlier draft of the document. Issues that were discussed in detail were a rationale for the number of proposed cone penetrometer rapid optical screening tools (CPT/ROST) samples, and the location of monitoring wells. (95-R06-010) (S. Huling(RSKERC)405-436-8610)

Technical Assistance to Region VII: A June 10, 1997, meeting with representatives from Region VII was held at RSKERC to discuss the status of contaminant transport modeling, and to identify additional field data needs at the Ogallala Ground-Water Contamination Site in Ogallala, NE. The objectives of the Ogallala Water Supply ground-water and contaminant transport modeling project are to predict the fate and transport of various contaminants in the aquifer and test various remedial alternatives. On June 20, 1997, a follow-up progress report was submitted to RPM Victor Lyke by Joe Williams (RSKERC) and Dr. Rashid Islam (ManTech). Two numerical models, MODFLOW and MT3D, were selected to model the ground-water flow and contaminant transport in the vicinity of the town of Ogallala. (97-R07-003) (J. Williams(RSKERC)405-436-8608)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Powell, Robert M. (ManTech) and Robert W. Puls (RSKERC). "Hitting the Bull's Eye in Groundwater Sampling." Pollution Engineering. June 1997.



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of July 14, 1997**

TECHNICAL ASSISTANCE

Technical Assistance to Region II: On June 24, 1997, in a continuing technical assistance effort at the Ewan Property Superfund Site in Shamong, NJ, Joe Williams (RSKERC) and Dr. Rashid Islam (ManTech) provided RPM Stephen Cipot with review comments of a document titled "Biotreatability Slurry Test Interpretation Results." The report stated that the results of the study were not used in the contaminant transport model due to the scattered nature of the data and a lack of correlation assuming a first-order decay. The review comments suggested other approaches for analyzing the data and warned that the use of literature values may not be representative of site conditions.

(97-R02-001)

(J. Williams(RSKERC)405-436-8608)

Technical Assistance to Region VI: On July 3, 1997, Dr. Scott Huling provided RPM Glenn Celerier with a technical review of the "Scope of Work for Groundwater Investigations and Modeling" at the Popile Superfund Site in El Dorado, AR. The focus of the review was on the need for additional information on the hydrogeological characteristics of the site, and the possible use of indicator compounds which represent a broad range of fate and transport characteristics in ground-water modeling efforts. It was also recommended that all assumptions be provided with respect to the estimate of contaminant mass, fate and transport modeling, and exposure pathway analysis.

(93-R06-003)

(S. Huling(RSKERC)405-436-8610)

Technical Assistance to Region IX: On July 3, 1997, in a continuing technical assistance effort at the Sparks Solvent/Fuel Site in Sparks, NV, Steven Acree (RSKERC) provided OSC Donn Zuroski with review comments on the preliminary remedial design for the facility. In general, the proposed enhancements to the extraction system appeared to be appropriate for capturing ground water contaminated with petroleum hydrocarbons. It was pointed out that, as with any capture system, monitoring hydraulic heads and downgradient contaminant concentrations should be used to determine the effectiveness of the system. Some concern was expressed concerning the design of the extraction wells.

(94-R09-001)

(S. Acree(RSKERC)405-436-8609)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Puls, Robert W. and Cynthia J. Paul (RSKERC). "Multi-Layer Sampling in Conventional Monitoring Wells for Improved Estimation of Vertical Contaminant Distribution and Mass." Journal of Contaminant Hydrology. 25 (1997)

(R. Puls(RSKERC)405-436-8543)

RESEARCH APPLICATIONS

During June 16-26, 1997, Randall Ross (RSKERC), Diane Easley (Region VII), and Dr. Birinder Shergill and Tim Hensley (ManTech) participated in the Region VII Regional Applied Research Effort (RARE) Project at the North Landfill Subsite of the Hastings Superfund Site in Hastings, NE. The objective of the RARE project was to demonstrate the utility of microwell technology for deep saturated and vadose zone vertical profiling of the distribution of contaminants. Ground-water monitoring points were installed at six locations and vadose zone monitoring points were installed at five locations.

(R. Ross(RSKERC)405-436-8611)



HIGHLIGHTS

**National Risk Management Research Laboratory
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TECHNICAL ASSISTANCE

Technical Assistance to the U.S. Army: On July 7, 1997, Dominic DiGiulio (RSKERC) and Dr. Varadhan Ravi (Dynamac) reviewed selected sections of the Federal Remediation Technology Roundtable (FRTR) Screening Matrix for the U.S. Army Environmental Center, Aberdeen Proving Ground, MD. The general observation was that the document provided a very superficial overview of available remedial technologies and was primarily suitable for personnel with little experience in the remediation field. Specific comments were given in the areas of bioventing, air sparging, vapor extraction, and natural attenuation.

(Misc.)

(D. DuGiulio(RSKERC)405-436-8605)

Technical Assistance to Region IX: On July 9, 1997, in a continuing technical assistance effort at the Montrose Superfund Site in Torrance, CA, Steven Acree (RSKERC) and Dr. Daniel Pope (Dynamac) provided RPM Jeff Dhont with a review of a Natural Attenuation Study and Supplemental Work Plan for monochlorobenzene (MCB). In addition, a review of current literature regarding the degradation potential of chlorobenzene was made. Detailed comments were offered in a variety of areas including the use of microcosms and very limited field investigations to better define potential degradation rates during remediation, and information needed to demonstrate natural attenuation.

(95-R09-015)

(S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region X: As part of a continuing technical assistance effort, Dr. Scott Huling (RSKERC) provided Dr. Robert Starr (Lockheed) with a review of the proposed ground-water remedial action for the Test Area North, Operable Unit 107B at the Idaho National Engineering Laboratory (INEL) near Idaho Falls, ID. The review comments, dated July 9, 1997, recommended that the work plan be revised to include the theoretical basis of in-situ chemical oxidation of TCE, specific objectives, approach, methods and materials, and other details of the treatability study.

(96-R10-001)

(S. Huling(RSKERC)405-436-8610)

Technical Assistance to the National Park Service: At the request of Charles Rafkind (National Park Service), Dr. Eva Davis (RSKERC) reviewed the Corrective Action Plan for Fleet and Industrial Supply Center Defense Fuel Supply Point in Yorktown, VA. The site is contaminated with a light, highly viscous Naval fuel oil that is floating on the shallow water table. The proposed corrective action calls for indirectly heating the floating oil phase in situ through a closed-loop steam injection system and the use of trenches for oil recovery and reinjection of hot water. In a letter dated July 7, 1997, comments were made on the location of trenches for oil recovery, the possibility of smearing the oil by the proposed water table drawdown, and the amount of heat needed to achieve the desired reduction in viscosity for the efficient recovery of the oil.

(Misc.)

(E. Davis(RSKERC)405-436-8548)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Puls, R.W. and C.J. Paul (RSKERC), and P.J. Clark (EPA Cin.). "Remediation of Chromate-Contaminated Ground Water Using an In-Situ Permeable Reactive Mixture: Field Pilot Test. Elizabeth City, North Carolina." American Chemical Society Proceedings. San Francisco. April 13-17, 1997.

(R. Puls(RSKERC)405-436-8543)

Cho, Jong Soo, Dominic C. DiGiulio, and John T. Wilson (RSKERC), and James A. Vardy (U.S. Coast Guard). "In-Situ Air Injection, Soil Vacuum Extraction and Enhanced Biodegradation: A Case Study in a JP-4 Contaminated Site." Environmental Progress, Vol. 16, No. 1, Spring 1997.

(J. Wilson(RSKERC)405-436-8532)

RESEARCH APPLICATIONS

During June 18-26, 1997, Steve Acree and Randall Ross (RSKERC), and Dr. Milovan Beljin (Univ. of Cinn.) applied an electromagnetic borehole flowmeter at the Hastings Superfund Site in Hastings, NE. The study was undertaken as part of the Region VII Regional Applied Research Effort (RARE) project. The survey was conducted to provide information on potential preferential pathways for contaminant migration. Preliminary results indicate the presence of a significant vertical flow associated with portions of the site.

(S. Acree(RSKERC)405-436-8609)



HIGHLIGHTS

**National Risk Management Research Laboratory
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TECHNICAL ASSISTANCE

Technical Assistance to Region I: In response to a July 2, 1997, request from RPM Bob Leger, Don Draper (RSKERC), and Lowell Leach and Jack Keeley (Dynamac) reviewed a work plan to demonstrate the technical impracticability of restoring ground water at the Hocomonco Pond Site in Westborough, MA. The July 10, 1997, comments were confined to proper monitoring well design and construction methods, and sampling techniques for metals analysis. (96-R01-010) (D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region II: On July 10, 1997, Don Draper (RSKERC), and Brad Hill and Drs. Ying Ouyang and Rashid Islam (ManTech) provided responses to Regional questions concerning fate and transport modeling conducted during the Focused Feasibility Study at the Colesville Landfill Site in Colesville, NY. The questions addressed the time required to achieve maximum contaminant levels, calibration and sensitivity analysis, model boundary conditions, and conclusions reached as a result of modeling conducted during the study. (96-R02-002) (D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region VI: On July 18, 1997, Dr. Scott Huling (RSKERC) and Dr. Bruce Pivetz (ManTech) provided RPM Glen Celerier technical comments regarding the potential use of a soil amendment at the North Cavalcade Street Superfund Site in Houston, TX. It was suggested that, prior to the full-scale implementation at the land treatment unit, it would be necessary to determine whether the proposed amendment accomplishes significant site-specific contamination reduction in a controlled system. Detailed comments were also offered concerning the treatment investigation. (95-R06-010) (S. Huling(RSKERC)405-436-8610)

Technical Assistance to Region IX: On July 10, 1997, Steven Acree (RSKERC), and Brad Hill and Dr. Ying Ouyang (ManTech) provided the Region with comments on a transport modeling study for methyl tertiary butyl ether (MTBE) at the Charnock and Arcadia Sites in Santa Monica, CA. In general, the report was brief and contained insufficient documentation to justify the soil cleanup levels. In order to allow an adequate evaluation, the report needed to include more VLEACH and mixing cell model results to help explain how the soil cleanup levels were calculated. (97RC09-001) (S. Acree(RSKERC)405-436-8609)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Bennett, T.A., D.W. Blowes, R.W. Gillham, C.J. Hanton-Fong, and C.J. Ptacek (Univ. of Waterloo), and R.W. Puls (RSKERC), and J.L. Vogan (Envir. Tech. Inc.). "Design and Installation of an In Situ Reactive Wall for Treatment of CR(VI) and Trichloroethylene in Groundwater." Proceedings of Div. of Envir. Chem., American Chemical Society, San Francisco, CA. Apr. 13-17, 1997. R. Puls(RSKERC)405-436-8543)

Wilson, L.P. and E.J. Bouwer (Johns Hopkins Univ.). "Biodegradation of Aromatic Compounds Under Mixed Oxygen/Denitrifying Conditions: A Review." Journal of Industrial Microbiology & Biotechnology. Vol. 18, 1997. (S. Hutchins(RSKERC)405-436-8563)



HIGHLIGHTS

**National Risk Management Research Laboratory
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Status Report for the Week of September 1, 1997**

TECHNICAL ASSISTANCE

Technical Assistance to the Office of Radiation and Indoor Air: On August 21, 1997, Joe Williams (RSKERC) and Dr. Ying Ouyang (ManTech) provided Robin Anderson (ORIA) review comments on the Fact Sheet on Electrokinetics and Field Processes Applicable to Radioactive and Hazardous Mixed Waste in Soil and Groundwater. The purpose of the fact sheet was to provide a resource document on electrokinetic remediation technologies. Organizationally, the document provided a good overview of each of the electrokinetic processes including the name of the developer, research description, figures and diagrams, and current status. However, due to its brevity, research descriptions tended to be insufficient for an adequate understanding of the processes. Another concern was that information was not provided to demonstrate that removal was strictly based on electrokinetic processes while biodegradation into daughter products was ignored.

(Misc.)

(J. Williams(RSKERC)405-436-8608)

Technical Assistance to Region II: On August 21, 1997, in a continuing technical assistance effort at the Ewan Property Site in Shamong Township, NJ, Joe Williams(RSKERC), and Drs. Ying Ouyang and Rashid Islam (ManTech) provided RPM Stephen Cipot with comments on Appendix C of the Final Remedial Design Report for Operable Unit 2. Appendix C covers the modeling effort supporting the remedial design. As requested, this review focused on the incorporation of April 22, 1997, TSC comments of the draft report into the final design. In general, the earlier comments concerning boundary conditions, input parameters, and simulation results were adequately addressed in the final report. A minor comment discussed the sensitivity analysis performed to select the appropriate stream bed conductance.

(97-R02-001)

(J. Williams(RSKERC)405-436-8608)

Technical Assistance to Region VI: On August 22, 1997, Dr. Scott Huling (RSKERC) and Dr. Bruce Pivetz (ManTech) provided RPM Glen Celerier with a technical review of the Quality Assurance Project Plan (QAPP) for the evaluation of a co-treatment process at the soils operable unit at the North Cavalcade Superfund Site in Houston, TX. It was pointed out that the QAPP did not detail the statistical test to be used in evaluating the co-treatment process bench-scale study. A detailed discussion was provided regarding procedures to determine whether the treatment had a statistically significant effect on the concentration of contaminants in the soil. Additional suggestions were made with respect to sampling procedures.

(95-R06-010)

(S. Huling(RSKERC)405-436-8610)

Technical Assistance to the National Park Service: On August 22, 1997, Dr. Eva Davis (RSKERC) provided Charles Rafkind (National Park Service) with review comments on the final Corrective Action Plan for the Fleet and Industrial Supply Center Defense Supply Point in Yorktown, VA. In general, as stated in previous review comments, it was agreed that the use of indirect steam injection to reduce the viscosity of the fuel oil so that it can be mobilized and recovered via trenches is appropriate for this site. Considerable detail was provided about the location of recovery trenches, the proper utilization of contingency wells, proper location of steam lines for heating the oil, and the importance of reducing the amount of oil smearing during recovery.

(Misc.)

(E. Davis(RSKERC)405-436-8548)

TECHNOLOGY TRANSFER ACTIVITIES

During August 19-21, 1997, Dr. John Wilson, Steve Acree, and Dr. Dan McInnis (RSKERC), and Dr. Kelly Hurt (NRC), and Steve Vandegrift, and Drs. Bill Lyon and Ming Ye (ManTech) participated in the Workshop on Natural Attenuation of Ground-Water Contamination sponsored by the Office of Research and Development in Denver, CO. The purpose of the workshop was to discuss the state-of-science for evaluating natural attenuation of ground-water contamination and to solicit recommendations to further the development of technical guidance. Approximately ninety people from EPA and state agencies participated in the workshop.

(S. Acree(RSKERC)405-436-8609)



HIGHLIGHTS

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Status Report for the Week of September 8, 1997**

TECHNICAL ASSISTANCE

Technical Assistance to Region V: On August 29, 1997, in response to a July 14, 1997, request from RPM Beth Reiner, Drs. Mary Randolph and John Wilson (RSKERC) provided review comments on a number of site-related documents at the Refuse Hideaway Landfill Site in Madison, WI. The purpose of the reviews was to evaluate the feasibility of using natural attenuation to address ground-water contamination at the site. The ROD selected a landfill cap, gas and leachate extraction, and a pump-and-treat system for ground-water contamination exceeding 200 ppb total VOCs. Since the completion of these measures, trends in ground-water monitoring data suggest that the concentrations of VOCs have significantly decreased. A number of natural attenuation scenarios were discussed using ground-water flow calculations from the Remedial Investigation and varying attenuation rates for tetrachloroethene. It was suggested that an evaluation of the concentration of hydrogen gas in the contaminated ground water could help select a more appropriate rate constant. The latest RSKERC version of the procedure for measuring concentrations of hydrogen in ground water was provided to the RPM.

(97-R05-006)

(M. Randolph(RSKERC)405-436-8616)

Technical Assistance to Region IX: On August 27, 1997, Steve Acree (RSKERC) met with representatives from Region IX, Nevada Department of Environmental Protection, and PRPs and their consultants at the Sparks Solvent/Fuel Site in Sparks, NV, to discuss remedial options and long-term actions to be taken following recent flooding of the former gravel pit. The meeting focussed on potential remedial technologies and strategies for capturing contaminated ground water and subsurface remediation. Additional RSKERC activities will involve a review of documents describing the proposed modifications to the former remediation system.

(94-R09-001)

(S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region IX: In response to a request from RPM Steve Linder, Steve Acree (RSKERC) met with representatives from Region IX and their consultants, City of Santa Monica, and the Los Angeles Regional Water Quality Control Board at the Charnock and Arcadia RCRA Sites in Santa Monica, CA. The purpose of the August 28, 1997, meeting was to evaluate site characterization and proposed contaminant transport modeling studies. Conceptual models for the release, transport, and fate of LNAPLs in the subsurface were discussed in detail along with potential studies to characterize release sites. It is expected that RSKERC will be requested to review documents describing the proposed ground-water modeling and contaminant transport modeling efforts.

(97RC09-001) (S. Acree(RSKERC)405-436-8609)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Pennell, Kurt D. (Georgia Inst. of Tech), Gary A. Pope (Univ. of Texas), and Linda M. Abriola (Univ. of Michigan). "Influence of Viscous and Buoyancy Forces on the Mobilization of Residual Tetrachloroethylene During Surfactant Flushing." Environmental Science and Technology Vol. 30, No. 4, 1996.

(C. West(RSKERC)405-436-8551)



HIGHLIGHTS

**National Risk Management Research Laboratory
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Status Report for the Week of September 15, 1997**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: On September 9, 1997, in a continuing technical assistance effort at the Ohio River Site on Neville Island, PA, Dr. John Wilson (RSKERC) provided RPM Romuald Roman with a review and evaluation of Groundwater Quality Beneath the Ohio River Back Channel, Neville Township, Pennsylvania. The document, which was supplemental to a previous report on an intrinsic remediation demonstration at the site, addressed the disposition of contamination from the Ohio River Site under the Back Channel of the Ohio River. The study resulted from concerns about contamination of a municipal well field. Water samples from the aquifer under the Back Channel were acquired using a hydropunch mounted on a barge. A study of changes in the ground-water chemistry suggests that water impacted by the Ohio River Site is not moving to the well field but follows the gradient of the Ohio River.

(96-R03-006)

(J. Wilson(RSKERC)405-436-8534)

Technical Assistance to Region III: In response to a July 10, 1997, request from RPM Melissa Whittington, Dr. Mary Randolph (RSKERC) and Dr. Daniel Pope (Dynamac) provided a review of the Bioremediation Treatability Study Work Plan for the Standard Chlorine of Delaware Site in Delaware City, DE. In addition, Dr. Ruth Michler (RSKERC) provided comments on the field sampling plan. The September 4, 1997, response stated that the presence of very high concentrations of contaminants and "solid pieces" of contaminants are problematical and that dilution will likely be necessary for effective bioremediation. It was also mentioned that the solid pieces of contaminants will not bioremediate, so a procedure for dealing with these materials must be developed. Comments concerning the sampling plan included the need to establish accurate background conditions, experimental error in field tests, the need to obtain statistically significant conclusions, and problems with the extrapolation of microcosm rate data to predict remediation times in the field.

(96-R03-008)

(M. Randolph(RSKERC)405-436-8616)

Technical Assistance to ORD Headquarters: On September 4, 1997, Don Draper (RSKERC) and Lowell Leach (Dynamac) provided Edward Hanlon (Office of Science Policy) with a technical review of ground-water monitoring requirements in the proposed OSW Cement Dust Disposal Regulations. The review stated that most of the material in the ground-water monitoring section was presented in a logical format and contained most of the criteria required for documenting the mobility of contaminants and/or progress of remediation when required. Although the statistical evaluation of sample analysis was described in elaborate detail, a parallel detail of monitoring well design, construction, and sampling procedures was lacking. A list of EPA and ASTM publications where these details could be located was provided.

(Misc.)

(D. Draper(RSKERC)405-436-8603)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Ning Xu and Hai Shen (NRC), and Guy W. Sewell (RSKERC). "Simultaneous Determination of Chromate and Aromatic Hydrocarbons in Environmental Samples by Capillary Electrophoresis." Intern. J. Anal. Chem, Vol. 66. 1997.

(G. Sewell(RSKERC)405-436-8566)

Weaver, James W. (RSKERC), Randall J. Charbeneau and John D. Tauxe (Univ. of Texas), Bob K. Lien (RSKERC), Jacques B. Provost Computer Sciences Corp.), and Ulrich Hungsberg (Mexico Inst. of Technology). "Modelo Para Evaluation De Derrames De Hidrocarburos (HSSM) Guia Del Usuario." EPA Publication EPA/600/R-97/003. 1997

(C. West(RSKERC)405-436-8551)

TECHNOLOGY TRANSFER ACTIVITIES

A training course entitled "Ground-Water Investigations" was held in Topeka, KS, September 9-11, 1997. Approximately 27 students, primarily from the Kansas Department of Health and the Environment, participated in the three-day course. Subjects covered included vadose zone monitoring, fundamentals of ground-water hydrology, transport and fate of contaminants, ground-water quality, ground-water investigations, and ground-water remediation. Dr. Mary Randolph (RSKERC) served as course moderator and instructor. Other instructors were Lowell Leach, Dr. Wayne Pettyjohn and Dr. Daniel Pope (Dynamac), and Dr. Ron Sims (Utah St. Univ.).

(M. Randolph(RSKERC)405-436-8616)



HIGHLIGHTS

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TECHNICAL ASSISTANCE

Technical Assistance to Region I: On August 7, 1997, Hydrologist Richard Willey requested a review of the draft Baseline Intrinsic Remediation Assessment Report for Fort Devens, MA. In the September 8, 1997, response, Don Draper (RSKERC) and Dr. Ann Azadpour (Dynamac) stated that the current analytical data and the interpretation of previous site characterization information proved inconclusive in demonstrating the natural attenuation of volatile and extractable hydrocarbons. Detailed comments were offered on a wide variety of issues ranging from spelling and syntax errors to basic inconsistencies in the principles underlying natural attenuation and the questionable value of existing data. A number of suggestions were provided on ways to improve the report ranging from an explanation of the fundamental conditions required to confirm that the processes contributing to natural attenuation are taking place, the need to establish a statistically sound characterization of the site with respect to the location and distribution of contaminants, and the instigation of a monitoring program designed to demonstrate that natural attenuation is occurring.

(97-R01-006)

(D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region II: RPM Steve Cipot received a work plan from the PRP's contractor outlining a pilot test for the Fenton's Reagent technology at the Ewan Superfund Site in Shamong Township, NJ, and requested review comments from the TSC. On September 18, 1997, Scott Huling (RSKERC) responded by commenting on a document titled Treatability Study Workplan for Fenton Pilot Test Ewan Property Site. A number of issues were discussed including the effect of using H₂O₂ and a dilute acid on the fate and transport of metals in the subsurface, the results of bench tests on the removal efficiency of volatiles and semi-volatiles, problems involved in the evaluation of performance attributed to oxidation, and an assessment of the acid neutralizing capacity of the aquifer soils.

(97-R02-007)

(S. Huling(RSKERC)405-436-8610)

Technical Assistance to Region VI: The TSC has been providing technical assistance at the Vertac Site in Jacksonville, AR, since 1992. On September 11, 1997, Steven Acree (RSKERC) provided RPM Philip Allen with comments on a monitoring plan designed to determine the effectiveness of containment systems for contaminated ground water. Based on the proposed plan, it did not appear that the proposed monitoring would be sufficient to determine whether the "plume concentration limits" established in the ROD would be exceeded in a creek adjacent to the site. A more extensive monitoring plan was suggested which included additional ground-water quality measurements between the creek and a french drain, seepage to a former cooling pond that discharges to the creek, and surface water. It was recommended that additional information, such as pumping rates from each extraction well, specific capacity information for these wells, and extraction rates from the French drain also be collected to evaluate the long-term performance, operations, and maintenance of these ground-water containment systems.

(92-R06-003)

(S. Acree(RSKERC)405-436-8609)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Yeh, Gour-Tsyh (George) and Jing-Ru (Ruth) Cheng (Penn. St. Univ.), and Thomas E. Short (RSKERC). "2DFATMIC: Two-Dimensional Subsurface Flow, Fate and Transport of Microbes and Chemicals Model, User's Manual Version 1.0." EPA Publication EPA/600/R-97/052. 1997

(T. Short(RSKERC)405-436-8544)

Yeh, Gour-Tsyh (George) and Jing-Ru (Ruth) Cheng (Penn. St. Univ.), and Thomas E. Short (RSKERC). "3DFATMIC: Three-Dimensional Subsurface Flow, Fate and Transport of Microbes and Chemicals Model, User's Manual Version 1.0." EPA Publication EPA/600/R-97/053. 1997

(T. Short(RSKERC)405-436-8544)

Borden, Robert C., Melody J. Hunt, Michael B. Shafer, and Morton A. Barlaz (NC St. Univ.). "Anaerobic Biodegradation of BTEX in Aquifer Material." EPA Research Brief. EPA/600/S-97/003. 1997

(J. Wilson(RSKERC)405-436-8534)



HIGHLIGHTS

**National Risk Management Research Laboratory
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TECHNICAL ASSISTANCE

Technical Assistance to Region I: On September 18, 1997, Don Draper (RSKERC) and Dr. Daniel Pope (Dynamac) provided RPM Richard Goehlert with technical comments on an evaluation of biotic transformations of chlorinated compounds at the Savage Well Superfund Site in Milford, NH. The assistance was in response to a request dated August 14, 1997. It was pointed out that the conclusions reached must be considered tentative because of the limited amount of available data. Although there appeared to be reasonable evidence that biodegradation was taking place at several locations in the aquifer, there was not enough data to determine degradation rates accurately, nor was there enough information to estimate (by modeling) what contribution biodegradation was making toward the remediation or control of the plume.

(97-R01-007)

(D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region II: On September 23, 1997, Drs. David Jewett and Ruth Michler (RSKERC), and Dr. Rashid Islam (ManTech) provided RPM Stephen Cipot with comments concerning metals concentrations in ground water at the Ewan Property Site in Shamong Township, NJ. The review comments focussed on proper statistical methods to analyze metal concentrations in monitoring wells. The remediation plan involves the discharge of effluent from a ground-water remediation system to surface impoundments and subsequent infiltration to the subsurface. It was suggested that modeling the fate and transport of metals in the subsurface requires a good understanding of the geochemical nature of the porous medium as well as the degree of geochemical heterogeneity present at the site.

(97-R02-001)

(D. Jewett(RSKERC)405-436-8560)

Technical Assistance to Region IX: On July 23, 1997, RPM Carolyn d'Almeida requested technical assistance from Ed Bates (EMSL Cinn.) who, on July 29, 1997, requested assistance from RSKERC. The assistance concerns the type of information required to identify all of the major contaminant transport routes of mercury from the Sulphur Bank Mercury Mine near Clear Lake, CA, into the lake. The September 29, 1997, response from Dr. David Jewett (RSKERC) outlined three possible avenues for contaminant transport, and suggested methods by which information could be collected for their evaluation, including geophysical investigations, subsurface sampling, monitoring well installation, field tests and water quality sampling, and tracer studies.

(97-R09-006)

(D. Jewett(RSKERC)405-436-8560)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Sims, Ronald C., Judith L. Sims, and Darwin L. Sorensen (Utah St. Univ.). "Champion International Superfund Site, Libby, Montana Field Performance Evaluation Bioremediation Unit: In Situ Bioremediation of the Upper Aquifer." EPA Report. EPA/600/R-97/044. 1997

(D. Burden(RSKERC)405-436-8606)



HIGHLIGHTS

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TECHNICAL ASSISTANCE

Technical Assistance to Region I: On October 1, 1997, Dominic DiGiulio (RSKERC) provided RPM Neil Handler with recommendations on soil venting monitoring at the Stamina Mills NPL Site in North Smithfield, RI. Comments were offered in areas including continuous and periodic monitoring of air flow, water, and soil moisture, and the installation of vapor probes.

(Misc.)

(D. DiGiulio(RSKERC)405-436-8605)

Technical Assistance to Region IX: On October 3, 1997, Steven Acree (RSKERC) provided RPM Jeff Dhont with review comments on a DNAPL evaluation plan for the Montrose Superfund Site in Torrance, CA. In general, it appeared that the proposed studies, combined with information from previous DNAPL recovery tests, would provide some useful information for the performance of screening-level evaluations of DNAPL removal using conventional pumping technologies. The information may also be used to calculate the potential mobility of DNAPLs under various scenarios and forming conceptual mobility models.

(95-R09-015)

(S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region X: On July 9, 1997, Site Assessment Manager Joanne LaBaw requested assistance in understanding how ethylene dibromide (EDB) behaves in the subsurface at Fort Hall, ID. On October 3, 1997, Dr. Mary Randolph (RSKERC) and Dr. Bruce Pivetz (ManTech) addressed the lack of detection of EDB in soil-gas samples as well as its behavior in the subsurface. In general, EDB can persist for long periods of time in soil due to entrapment in soil micropores even though it is very volatile, relatively soluble, and only weakly sorbed. It is possible that soil-gas measurements are not reliable in detecting the presence of residual EDB in soil even when the gas phase analytical techniques are calibrated and performed correctly. It was suggested that methods used in field sampling and analysis be closely reviewed to determine if the lack of EDB detection is due to shortcomings in the field investigation and the inherent difficulties in measuring aged EDB in soil gas. Detailed information was provided about the sampling, extraction, and analytical interpretation of results to assist in making a determination as to the presence of EDB in the soil.

(97-R10-002)

(M. Randolph(RSKERC)405-436-8616)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Jorgensen, Eric E. and Guy W. Sewell (RSKERC). "Risk Management Research Plan for Ecosystem Restoration in Watersheds." EPA Published Report. EPA-600/R-97/078. 1997

(E. Jorgensen(RSKERC)405-436-8545)

VISITING SCIENTISTS

On September 30, 1997, Drs. Robin Newmark and Roger Aines from the Lawrence Livermore National Laboratory in Livermore, CA, gave a presentation at RSKERC on thermal remediation. The technology that they have been instrumental in developing involves the injection of steam into permeable subsurface zones, and if necessary, the electrical heating of low permeability zones, to displace and volatilize organic contaminants. A full-scale demonstration at a gasoline spill site was successful in recovering gasoline, while a full-scale remediation is currently in progress to recover creosote at a wood treatment site. At both sites, recovery rates achieved by pump-and-treat were dramatically increased by injecting steam. At the gasoline spill site 7,600 gallons of gasoline were recovered in approximately three months of steam injection, and there is evidence that indigenous microbial populations are metabolizing the small amount of remaining gasoline. At the wood treatment site, over 25,000 gallons of creosote were recovered in the first six weeks of steam injection. The costs for these two remediations are in the range of \$110 to \$25 per cubic yard of soil treated. They also presented results of their current research which shows that a percentage of the contaminants are destroyed in situ by hydrous pyrolysis/oxidation reactions which occur at the temperatures reached in the subsurface during steam injection, ultimately converting them to carbon dioxide and water.

(E. Davis(RSKERC)405-436-8548)



HIGHLIGHTS

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TECHNICAL ASSISTANCE

Technical Assistance to Region I: On October 8, 1997, Don Draper and Dr. Guy Sewell (RSKERC), and Drs. Hugh Russell and Sam Lee (Dynamac) provided Region I with comments concerning the applicability of natural attenuation at the Ottati and Goss Superfund Site in Kingston, NH. In general, as with mosy sites, there is a wealth of information, but little that is of use when attempting to determine if natural attenuation is an applicable technology for the protection of human health and the environment. The conditions required to demonstrate that natural attenuation processes were taking place at the site were discussed in considerable detail. It was concluded that an analysis of the time required to meet established remediation goals could not be done with the information provided.

(96-R01-005)

(D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region VII: On September 4, 1997, RPM Tom Lorenz requested review comments on the feasibility study and remedial action for the ground-water operable units at the chemical plant and ordnance works areas at the Weldon Spring Ordnance Works Site near St. Charles, MO. In the October 8, 1997, response, Don Draper and Dr. Milovan Beljin (RSKERC) stated that, overall, the process of selecting alternative ground-water remediation alternatives was performed correctly, and the preferred alternative (monitoring with no active remediation) seemed to be the best option considering its effectiveness, implementability, and cost. It was suggested that the monitoring system be evaluated every three years, and if the changes in concentrations occur as expected, the reviews could be conducted every five years.

(97-R07-008)

(D. Draper(RSKERC)405-436-8603)

Technical Assistance to Region IX: On October 8, 1997, Steven Acree (RSKERC) provided RPM Steve Linder with comments on a proposed guidance for conducting and reporting on the results of subsurface investigations in the Charnock sub-basin of the Charnock and Arcadia Sites in Santa Monica, CA. The investigations were designed to identify potential sources of methyl tertiary butyl ether (MTBE) contamination. In general, the techniques described in the draft guidance were conventional tools and methods for subsurface characterizations which appeared to be suitable for identifying the principal sources of contamination. It was recommended, however, that the incorporation of recent techniques for more rapid and cost-effective site assessments be considered. Detailed comments and recommendations were provided in the areas of subsurface soil, ground-water, and active soil gas investigations.

(97RC09-001)

(S. Acree(RSKERC)405-436-8609)

Technical Assistance to Region IX: On August 26, 1997, RPM John Lucey requested review comments on a document entitled "SVE Closure Report, Buildings 673 and 763, TCE Source Area Remedial Action, Central Base Area Operable Unit, Norton AFB, San Bernardino, California." In a response dated October 3, 1997, Dominic DiGiulio (RSKERC) suggested that the main basis for closure appeared to be as a result of modeling with VLEACH. It was pointed out that this model is a gross simplification of reality and is essentially a risk management tool which was not intended to be validated in the field. A soil venting closure strategy must include provisions that ensure a sound engineering design and assessment of rate-limited vapor transport. A detailed outline for a reasonable approach to soil venting closure was provided.

(97-R09-007)

(D. DiGiulio(RSKERC)405-436-8605)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Guarnaccia, Joseph, and George Pinder (Univ. of Vermont), and Mikhail Fishman (Dynamac). "NAPL: Simulator Documentation." EPA Published Report. EPA/600/R-97/102. 1997

(T. Short(RSKERC)405-436-8544)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of October 27, 1997**

TECHNICAL ASSISTANCE

Technical Assistance to Region V: The Wurtsmith Air Force Base is located in Oscoda, MI. Enhanced in-situ bioremediation has been selected to remediate the dissolved phase contaminant plume at the Northern Landfills on the Base. On September 5, 1997, RPM Diana Mally requested a review of the Supplemental Design Support Work Plan for this work. In the October 10, 1997, response, Dr. John Wilson (RSKERC) pointed out that the use of an oxygen releasing compound (ORC) should be used in place of hydrogen peroxide due to its residual capacity. It was also pointed out that the site is a good candidate for in-situ bioremediation; however, any successful application will depend on the proper circulation of ground water. The design, as now proposed, would have little chance of success.

(97-R05-007)

(J. Wilson(RSKERC)405-436-8534)

Technical Assistance to Region VII: On September 25, 1997, a meeting was held at the RSKERC to present the results of contaminant transport simulations for four plumes at the Ogallala Ground-Water Contamination Site in Ogallala, NE, and to identify additional field data needed to complete the modeling tasks. The overall objectives of the Ogallala Water Supply modeling effort are to develop a comprehensive ground-water and contaminant transport model to predict the fate and transport of contaminants in ground water. Following a site visit October 6-7, 1997, Dr. David Jewett (RSKERC) and Dr. Rashid Islam (ManTech), working through the Center for Subsurface Modeling Support (CSMoS), provided RPM Victor Lyke with information to help prepare a statement of work for the next round of ground-water quality sampling, and an update on site ground-water flow and contaminant transport modeling.

(97-R07-003)

(D. Jewett(RSKERC)405-436-8650)

Technical Assistance to Region IX: In a continuing technical assistance effort at the Sparks Solvent/Fuel Site in Sparks, NV, Steven Acree (RSKERC) provided OSC Donn Zuroski with a technical review of a draft long-term monitoring plan for the site. The October 9, 1997, comments stated that, in general, the proposed plan appeared to be adequate as an initial basis for monitoring the effectiveness of the extraction system in containing contaminated ground water. It was noted, however, that significant changes to the remediation system have been discussed, and that any changes in the system design should be accompanied by a re-evaluation of the long-term monitoring objectives.

(94-R09-001)

(S. Acree(RSKERC)405-436-8609)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Sabatini, David A., Robert C. Knox, and Edwin E. Tucker (Univ. of Okla.), and Robert W. Puls (RSKERC). "Innovative Measures for Subsurface Chromium Remediation: Source Zone, Concentrated Plume, and Dilute Plume." EPA Research Brief. EPA/600/S-97/005. 1997

(R. Puls(RSKERC)405-436-8543)

Cohen, Robert M., James W. Mercer, and Robert M. Greenwald (GeoTrans), and Milovan S. Beljin (RSKERC). "Design Guidelines for Conventional Pump-and-Treat Systems." EPA Issue Paper. EPA/540/S-97/504. 1997

(D. Burden(RSKERC)405-436-8606)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of November 17, 1997**

TECHNICAL ASSISTANCE

Technical Assistance to Region V: On October 30, 1997, Randall Ross (RSKERC) and Dr. Milovan Beljin (Dynamac) participated in a public meeting concerning the Velsicol (Michigan) Superfund Site in St. Louis, MI. They presented the general findings of the Velsicol Containment System Assessment Report prepared by Memphis Environmental Consultants, and answered questions regarding leakage in and out of the hazardous waste containment system. Modifications necessary to finalize the draft modeling report were also discussed. About 150 people attended the meeting including representatives from the Region and MDEQ.

(95-R05-003)

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

Technical Assistance to Region VII: On November 4, 1997, Joe Williams and Dr. David Jewett (RSKERC), and Dr. Rashid Islam (ManTech) met in the Regional Office to present the status of ground-water modeling for the Ogallala Ground-Water Contamination Site in Ogallala, NE. Scenarios for evaluating the ground-water system were discussed along with information needed to justify an additional round of sampling. The Region was informed that base maps for the Ogallala Site are available in MapInfo/SiteGIS and information for producing contaminant contour distribution maps will be entered as soon as they become available.

(93-R07-002)

(J. Williams(RSKERC)580-436-8608)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Hunt, Melody J., Michael B. Shafer, Morton A. Barlaz, and Robert C. Borden (NC St. Univ.). "Biodegradation of Alkybenzenes in Aquifer Material Under Methanogenic and Iron Reducing Conditions." *Bioremediation Journal*, Vol. 1, 1997.

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

Wilson, John T. (RSKERC). "Enhanced Biological Electron Acceptor H_2O_2 ." *Subsurface Restoration*, 1997. Proceedings of Subsurface Restoration Conference at Dallas, TX, June 21-24, 1992.

(D. Kampbell(RSKERC)580-436-8564)

Vessely, Mark and David E. Moutoux (Parsons Eng.), Don Kampbell (RSKERC), and Jerry E. Hansen (Brooks AFB). "Demonstrating Remediation by Natural Attenuation Using Numerical Groundwater Models and Annual Groundwater Sampling." Proceedings of the Eleventh National Outdoor Action Conference and Exposition. Denver, CO. April 1-3, 1997.

(D. Kampbell(RSKERC)580-436-8564)

Xun, Ning (NRC), Steve Vandegrift and Dennis D. Fine (ManTech), and Guy W. Sewell (RSKERC). "Ion-Exclusion Chromatographic Determination of Carboxylic Acids Used to Support the Microbially Mediated Reductive Dechlorination of Tetrachloroethene." *Environmental Toxicology and Chemistry*, Vol. 16, No. 11. 1997.



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of November 24, 1997**

TECHNICAL ASSISTANCE

Technical Assistance to Region II: On September 23, 1997, RPM Mary Logan requested review comments on the draft remedial investigation for Operable Unit 3 which was developed to address ground-water contamination in the central and western portions of the Brookhaven National Laboratory in Upton, NY. In a response dated November 19, 1997, Steven Acree (RSKERC), and Dr. Rashid Islam and Lonnie Kennedy (ManTech) stated that the investigation appeared to have been focussed on defining the extent of ground-water contamination downgradient from potential sources. With some exceptions, the information provided a relatively detailed characterization of the extent of the known contaminant plumes. However, less information was available to characterize source areas for continuing ground-water contamination. It was suggested that such data gaps would render the evaluation of potential remedial options in these source areas relatively uncertain. Both general and detailed comments were provided in a number of diverse areas including contaminant sources, hydrogeologic characterization, numerical modeling of ground-water flow and contaminant transport, and the occurrence of DNAPLs.

(98-R02-002)

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

Technical Assistance to Region V: On October 2, 1997, RPM Ross del Rosario requested review comments on a document concerning the demonstration of natural attenuation at the Industrial Excess Landfill Site in Stark County, OH. In a response dated November 18, 1997, Dr. Mary Randolph (RSKERC) and Dr. Hai Shen (Dynamac) stated that, in general, the document was well organized and that its purpose was clearly presented. In addition to questioning some conclusions in the report, some apparent inconsistencies between the data presented and the interpretation of that data were pointed out. Other discussions focused on the information needed to demonstrate that natural attenuation processes were taking place and to determine that the rate of these processes are acceptable for site remediation.

(98-R05-001)

(M. Randolph(RSKERC)580-436-8616)

Technical Assistance to Region VII: On November 5, 1997, Joe Williams and Dr. David Jewett (RSKERC), and Dr. Rashid Islam (ManTech) met at the Regional Office to discuss and give an update on activities at the Coleman Operable Unit/29th and Mead Site in Wichita, KS. The possibility of additional ground-water modeling assistance was discussed. It was pointed out that the TSC has base maps in MapInfo/SiteGis, and are able to produce contaminant contour maps for the site.

(93-R07-002)

(J. Williams(RSKERC)580-436-8608)

Technical Assistance to Region IX: On October 28, 1997, Dr. Scott Huling (RSKERC) and Dr. Bruce Pivetz provided RPM Janet Rosati with an evaluation of the application of phytoremediation in soil at the Del Monte Corporation (Oahu Plantation) Superfund Site, Kunia, Oahu, Hawaii. On November 17, 1997, a follow-up technical review was provided based on additional information conveyed during a meeting held in the Regional Office October 29-30, 1997. A number of general issues were discussed including bench-scale on-site studies involved with the treatment of contaminated soil derived from drill cuttings generated during the site investigation, contingency plans if DNAPLs are encountered during field investigations, problems associated with aged ethylene dibromide (EDB) trapped in the soil, and the selection of plants used in phytoremediation studies. Specific comments were concerned with the transformation of soil fumigants, bench-scale treatability investigations, site characterization, sampling methods, and data analysis and interpretation.

(98-R09-001)

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

Technical Assistance to Region X: The U.S. Navy is proposing to apply natural attenuation and phytoremediation as the principle remedial elements for a landfill site at the Naval Undersea Warfare Center in Keyport, WA. On August 8, 1997, RPM Nancy Harmon requested assistance in the review of the natural attenuation of portion of the remediation plan. On November 18, 1997, Don Draper (RSKERC), and Drs. Varadhan Ravi and Daniel Pope (Dynamac) indicated that there were many serious concerns regarding the adequacy of the site characterization efforts for understanding the physical, chemical, and biological processes active at the site. Detailed discussions were presented regarding the processes involved in natural attenuation and the types of information needed to demonstrate that these processes are taking place at an acceptable rate, the need for additional characterization information for the source area and the aquifer, sampling and analysis, and long-term monitoring.

(97-R10-003)

(D. Draper(RSKERC)580-436-8603)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of December 8, 1997**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: On November 26, 1997, Dr. John Wilson (RSKERC) provided RPM Debra Rossi with review comments of the Focused Feasibility Study Ground-Water Remedy: Woodlawn Landfill Site in Cecil County, MD. A number of general issues were discussed including the problems associated with the continuing transfer of vinyl chloride from the landfill to the ground water, and the results of plume modeling. More specific comments and suggestions were made with respect to a wide spectrum of site related issues.
(97-R03-001) (J. Wilson(RSKERC)580-436-8534)

Technical Assistance to Region VI: On November 25, 1997, Dr. Scott Huling (RSKERC) provided RPM Glen Celerier with review comments of the Bioremediation Treatability Study for Remedial Action at the Popile Site in El Dorado, AR. Concerns were expressed about the scale of the project, as well as its location at the Army Engineer Waterways Experiment Station in Vicksburg, MS, versus an on-site study. Detailed comments were provided in areas such as the experimental design, sampling, data analysis, and amending the soil with carbon and surfactants.
(93-R06-003) (S. Huling(RSKERC)580-436-8610)

Technical Assistance to Region IX: On December 1, 1997, in a continuing technical assistance effort at the Unocal Site in Guadalupe, CA, Steven Acree (RSKERC) provided OSC Donn Zuroski with review comments on several potential remedial alternatives discussed in the Environmental Impact Report. It was pointed out that the rationale for the selections of remedial technologies in various areas was not always clear, and that estimates of the effectiveness of certain technologies may be overly optimistic. It was also noted that the development of remedial alternatives was complicated by the fact that remedial objectives were not well defined. A number of general and specific comments were offered in a variety of areas.
(97-R09-005) (S. Acree(RSKERC)580-436-8609)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Knox, R.C., D.A. Sabatini, R.E. Brown, and T. Soerens (Univ. of Okla.), and C. West (RSKERC). "Design of a Surfactant Remediation Field Demonstration Based on Laboratory and Modeling Studies." *Ground Water*, Vol. 35(6). 1997.
(S. Mravik(RSKERC)580-436-8553)

Knox, R.C., D.A. Sabatini, J.H. Harwell, and R.E. Brown (Univ. of Okla.), C.C. West (RSKERC), F. Blaha (U.S. Coast Guard), and C. Griffin (Global Env. Eng.). "Surfactant Remediation Field Demonstration Using a Vertical Circulation Wall." *Ground Water*, Vol. 35(6). 1997.
(S. Mravik(RSKERC)580-436-8553)

Acree, Steven D., Randall R. Ross, and Guy Sewell (RSKERC), Mike Hightower (Sandia Natl. Lab.), and Brent Weesner (Lockheed Martin). "Site Characterization for the Design of In-Situ Electron Donor Delivery Systems." Fourth International Symposium on In-Situ and On-Site Bioremediation. Battelle. New Orleans, LA. May, 1997.
(G. Sewell(RSKERC)580-436-8566)

Jorgensen, E.E. (RSKERC). "Habitat Suitability is an Important Concept." *Wildlife Society Bulletin*. 25:602-603. 1997.
(E. Jorgensen(RSKERC)580-436-8545)



H I G H L I G H T S

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of December 22, 1997**

TECHNICAL ASSISTANCE

Technical Assistance to Region VIII: On December 16, 1997, Don Draper (RSKERC) and Jack Keeley (Dynamac) provided review comments on the PCB ground-water monitoring plan associated with Minuteman II Deactivation at Ellsworth AFB, SD, to fulfill compliance requirements of the START Treaty. PCBs have been found in the coating materials used for waterproofing and corrosion control of the launch facility silos, support buildings and control facilities. These coatings apparently were universally used in all the Minuteman II sites constructed in this country. In general, the monitoring plan was found to be well written and comprehensive. It was clear that those associated with the development of the plan and the conduct of the work are qualified and experienced in ground-water monitoring. In addition to minor editorial corrections, suggestions were offered concerning the design of the monitoring wells and passive sampling procedures to reduce turbidity in the samples.

(Misc.)

(D. Draper(RSKERC)580-436-8603)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Jorgensen, E.E., C. Geron, and G.W. Sewell (RSKERC). "Risk Management Research Plan for Ecosystem Restoration in Watersheds." EPA Published Report. EPA/600/R-97/078. 1997.

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

TECHNOLOGY TRANSFER ACTIVITIES

During December 2-4, 1997, the Technology Support Center (TSC) presented a Natural Attenuation of Ground-Water Contamination training course in Dallas, TX, with discussions focusing on sorption, dilution, volatilization, and biodegradation processes, as well as monitoring requirements to demonstrate that these processes are taking place. The students were also involved with hands-on experience using BIOSCREEN as a decision support system in reviewing natural attenuation proposals. Twenty-six students attended the course representing Regions 6 and 7, the states of Arkansas and New Mexico, and the Tulsa District Corps of Engineers. Dr. Mary Randolph (RSKERC) served as course moderator, while the instructors included Dr. John Wilson (RSKERC), Barbara Wilson and Dr. Daniel Pope (Dynamac), and Dr. Ron Sims (Utah St. Univ.). The course will be presented again in Philadelphia (Jan. 13-15), Richmond (Feb. 24-26), Raleigh (Mar. 3-5), and Boston (Apr. 6-9).

(M. Randolph(RSKERC)580-436-8593)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of December 29, 1997**

TECHNICAL ASSISTANCE

Technical Assistance to Region VIII: On December 18, 1997, Steven Acree and Dr. Guy Sewell (RSKERC) attended a meeting in Salt Lake City, UT, to participate in the evaluation of natural attenuation at the Petrochem/Ekotech Superfund Site. Also attending the meeting were representatives from the Region, State of Utah, and the responsible parties and their consultants. The purpose of the meeting was to discuss hydrogeologic and geochemical characterization data and studies required to fill gaps in understanding contaminant transport and fate processes at the site. The meeting focused on potential characterization tools including borehole flowmeter studies to define the hydraulic conductivity distribution and the use of a natural gradient tracer test.

(93-R08-003)

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

Technical Assistance to Region II: In response to a request from RPMJ, Kevin Willis, Dr. David Jewett (RSKERC) and Dr. Rashid Islam (ManTech) made a technical review of a ground-water modeling study for the Port Washington Landfill in Port Washington, NY. The December 22, 1997, review comments stated that, in general, the ground-water modeling work appeared to well represent the detailed site geology and long-term hydrogeologic conditions, while progressing logically through the model development and implementation. A presentation of the conceptual model and the detailed description of the MODFLOW model construction appeared to be adequate. The calibrated model represented long-term, steady-state site conditions, and the capture zone analysis identified the surrounding area from which water is expected to move to the extraction wells. A number of concerns identified in the modeling study were discussed in detail.

(97-R02-006)

(D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region IV: On October 9, 1997, RCRA Programs Branch Chief Narindar Kumar requested review comments of the Preliminary Intrinsic Bioremediation Evaluation of the Corrective Measures Study for the United Technologies Corporation (Pratt & Whitney) Site in Palm Beach County, FL, with particular emphasis on the adequacy of the study to support its conclusions concerning the potential for intrinsic bioremediation to reduce the mass of VOCs in plumes at the site. In the December 22, 1997, response, Dr. Mary Randolph (RSKERC) and Dr. Bruce Pivetz (ManTech) stated that the sampling, analytical parameters, data interpretation approach, and results are sound and indicate there is a potential for intrinsic bioremediation, and supported further investigations of the site. Although a reduction in the concentration of contaminants of concern and the presence of dechlorination products suggests that naturally-occurring biodegradation is taking place, the data interpretation section should contain a stronger explanation as to how it relates to intrinsic bioremediation. It was suggested that the report demonstrate more conclusively that intrinsic bioremediation is taking place and that the rate at which it is occurring will result in a contaminant reduction to acceptable levels before receptors are reached.

(98RC04-001)

(M. Randolph(RSKERC)580-436-8616)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of January 12, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: On September 4, 1997, RSKERC provided RPM Melissa Whittington with review comments on the Bioremediation Treatability Study Work Plan for the Standard Chlorine Superfund Site in New Castle, DE. On January 2, 1998, Dr. Mary Randolph (RSKERC) and Dr. Daniel Pope (Dynamac) reviewed a revision of the work plan to determine if the previous comments had been incorporated. In general, most of the earlier comments had been addressed. The exceptions will impact the interpretations of the results of the proposed study so as to render the conclusions less broadly applicable. Essentially, the proposed studies are designed to indicate if it is worthwhile to pursue the concept of bioremediation further.

(96-R03-008)

(M. Randolph(RSKERC)580-436-8616)

Technical Assistance to Region III: Following a conference call with RPM Michael Jacobi on December 15, 1997, Randall Ross (RSKERC) and Dr. Daniel Pope (Dynamac) provided the Region with review comments on the Final Phase I RCRA Corrective Measures Study for the Babcock & Wilcox Athos Site in Lynchburg, VA. The January 6, 1998, comments stated that, in general, the study adequately responded to the original RSKERC concerns. Several unresolved concerns were discussed including ground-water flow and contaminant transport and fate. Other issues of importance concerned enhanced sampling and analysis of geochemical parameters and calculations of biodegradation rates.

(97RC03-002)

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

Technical Assistance to Region IX: In a continuing technical assistance effort at the Montrose Superfund Site in Torrance, CA, Steven Acree (RSKERC) provided RPM Jeff Dhont with review comments on a DNAPL Information Submission document. The January 7, 1998, comments discussed the significant uncertainty that will remain following studies aimed at defining zones of DNAPL contamination using currently available characterization techniques. Some emerging technologies for providing a better characterization of zones of DNAPL contamination were discussed, however, it was pointed out that they require a high degree of expertise, are still under development, and are not readily available. Detailed comments and recommendations regarding these and other potential areas of concern were provided.

(95-R09-015)

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



H I G H L I G H T S

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of January 19, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: On December 12, 1997, RPM Randy Sturgeon requested assistance in reviewing the preliminary results from a pilot SVE and NAPL recovery testing program at the Dover Gas Light Superfund Site in Dover, DE. In a response dated January 9, 1998, Dominic DiGiulio (RSKERC) questioned the report's conclusions that NAPLs were not present at the site and suggested that, when a substantial volume of DNAPL has been introduced to the subsurface, there is a significant potential that it has accumulated as a free fluid above the confining unit. It was pointed out that an investigation for recoverable DNAPL should incorporate drilling to the interface of the confining unit, but not below. The SVE system was discussed in considerable detail including problems associated with basing the SVE system design on radius of influence measurements.

(98-R03-003)

(D. DiGiulio(RSKERC)580-436-8605)

Technical Assistance to Region III: On November 25, 1997, RPM Jim Harper and Hydrogeologist Kathy Davies requested assistance in evaluating natural attenuation as a remedial alternative at the Blosenski Superfund Site in Chester County, PA. In the January 13, 1998, response, Jerry Jones (RSKERC) and Lowell Leach (Dynamac) discussed the hydrogeology in considerable detail as it concerned the transport of contaminants at the site. It was also noted that, although the products of anaerobic biodegradation appeared to be present, the reported concentrations of dissolved oxygen caused concern with respect to the validity of the analyses. It was suggested that additional wells be installed to make a more definitive correlation between the highest VOC concentrations in the most fractured zones with springs and streams located both north and south of the landfill area. It was also suggested that additional, carefully controlled sampling be carried out for dissolved oxygen, redox potential, and degradation products to satisfy concerns about the quality of the analyses.

(98-R03-005)

(J. Jones(RSKERC)580-436-8593)

Technical Assistance to Region VII: In a continuing technical assistance effort at the Well #3 Subsite of the Hastings Ground-Water Contamination Site in Hastings, NE, Randall Ross (RSKERC) provided RPM Diane Easley with review comments on the performance of a ground-water extraction system. In the January 12, 1998, response it was pointed out that it was unclear whether the primary objective of the ground-water extraction system is hydraulic containment, ground-water quality restoration, or a combination of the two. Criteria necessary to evaluate the success or failure of the ground-water extraction system are different for hydraulic containment and restoration. Included with the review comments were a number of ground-water extraction simulations from which conclusions were drawn concerning the number of monitoring points, the influence of industrial wells in the area, the impact of injecting treated ground water back into the formation, and the value of pulse pumping extraction wells.

(97-R07-004)

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

TECHNOLOGY TRANSFER ACTIVITIES

During January 13-15, 1998, the Technology Support Center (TSC) presented a Natural Attenuation of Ground-Water Contamination training course in Philadelphia, PA, with discussions focusing on sorption, dilution, volatilization, and biodegradation processes, as well as monitoring requirements to demonstrate that these processes are taking place. The students were also involved with hands-on experience using BIOSCREEN as a decision support system in reviewing natural attenuation proposals. Forty students attended the course representing Regions III and the states of Maryland, Delaware, and Pennsylvania. Dr. Mary Randolph (RSKERC) served as course moderator, while the instructors included Dr. John Wilson (RSKERC), Barbara Wilson and Dr. Daniel Pope (Dynamac), and Dr. Ron Sims (Utah St. Univ.). The course will be presented again in Richmond, VA (Feb. 24-26), Raleigh, NC (Mar. 3-5), and Boston, MA (Apr. 6-9).

(M. Randolph(RSKERC)580-436-8616)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of February 2, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: On January 20, 1998, in a continuing technical assistance effort at the Picillo Farm Site in Kent County, RI, Dominic DiGiulio (RSKERC) provided RPM Anna Krasko with comments and recommendations concerning dewatering and soil vacuum extraction activities at the site. Major recommendations concerned the vertical spacing in wells for ground-water sampling for VOCs and acceptable depths for dewatering.

(92-R01-009)

(D. DiGiulio(RSKERC)580-436-8605)

Technical Assistance to Region I: On December 30, 1997, RPM Richard Goehlert requested technical assistance in the evaluation of the biotic transformation of chlorinated compounds at the Savage Well Site located in the western portion of the Town of Milford, NH. On January, 27, 1998, Jerry Jones (RSKERC) and Dr. Daniel Pope (Dynamac) suggested that further evaluation is needed in terms of data and time to assess degradation rates at specific site locations if the biodegradation component of natural attenuation is to be considered as a remedial alternative. It was pointed out that fate and transport modeling based on contaminant and hydrogeological data should be enough to evaluate the role of natural attenuation in terms of achieving site remedial goals. Long-term monitoring will also be necessary to determine if the selected remedy is adequately meeting these goals.

(97-R01-007)

(J. Jones(RSKERC)580-436-8593)

Technical Assistance to Region II: On January 15, 1998, RPM Linda Ross requested review comments on the Conceptual Design Plan Air Sparge/Soil Vapor Extraction System for the Fulton Avenue Site in Fulton, NY. On January 13, 1998, Dominic DiGiulio (RSKERC) stated that the design of a vacuum extraction system based on the radius of influence approach, and monitoring the effectiveness of sparging on dissolved oxygen monitoring are both inappropriate. It was pointed out that the greatest objection to using the radius of influence approach for determining the pneumatic permeability and SVE design is that radial flow rarely occurs in soil during vacuum extraction because of partial penetration of screened intervals and a constant pressure (atmospheric) boundary at the soil surface. In regard to monitoring needs to support an air sparging application, detailed and specific recommendations were provided.

(98-R02-004)

(D. DiGiulio(RSKERC)580-436-8605)

Technical Assistance to Region IX: On January 22, 1998, in a continuing technical assistance effort at the Charnock and Arcadia RCRA Sites in Santa Monica, CA, Steven Acree (RSKERC) provided RPM Steve Linder with review comments on documents relating to a short-term pumping test performed in September, 1997, at the Arcadia well field. In general, it appeared that several previous conclusions regarding site hydrology were not supported by the pump test results. The data suggests that significant hydraulic communication may exist between the shallow and deeper aquifers and significant leakage may occur under pumping conditions. It did not appear, however, that sufficient information has been acquired to adequately evaluate potential contaminant migration pathways and estimate aquitard properties. These issues and other concerns were discussed in considerable detail.

(97RC09-001)

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



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of February 9, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region VIII: On December 8, 1997, On-Scene Coordinator Johanna Miller requested technical assistance at the former Lovell Refinery Site in Lovell, WY, where the current phase of remediation involves land treating approximately 50,000 cubic yards of petroleum contaminated soil. In a response dated January 30, 1998, Dr. Scott Huling (RSKERC) and Dr. Bruce Pivetz (ManTech) discussed a number of issues in detail including problems associated with full-scale bioremediation treatment and recommended changes to field operations. Overall, it was recommended that the vegetative cover issue be further evaluated with respect to the relative advantages of various candidate plant species, cost analysis, and appropriate test plots. It was also suggested that no further action be taken regarding proposed changes to field operations until the vegetative cover scenario is evaluated.

(98-R08-001)

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

Technical Assistance to Region IX: On January 27, 1998, at the request of RPM Carolyn d'Almeida, Dr. David Jewett (RSKERC) attended a meeting at the University of California at Davis (UCD) concerning the Sulphur Bank Mercury Mine (SBMM). In addition to an update on site activities, the objectives of the meeting were to review the UCD proposed work plan and discuss additional site characterization investigations. Also in attendance were representatives from Region IX, NRMRL-Cincinnati, UCD researchers, and personnel from various state and local environmental agencies. The Technology Support Center will continue to provide support to Region IX by reviewing the UCD work plan, developing a GIS database, and characterizing the subsurface.

(97-R09-006)

(D. Jewett(RSKERC)580-436-8560)

RESEARCH APPLICATIONS

Drs. John Wilson and Kelly Hurt, and Frank Beck (RSKERC) traveled to Griffin, GA, January 26-30, 1998, to sample ground-water monitoring wells at an old manufactured-gas plant (MGP) where natural attenuation is being implemented to remediate a 1-acre site contaminated with polynuclear aromatic hydrocarbons (PAHs). Based on long-term research at RSKERC to clean up BTEX compounds, the Responsible Party's consultant chose to apply this technology to clean up the MGP. Georgia officials invited RSKERC to participate in a performance evaluation of the remediation approach. The plant, one of more than 1,500 MPGs operated country-wide before natural gas was effectively harnessed, was in service between 1914 and 1930.

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



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of February 16, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: In response to a February 2, 1998, request from RPM Paul Marchessault, Dr. John Wilson (RSKERC) provided Region I with review comments on the Draft LF-1 Execution Plan for the Massachusetts Military Reservation located on Cape Cod, MA. The February 10, 1998, response concerned the demonstration of natural attenuation as an appropriate strategy for a portion of a plume of ground-water contamination at the site. It was pointed out that in order to estimate the rate of biodegradation of PCE, TCE, and carbon tetrachloride as a part of the transport and fate modeling of natural attenuation, it is necessary to know whether the geochemistry is reducing enough to support biological reductive dechlorination. It was suggested that the best way to determine whether biological reductive dechlorination can be expected is to measure the concentration of H_2 dissolved in ground water. To this end, a draft RSKERC procedure for the sampling and analysis of hydrogen in ground water was provided as well as a list of other parameters which should be added to the monitoring plan.

(98-R01-001)

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

Technical Assistance to Region II: On February 10, 1998, Dr. David Jewett (RSKERC) provided RPM Romona Pezzella with a technical review of an Intrinsic Bioremediation Work Plan for the Ciba-Geigy Superfund Site in Toms River, NJ. The review comments focused on the need for improved site characterization information including the heterogenous nature of hydrogeologic properties, geochemical conditions, and contaminant distribution. Detailed discussions were provided with respect to the number, location, and design of monitoring wells.

(95-R02-003)

(D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region IX: On February 6, 1998, Steven Acree (RSKERC) and Lonnie Kennedy (ManTech) provided RPM Steve Linder with review comments of a conceptual hydrogeologic model for the Charnock and Arcadia RCRA Sites in Santa Monica, CA. In general, the document presented a reasonable framework for developing a numerical model of gross ground-water flow conditions within the Charnock sub-basin. However, it was not clear that sufficient hard data were available to fully support the complex effort outlined in the proposal. In addition, it was suggested that the basic objective of simulating the movement of MTBE will not be realized without a well defined contaminant transport component to the effort. These and other issues were discussed in detail.

(97RC09-001)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Rao, P. Suresh C., Randall K. Sillan, Dongping Dai, Michael D. Annable, Kirk Hatfield, and Wendy D. Graham (Univ. of Florida), and A. Lynn Wood and Carl G. Enfield (RSKERC). "Field-Scale Evaluation of In-Situ Cosolvent Flushing for Remediation of an Unconfined Aquifer Contaminated with a Complex NAPL." Water Resources Research, Vol. 33, No. 12. Dec. 1997.

(L. Wood(RSKERC)580-436-8552)



H I G H L I G H T S

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of February 23, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region II: On December 12, 1997, RPM Lorenzo Thantu requested technical review comments on a number of documents associated with the Liberty Industrial Finishing Superfund Site in Farmingdale, NY. Special attention was requested concerning the implementation of two in-situ remedial alternatives discussed in a draft Focused Feasibility Study (FFS): ground-water circulation well technology to address VOCs and chelating or precipitation to address metals contamination. The February 17, 1998, response was prepared by Steven Acree (RSKERC), Dr. Bruce Pivetz and Rick Stransky (ManTech), and Dr. Varadhan Ravi, Lowell Leach, and Dr. Hi Shen (Dynamac). In general, the documents were found to be conceptual in nature and lacked supporting calculations or the referenced methodologies used to estimate some design parameters. General comments concerning the two proposed remedial alternatives were that they offered the potential to be effective, implementable, and cost effective. It was noted, however, that these technologies are highly innovative and are not proven as implied in the FFS. A major concern about the use of the ground-water circulation cells was if VOCs could be reduced to target levels prior to their migration downgradient from the treatment cells. Given the innovative nature of the in-situ metals precipitation technology, it was recommended that the data, assumptions, and calculations used in the development of the conceptual design be included in an appendix. (98-R02-003) (S. Acree(RSKERC)580-436-8609)

Technical Assistance to Region III: On February 11, 1998, in a continuing technical assistance effort at the Babcock & Wilcox Mt. Arthos Site in Lynchburg, VA, Randall Ross (RSKERC) and Dr. Daniel Pope (Dynamac) provided RPM Michael Jacobi with review comments on the Final Phase I RCRA Corrective Measures Study. The comments, which were prepared in response to issues raised in a conference call on January 30, 1998, concerned recommendations for specific locations of additional monitoring wells, measuring surface water elevations, timing of sampling events during the first year of the study, and a rationale for sampling H₂ in ground water to help identify terminal electron acceptors. One of the primary purposes of the study is to determine the significance of biodegradation as a component of natural attenuation at the site. (97RC03-002) (R. Ross(RSKERC)580-436-8611)

Technical Assistance to Region IV: On February 12, 1998, Steven Acree (RSKERC) and Dr. Daniel Pope (Dynamac) provided RPM Galo Jackson with a technical review of the Phase II Natural Attenuation Evaluation, Round 1.0 Data Package for the Sydney Mine NPL Site in Brandon, FL. In general, the studies performed this fall appeared to have resulted in improving the definition of the geochemistry and contaminant plume in the upper and lower portions of the Boone Valley unit. However, the extent of the plume had not been defined to ROD standards. Detailed comments were offered in a number of areas including conductivity logging to evaluate stratigraphy, the need for increased ground-water elevation measurements, and apparent problems with geochemical analyses. (96-R04-003) (S. Acree(RSKERC)580-436-8609)

Technical Assistance to Region VII: On February 6, 1998, RPM Scott Marquess requested technical assistance at the Lake City Army Ammunition Plant Superfund Site in Independence, MO, with respect to the design of a multi-phase vacuum extraction system at the facility. In addition, the possibilities for assistance in evaluating hydrologic conditions, including a site-wide ground-water model, and the operation of several extraction wells were explored. The February 6, 1998, response by Dominic DiGiulio (RSKERC) stated that in many instances it was difficult to provide constructive comments since test results appeared to be significantly complicated by snowmelt, infiltration, perched water, and "clogged" probes. There were several areas of concern, however, which included the depth of dewatering, moisture characteristic analysis, mass flux, and pneumatic permeability. Based on the information presented, it appeared that there was insufficient information to design a dewatering/vacuum extraction system at this time. It was suggested that implementation should proceed in small steps as it is likely that much will be learned as the system is installed. (98-R07-001) (D. DiGiulio(RSKERC)580-436-8605)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of March 2, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: Since 1992, the TSC has been providing continuing technical assistance at the Picillo Farm Site in Kent County, RI. On February 23, 1998, Dominic DiGiulio (RSKERC) provided RPM Anna Krasko with the results of indicator kriging and linear triangulation to support the determination of SVE implementation areas at the site. Indicator kriging illustrated the extent of SVE application and linear triangulation illustrated locations where the depth of contamination was uncertain based on total volatile organic compounds. Also provided on February 23, 1998, were responses to 30 comments on an SVE Closure Paper from remedial contractors on behalf of the Picillo Farm responsible party committee. On February 25, 1998, in response to requests from the responsible party committee, copies of two figures illustrating currently observed and inferred maximum depths of total volatile organic contamination were provided to the RPM.

(92RC01-009)

(D. DiGiulio(RSKERC)580-436-8650)

Technical Assistance to Region III: On January 9, 1998, RPM David Iacono requested review comments of the Draft Work Plan, Natural Attenuation Assessment, for the Kane and Lombard Study Area in Baltimore, MD. On February 17, 1998, Dr. John Wilson (RSKERC) expressed concerns about the method used to extract site specific rate constants for biodegradation of TCE and cis-DCE. Using data from the report, Dr. Wilson independently determined a site-specific rate constant and developed a number of projections using the model BIOSCREEN which showed good agreement with field data. These results were provided to the Region. One of the conclusions was that the TCE plume is presently at steady state and would not be expected to migrate farther. Although it was suggested that planned activities at the site are reasonable, a number of suggestions were offered to improve the program in terms of long-term monitoring.

(98-R03-008)

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

Technical Assistance to Region IX: On February 9, 1998, Steve Acree (RSKERC) and Lonnie Kennedy (ManTech) attended a meeting in the Region II Office to discuss the conceptual model and numerical simulation of ground-water flow within the Charnock sub-basin of the Charnock and Arcadia RCRA Sites in Santa Monica, CA. Also discussed were proposed studies to better characterize the hydrology including a multi-well pumping test and borehole flowmeter survey. Others attending the meeting represented Region IX, City of Santa Monica, Regional Water Quality Control Board, potentially responsible parties, and consultants. Additional action by RSKERC is anticipated in the review of documents describing proposed ground-water flow modeling.

(97RC09-001)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Hurst, C.J., R.C. Sims, D.L. Sorensen, J.E. McLean (Utah St. Univ.), and S. Huling (RSKERC). "Polycyclic Aromatic Hydrocarbon Biodegradation as a Function of Oxygen Tension in Contaminated Soil." Jour. Hazardous Materials, Vol. 51, N. 1996.

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

TECHNOLOGY TRANSFER ACTIVITIES

During February 24-26, 1998, the Technology Support Center (TSC) presented a Natural Attenuation of Ground-Water Contamination training course in Richmond, VA, with discussions focusing on sorption, dilution, volatilization, and biodegradation processes, as well as monitoring requirements to demonstrate that these processes are taking place. The students were also involved with hands-on experience using BIOSCREEN as a decision support system in reviewing natural attenuation proposals. In addition, representatives from Region III discussed the policy implications of using natural attenuation. Sixty students attended the course from the State of Virginia's RCRA, CERCLA, and UST programs. Dr. Mary Randolph (RSKERC) served as course moderator, while the instructors included Dr. John Wilson (RSKERC), Barbara Wilson and Dr. Daniel Pope (Dynamac), and Dr. Ron Sims (Utah St. Univ.). The course will be presented again in Raleigh, NC (Mar. 10-12), and Boston, MA (Apr. 6-8 and 7-9). Additional presentations are being planned for Region VII in May, and Region V in June.

(M. Randolph(RSKERC)580-436-8616)



HIGHLIGHTS

National Risk Management Research Laboratory Subsurface Protection & Remediation Division Robert S. Kerr Environmental Research Center Status Report for the Week of March 9, 1998

TECHNICAL ASSISTANCE

Technical Assistance to Region II: On February 24, 1998, in a continuing technical assistance effort at the Ewan Property Site in Shamong Township, NJ, Dr. Scott Huling (RSKERC) provided RPM Steve Cipot with comments regarding the response to a September 18, 1997, technical review of a proposed pilot test at the site. The comments addressed the treatability study overview, bench tests, and chemical and physical processes. Comments were also provided concerning the revised treatability study work plan. Topics of discussion included pilot study treatment goals, the installation of injection trenches and monitoring wellpoints, and ground-water and soil sampling.
(97-R02-007) (S. Huling(RSKERC)580-436-8610)

Technical Assistance to Region III: On December 12, 1997, RPM Frank Klanchar requested technical assistance to review soil vapor extraction (SVE) reports associated with the Center County Kepone Site in State College, PA. In review comments dated February 23, 1998, Dominic DiGiulio (RSKERC) stated that the nature of soils, perched water, contaminated bedrock, and potential accessibility problems due to structures on the site will make the operation of SVE complex. The points were not to discourage vacuum extraction, but to make expectations of performance and eventual closure more realistic. Specific comments were offered in areas of concern including the control of perched water table conditions, assessment of hydraulic fracturing, model calibration and parameter estimation, and the achievement of clean-up standards.
(98-R03-002) (D. DiGiulio(RSKERC)580-436-8605)

Technical Assistance to Region IX: In a continuing technical assistance effort at the Sulphur Bank Mercury Mine in Clear Lake, CA, Dr. David Jewett (RSKERC) provided RPM Carolyn d'Almeida with a technical review of the field sampling plan. Dr. Paul Lechler, Nevada Bureau of Mines and Geology, provided geochemical expertise to the review and will conduct analyses on future samples to aid in modeling efforts. The March 2, 1998, comments covered a number of issues including the primary objective of the investigation, the collection of soil samples, piezometer construction, and geochemical modeling.
(97-R09-006) (D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region IX: The Southern California Edison Site, in Visalia, CA, was operated as a utility pole treatment yard from the 1920s until 1980. Wood preservatives, including creosote and PCP, were used and stored on-site during operations. Leaking tanks and stored treated poles have contaminated ground water and soil. A process called Dynamic Underground Stripping (DUS) to enhance the recovery of NAPLs was started in June 1997 with the injection of steam. On February 24, 1998, Dr. Eva Davis (RSKERC) visited the site and discussed ongoing activities with Craig Eaker, the PRP's representative. Items discussed were the location of contamination before steam injection was initiated, monitoring data from ground-water samples and extracted vapors, how the steam injection has been operated, and what happens after steam injection is ended.
(98-R09-002) (E. Davis(RSKERC)580-436-8548)

TECHNOLOGY SUPPORT PROJECT MEETING

The semi-annual Technology Support Project (TSP) meeting was held February 10-12, 1998, in Salt Lake City, Utah. Attendees included the Ground-Water, Engineering, and Federal Facilities Forums; ORD Technical Support Centers; interested Headquarters personnel from TIO, OSWER, and OSW; and technical representatives from ORD, Lawrence Livermore National Laboratory, and Idaho National Engineering and Environmental Laboratory. Among the topics discussed were Reactive Barrier Walls (Bob Puls/RSKERC), Use of Heat to Remediate Subsurface Contamination (Roger Aines/ Lawrence Livermore and Eva Davis/RSKERC), SVE Closure Criteria (Jim Cummings/TIO and Dominic DiGiulio/RSKERC), Technical Guidance on Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water (John Wilson/RSKERC), and Soil Sampling Procedures to Minimize VOC Losses (Alan Crockett/Idaho National Engineering and Environmental Laboratory).
(J. Jones(RSKERC)580-436-8593)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Rafai, Hanadi S. (Univ. of Houston), Charles J. Newell (Groundwater Services), James R. Gonzales (AFCEE), Stergios Dendrou and Basil Dendrou (ZEi/MicroEngineering), Lonnie Kennedy (Deerinwater Environ. Mgmt. Services), and John T. Wilson (RSKERC). "BIOPLUME III: Natural Attenuation Decision Support System User's Manual, Version 1.0" EPA Report.
EPA/600/R-98/010.
(J. Wilson(RSKERC)580-436-8534)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of March 16, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: Dr. Robert Puls (RSKERC) provided site-specific technical assistance to Region I at the Industri-Plex Superfund Site in Woburn, MA, February 2-3, 1998. Dr. Puls met with the Industri-Plex Superfund Site Team at the Region I offices to discuss responses to PRP comments on various documents and review plans for follow-up site investigations to assess the fate and transport of arsenic at the site. Dr. Puls met with the PRPs to discuss comments concerning several recently issued documents by EPA and the PRPs and provide input and comments on the PRP's potential use/application of natural attenuation to address the arsenic problem at the site. More meetings are anticipated. (97-R01-002) (R. Puls(RSKERC)580-436-8543)

Technical Assistance to Region III: Dr. Robert Puls and Steve Acree (RSKERC) provided technical assistance to the Arrowhead Plating Superfund Site in Montross, VA, on January 29, 1998. The contractor's site conceptual model was reviewed along with hydrologic and geochemical data. A permeable reactive barrier (PRB) is proposed at the site by the PRP contractors to remediate a chlorinated solvents plume. While this technology appeared feasible, significant additional pre-design data will be necessary to refine the site conceptual model and optimize a PRB design. (98-R03-004) (R. Puls(RSKERC)580-436-8543)

Technical Assistance to Region IV: On December 1, 1997, Environmental Scientist John Johnston requested technical assistance at the South Boulevard Properties, Inc. Site in Charlotte, NC, with regard to the Baseline Risk Assessment, Addendum to Post Closure Permit Application. The portions of the document for which assistance was requested were ground-water flow and solute transport modeling, and the summary and conclusions. On March 3, 1998, Dr. David Burden (RSKERC) and Lonnie Kennedy (ManTech) provided review comments based on data adequacy, model selection (MODFLOW and MT3D), model applications and assumptions, model calibration, and model interpretation. In general, the conceptual approach appeared to be reasonable. The primary concerns were the effect of a ground-water divide on mass transport, and background data to confirm model calibration. (98RC04-002) (D. Burden(RSKERC)580-436-8606)

Technical Assistance to Region VII: On March 3, 1998, Jerry Jones (RSKERC) and Dr. Ann Azadpour (Dynamac) provided RPM Nancy Swyers with comments concerning the potential for natural attenuation at the Former AC Rochester Facility, General Motors Site in Sioux City, IA. In general, the past and proposed work appeared to be well considered in terms of the types of activities that needed to be carried out at the site. A number of issues were discussed including the basic conditions which must be present to confirm that natural attenuation processes are taking place, statistical analyses which will be necessary as the investigation proceeds, appropriate sampling parameters, and the use of H₂ in determining the terminal electron acceptor processes which are predominant in the area of contamination. (98-R07-002) (J. Jones(RSKERC)580-436-8593)

RESEARCH IN PROGRESS

A column study was set up to evaluate changes in contaminant distribution and sediment toxicity following nitrate-based bioremediation of fuel-contaminated sediments. Specific objectives were to ascertain the extent of biodegradation versus soil washing in contaminant removal, and to correlate toxicity reduction with loss of fuel components. Results show that biodegradation accounted for 94 percent of the total BTEX mass loss, with only 6 percent being leached from the columns, providing additional supporting evidence for the role of biodegradation in the field study at Eglin AFB, FL. Toxicity assays using FETAX (Frog Embryo Toxicity Teratogenesis Assay - Xenopus) demonstrated that toxicity levels declined to background values, even though total fuel levels were reduced by only 35 percent. This indicates that complete remediation is not necessarily required to achieve environmentally acceptable goals, and bioassays such as FETAX may provide suitable alternative endpoints for assessing ecosystem damage and restoration. (S. Hutchins(RSKERC)580-436-8563)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of March 23, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region II: During March 4-5, 1998, in response to a request from RPM Romona Pezzella, Dr. David Jewett (RSKERC) attended a meeting in Edison, NJ, to discuss the Draft Interim Calibration and Modeling Report - Part 1 for Operable Unit 2 at the Ciba-Geigy Superfund Site in Toms River, NJ. Also attending the meeting were representatives from Region II, NERL-Las Vegas, a support contractor, and Ciba-Geigy. The focus of the meeting was the calibration and proposed sensitivity analysis of a contaminant transport model, anticipated time line for the project, and other issues that needed to be resolved. The meeting was followed by a visit to the facility to gain a better understanding of site conditions and how these influence the proposed modeling effort. Additional technical assistance is expected with regard to model calibration.

(95-R02-003)

(D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region V: On March 6, 1998, Dr. Mary Randolph (RSKERC) and Dr. Hai Shen (Dynamac) provided RPM Ross del Rosario with a technical review of the response to November 18, 1997, TSC comments on the evaluation of ground-water chemistry and natural attenuation at the Industrial Excess Landfill in Uniontown, OH. The response expressed a continuing concern about an apparent increase in contaminants in ground water, conditions required for reductive dechlorination, and the reduction of toxic metals at the site.

(98-R05-001)

(M. Randolph(RSKERC)580-436-8616)

Technical Assistance to Region V: In response to a December 29, 1997, request from PRM Ted Smith, Steven Acree and Dr. John Wilson (RSKERC), and Drs. Sam Lee and Ann Azadpour (Dynamac) provided review comments on a number of documents associated with the New Lyme Landfill in Astabula County, OH. The March 11, 1998, comments stated that, in general, site characterization studies conducted to date are not sufficient to support the complex ground-water model used to project contaminant plume development, and the transport and fate of contaminants. Several issues regarding site characterization, ground-water flow/contaminant transport modeling, effects of the current remediation system, and the proposed remedial alternative were discussed in detail.

(98-R05-002)

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

Technical Assistance to Region IX: On March 10, 1998, Dr. Scott Huling (RSKERC) and Dr. Bruce Pivetz (ManTech) provided RPM Janet Rosati with a technical review of a revised work plan for the Del Monte Corporation (Oahu Plantation) Superfund site in Kunia, Oahu, HI, and an evaluation of phytoremediation research from the University of Washington. The revised work plan addressed all of the TSC comments and recommendations provided in a technical review dated November 17, 1997, however, general and specific comments were provided in a number of areas including treatment system preparation, discrepancies in the description of the site geology, and contingency measures if DNAPLs are encountered during drilling. With respect to the phytoremediation research, comments were offered concerning plant uptake and resistance studies.

(98-R09-001)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Hutchins, S.R. (RSKERC), J.A. Bantle, and E.J. Schrock (Okla. St. Univ.). "Effect of Nitrate-Based Bioremediation on Contaminant Distribution and Sediment Toxicity - Column Study." Environmental Toxicology and Chemistry. Vol. 17, No.3. 1998.

(S. Hutchins(RSKERC)580-436-8563)

TECHNOLOGY TRANSFER ACTIVITIES

During March 10-12, 1998, the Technology Support Center (TSC) presented a Natural Attenuation of Ground-Water Contamination training course in Raleigh, NC, with discussions focusing on sorption, dilution, volatilization, and biodegradation processes, as well as monitoring requirements to demonstrate that these processes are taking place. The students were also involved with hands-on experience using BIOSCREEN as a decision support system in reviewing natural attenuation proposals. Thirty-two students attended the course representing various NC state agencies.

Dr. Mary Randolph (RSKERC) served as course moderator, while the instructors included Barbara Wilson and Dr. Daniel Pope (Dynamac), and Drs. Ron Sims and Ryan Dupont (Utah St. Univ.). The course will be presented again in Boston, MA (Apr. 6-8 & Apr. 7-9), Region VII (May 6-8), and St. Paul, MN (June).

(M. Randolph(RSKERC)580-436-8616)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of March 30, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region II: In response to a February 2, 1998, request from RPM George Jacob, Dr. David Burden (RSKERC) and Dr. Varadhan Ravi (Dynamac) provided the Region with review comments on a proposed sampling plan to evaluate intrinsic remediation at the Colesville Landfill in Colesville, NY. The March 26, 1998, comments stated that the sampling plan appeared to be adequate with respect to the identification of monitoring constituents, however, there was not enough information to assess the plan in terms of the location and design of monitoring wells or the frequency of sampling. Other concerns were expressed with respect to some conclusions made in the report.

(98-R02-006)

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

Technical Assistance to Region IV: On March 26, 1998, Dr. Mary Randolph (RSKERC) and Dr. Bruce Pivetz (ManTech) provided RPM Donna Wilkinson with review comments of a preliminary intrinsic bioremediation evaluation at the United Technologies/Pratt & Whitney RCRA facility in Palm Beach County, FL. Concern was expressed about the assumptions and data used in a ground-water flow and contaminant transport model developed for the site, as well as conclusions regarding the time for remediation. A major recommendation concerned the need to evaluate the data in a holistic view of the site rather than being interpreted in an isolated fashion based solely on the location of waste management units. It was also suggested that the presence, fate, and transport of vinyl chloride are important issues that should be resolved in the natural attenuation evaluation.

(98RC04-001)

(M. Randolph(RSKERC)580-436-8616)

Technical Assistance to Region VII: On March 23, 1998, Dr. David Jewett and Dominic DiGiulio (RSKERC) provided RPM Ken Rapplean with a technical review of the "Draft Preliminary Design Final Soil Remedy, Coleman Operable Unit, Wichita, Kansas." The primary concern with the soil vapor extraction design document was the use of the radius of influence approach for determining the location of and impact of vapor extraction wells. It was pointed out that the approach suffers from numerous inadequacies including methods of site characterization and well screening/placement methods. Other concerns related to an absence of data for characterizing the soil, some assumptions incorporated with the use of SVE design software, and the impact of elevated VOC concentrations in ground water on soil VOC concentrations.

(93-R07-002)

(D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region IX: On March 19, 1998, in a continuing technical assistance effort at the Sparks Solvent/Fuel Site in Sparks, NV, Steven Acree (RSKERC) provided OSC Donn Zuroski with a review of the ground-water flow model developed for the site and the potential effectiveness of the remediation system. In general, the ground-water flow model appeared to be an adequate tool for the evaluation of various remedial scenarios at site scale. However, the model was not designed for detailed evaluations of three-dimensional flow within the upper aquifer. Results of the application of the tool for this purpose should be considered to be relatively uncertain. It was recommended that monitoring the hydraulic head and water quality during the operation of the system should be used to assess system performance. These and other concerns were discussed in detail.

(94-R09-001)

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

Technical Assistance to OERR: On March 16, 1998, Dr. David Burden (RSKERC) and Drs. Ron Drake, Sam Lee, and Hai Shen (Dynamac) provided the Office of Emergency and Remedial Response with comments on three Fact Sheets entitled: Using Ground Water Samples to Document an Observed Release of Metals, Evaluating Karst Geology Using the Hazard Ranking System, and Evaluating Ground Water Plumes Under the Hazard Ranking System.

(Misc.)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Cho, Jong Soo, John T. Wilson, and Dominic C. DiGiulio (RSKERC), James A Vardy (U.S. Coast Guard), and Woohee Choi (Penn. St. Univ.). "Implementation of Natural Attenuation at a JP-4 Fuel Release After Active Remediation." Biodegradation 8:265-273, 1997. Printed in The Netherlands.

(J. Wilson(RSKERC)580-436-8543)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of April 6, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region IV: On March 17, 1998, Dr. Mary Randolph (RSKERC) visited the United Technologies Corporation/Pratt & Whitney Site in Jupiter, FL, to discuss the Preliminary Intrinsic Bioremediation Evaluation (PIBE) to determine if there is a potential for natural attenuation to reduce the mass of VOCs in ground water. Discussions focused on the location of areas with the highest concentration of VOCs, the accumulation of vinyl chloride, and the technical protocol for monitoring natural attenuation. Others attending the meeting were representatives from Region IV, State of Florida, and Pratt & Whitney and their contractors.

(98RC04-001)

(M. Randolph(RSKERC)580-436-8616)

Technical Assistance to Region VI: In a continuing technical assistance effort at the South Cavalcade Superfund Site in Houston, TX, Dr. Scott Huling (RSKERC), and Mr. Rick Stransky and Dr. Bruce Pivetz (ManTech) prepared plume maps for the shallow aquifer at the site. The March 31, 1998, information was prepared because it was apparent that the location of the ground-water contamination plume was not sufficiently delineated to develop a conceptual model regarding contaminant transport and fate in order to evaluate pump-and-treat technology or natural attenuation. Overall, the extent of the ground-water plumes is poorly delineated and additional data are required for further characterization. It was suggested that additional data collection will be necessary if a clear and useful map does not result from a more complete review of available site information.

(95-R06-005)

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

Technical Assistance to Region VII: On March 17, 1998, Randall Ross (RSKERC) and Dr. Daniel Pope (Dynamac) toured the Second Street Subsite of the Hastings Superfund Site in Hastings, NE. On March 18, 1998, they attended a meeting in the Regional Office to discuss specific issues related to the State's proposal to use natural attenuation to remediate apparently commingled benzene plumes from the Second Street Subsite and the adjacent Foot Oil UST site.

(97-R07-006)

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

Technical Assistance to Region VIII: Based on phytoremediation criteria for the Lovell Refinery in Lovell, WY, Dr. Scott Huling (RSKERC) and Dr. Bruce Pivetz (ManTech) provided OSC Johanna Miller with comments and recommendations regarding plant selection for a remediation system involving the land treatment of approximately 50,000 cubic yards of petroleum contaminated soil. Eric Morrison, the extension office agriculture agent for Big Horn County, WY, was consulted during the preparation of the March 26, 1998, recommendations. In addition to a detailed discussion on plant selection, comments were offered regarding soil preparation, seeding, and irrigation. It was suggested that this would present a unique opportunity to quantify the relative effects of a vegetative cover on petroleum contaminated soil. On March 31, 1998, additional information was provided on seedbed preparation, planting, irrigation, and establishing vegetation at the site.

(98-R08-001)

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

Technical Assistance to Region IX: On March 26, 1998, Dr. Eva Davis (RSKERC) attended the Innovative Technologies Tour at the Southern California Edison Company's Visalia Pole Yard in Visalia, CA. Approximately 60 people came from 16 states representing government agencies, consulting firms, and users of the environmental technology. A tour was conducted after an overview of the site was presented along with a discussion of the steam injection technology being used to recover creosote from below the water table at the site. In 10 months of steam injection, an estimated 76,000 gallons of DNAPL have been recovered at a cost of approximately \$10.8 million. Carbon dioxide recovered in the vapor extraction system shows that another 62,000 pounds of contaminants were destroyed in place by thermal oxidation or biodegradation. Additional contaminants have been recovered in the dissolved and vapor phases.

(98-R09-002)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Lien, Bob K. and Carl G. Enfield (RSKERC). "Delineation of Subsurface Hydrocarbon Contaminant Distribution Using a Direct Push Resistivity Method." Journal of Environmental and Engineering Geophysics. Vol. 2, No. 3. Jan. 1998.

(B. Lien(RSKERC)580-436-8555)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of April 13, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: On April 2, 1998, in a continuing technical assistance effort at the Picillo Farm Site in Kent County, RI, Dominic DiGiulio (RSKERC) provided RPM Anna Krasko with comments on the 60 percent design of an SVE system. The focus of the review was on well spacing as a function of the level of contamination of the soils. Based on extensive specific discharge and pressure differential calculations and corresponding plots, it was suggested that the wells be spaced 30 feet apart throughout the entire region of vacuum extraction. It was also suggested that selected boreholes be converted to monitoring wells, and that vapor probe clusters be installed to monitor the progress of the SVE system.

(95-R01-002)

(D. DiGiulio(RSKERC)580-436-8605)

Technical Assistance to Region II: In a continuing technical assistance effort at the Brookhaven National Laboratory in Upton, NY, Steven Acree (RSKERC) and Dr. Rashid Islam and Lonnie Kennedy (ManTech) provided RPM Mary Logan with review comments on the Feasibility Study Report (FS) and Draft Proposed Remedial Action Plan for Operable Unit III. The April 6, 1998, technical review stated that, in general, the FS and proposed plan relied heavily on projections of contaminant concentrations from modeling studies. Significant uncertainty exists in such detailed projections. In addition, the evaluation of various remedial goals and alternatives was highly subjective and significant migration of contaminants into currently uncontaminated portions of the aquifer is projected to occur under some of these scenarios, including the preferred alternative for addressing VOCs. Detailed comments and recommendations regarding these issues and other concerns were provided.

(97-R02-004)

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

Technical Assistance to Region II: On April 2, 1998, Steven Acree (RSKERC), Dr. Bruce Pivetz and Rick Stransky (ManTech), and Drs. Varadhan Ravi and Hai Shen (Dynamac) provided RPM Lorenzo Thantu with technical review comments on the field and bench-scale testing program and conceptual design for the remedial action at the Liberty Industrial Finishing Site in Farmingdale, NY. The work plan proposed pilot-scale field tests of two ground-water circulation techniques, density-driven convection and vacuum vaporizer well technology, a laboratory treatability study for metals removal by chelation technology, and a field test involving in-situ precipitation of inorganic contaminants. In general, it appeared that the proposed pilot-scale studies would provide much of the information required to evaluate the application of these emerging technologies at this site. Detailed comments were provided regarding specific aspects of the design and proposed performance monitoring of the pilot tests.

(98-R02-003)

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

Technical Assistance to Region III: In an April 3, 1998, technical assistance response to RPM Frank Klanchar, Dominic DiGiulio (RSKERC) recommended against using mass reduction and vapor concentration in wells as a closure strategy for SVE at the Center County Kepone Site in State College, PA. In adapting this strategy, there is little potential for consistency in decision making and no way to directly relate mass removal or concentration reduction to an environmental benefit. It was also pointed out that this approach leads to less stringent remediation at highly contaminated sites. It was suggested that an SVE closure strategy should consider five factors including site characterization, design, performance monitoring, rate-related vapor transport, and mass flux to and from ground water.

(98-R03-002)

(D. DiGiulio(RSKERC)580-436-8605)

Technical Assistance to Region III: On April 1, 1998, in a technical assistance effort at the Dover Gas Light Site in Dover, DE, Dominic DiGiulio (RSKERC) provided RPM Randy Sturgeon with comments concerning well spacing for an SVE system. It was pointed out that the concept of radius of influence (ROI) in well spacing design is mathematically and intuitively incorrect due to a number of limitations. Perhaps the greatest objection to using the ROI approach for pneumatic permeability determination and SVE design is that strictly radial flow rarely occurs in soils during vacuum extraction because of partial penetration of screened intervals and a constant pressure (atmosphere) boundary at the soil surface. A more appropriate method of permeability determination is through the use of solutions in cylindrical coordinates. Specific air discharge calculations on field testing conducted by the consultant were provided.

(98-R03-003)

(D. DiGiulio(RSKERC)580-436-8605)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of April 20, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region IV: In a continuing technical assistance effort at the Petroleum Products Corporation Superfund Site in Broward County, FL, Steven Acree (RSKERC) and Dr. Ann Azadpour (Dynamac) reviewed a work plan for assessing the efficacy of natural attenuation at the site. The April 15, 1998, comments stated that the proposed investigation may provide some preliminary information to assess the potential role of natural attenuation outside the zone of highest contamination. However, it is unlikely that the data will be sufficient for a detailed evaluation of the fate of the major contaminants of concern. Although natural attenuation processes may limit the migration rate of the plume, these processes would not be expected to significantly reduce contaminant mass in areas that are grossly contaminated with sludges and waste oil within reasonable time frames. Detailed comments were provided on a number of issues including the complexity of the hydrology, the need for additional studies to fully evaluate the potential for lead transport, geochemical modeling, and sampling.

(98-R04-001)

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

Technical Assistance to Region VII: Following a meeting at the Regional Office on March 18, 1998, Randall Ross (RSKERC) and Dr. Daniel Pope (Dynamac) provided RPM Darrel Sommerhauser with technical review comments regarding natural attenuation at the Second Street Subsite of the Hastings Superfund Site in Hastings, NE. The April 7, 1998, comments stated that the most recent round of sampling results essentially doubled the apparent longitudinal dimension of the benzene and naphthalene plume associated with the Second Street Subsite and/or the Foot UST Site. This is significant in that it demonstrates that the longitudinal and transverse dimensions of the plumes are currently unknown and that the down-gradient location of the 100 ppb benzene line currently identified as the regulatory limit has not been established. A review of specific contaminant concentrations and geochemical parameters suggested that biodegradation is occurring, however, the magnitude and extent is currently unknown. It was suggested that additional data will be necessary to better characterize biotic and abiotic processes affecting the dissolved contaminant plume and estimating the rate of degradation. The type of information needed to make these determinations was discussed in considerable detail.

(97-R07-006)

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

Technical Assistance to Region VIII: On April 13, 1998, Steven Acree (RSKERC) provided RPM Russell Leclerc with review comments of the draft sampling plan for the Ekotek/Petroleum Superfund Site in Salt Lake City, UT. In general, the plan appeared to be well conceived for characterizing the distribution of contaminants in three dimensions and the variation in hydraulic conductivity in the area of a proposed tracer test. Several comments and recommendations were offered regarding specific aspects of the work plan including sampling and analysis of geochemical parameters indicative of biological activity, the potential for sorption to the various system components, and the potential for the loss of volatiles during sampling, well design and development, and flowmeter measurements.

(93-R08-003)

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

Technical Assistance to Region IX: On April 8, 1998, Dr. David Jewett (RSKERC) provided RPM Carolyn d'Almeida with review comments on the UC-Davis work plan titled "The Role of the Sulphur Bank Mercury Mine Site in the Dynamics of Mercury Methylation, Transport, and Bioaccumulation within the Clear Lake Aquatic Ecosystem." The 120-acre Sulphur Bank Mercury Mine site, in Clearlake Oaks, CA, was mined for sulphur from 1865 to 1871. Detailed comments concerned tracer studies, ground-water sampling, clean-up standards, and natural sedimentation as a capping process to reduce the production of methylated mercury.

(97-R09-006)

(D. Jewett(RSKERC)580-436-8560)

TECHNOLOGY TRANSFER ACTIVITIES

During April 6-9, 1998, the Technology Support Center (TSC) presented two consecutive training courses in Boston, MA, on "Natural Attenuation of Ground-Water Contamination." Discussions focused on sorption, dilution, volatilization, and biodegradation processes, as well as monitoring requirements to demonstrate that these processes are taking place. The students were also involved with hands-on experience using BIOSCREEN as a decision support system in reviewing natural attenuation proposals. About thirty students, representing Regional and State Superfund, RCRA, and UST programs, attended each of the courses. Dr. Mary Randolph (RSKERC) served as course moderator, while the instructors included Dr. John Wilson (RSKERC), Barbara Wilson and Dr. Daniel Pope (Dynamac), and Dr. Ron Sims (Utah St. Univ.). The course will be presented again in Region VII (May 6-8), and St. Paul, MN (June).

(M. Randolph(RSKERC)580-436-8616)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of May 11, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region II: On April 15, 1998, Randall Ross and Dr. Scott Huling (RSKERC) toured the Tutu Wells Superfund Site in St. Thomas, U.S. Virgin Islands, with RPM Caroline Kwan. During April 16-17, 1998, they participated in meetings with Region II personnel and U.S. Virgin Islands Department of Planning and Natural Resources personnel and their consultants. The primary purpose of the meetings was to discuss specific technical issues relating to the on-going and proposed remedial systems by Texaco and Esso and concerns regarding area-wide remediation plans.

(98-R02-005)

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

Technical Assistance to Region IX: On April 15, 1998, Steven Acree (RSKERC) provided Project Manager Carmen Santos with review comments on the Corrective Measures Study for the BKK Landfill RCRA Site in West Covina, CA. The BKK Landfill is a 583-acre RCRA facility consisting of a closed hazardous waste landfill and an active municipal solid waste landfill. In general, the report is highly conceptual and neither presents nor specifically references data to support many of the conclusions which may require additional characterization studies. Detailed comments discussed the containment of the sources, contaminant distribution and transport, source control costs, and natural attenuation potential.

(98RC09-001)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Shen, Y. (RSKERC). "In Vitro Cytotoxicity of BTEX Metabolites in Hela Cells." Arch. Environ. Contam. Toxicol. 34: 229-234 (1998).

(J. Williams(RSKERC)580-436-8608)

Shen, Y., and C. West (RSKERC). "Toxicity of Aromatic Aerobic Biotransformation Products of Toluene to Hela Cells." Bull. Environ. Contam. Toxicol. 60:177-184 (1998).

(J. Williams(RSKERC)580-436-8608)

RESEARCH IN PROGRESS

A field study was completed utilizing large, in-situ column lysimeters to evaluate the use of selected amendments on nitrate-based bioremediation for fuel-contaminated aquifers. The study was conducted at Eglin AFB, FL, and involved driving five six-foot steel columns into a shallow aquifer contaminated with JP-4 jet fuel. Miniature application, monitoring, and extraction wells were installed within each column lysimeter and used to deliver and extract amended recharge for six months. Treatments included: water only; water and nitrate; water, nitrate, and 0.8-1.5 mg/l dissolved oxygen; water, nitrate, and 535 mg/l Triton X-100 (surfactant); and water, nitrate, and 1,400 mg/l iron-EDTA. Treatment efficiency was assessed by core samples and mass balances. Nitrate and surfactant yielded the best overall treatment, followed by nitrate and iron, nitrate alone, water alone, and nitrate and oxygen. Mass loss of BTEXTMB (benzene, toluene, ethylbenzene, xylenes, and trimethylbenzene) ranged from 81±6 percent in the nitrate and surfactant column to 49±6 percent in the nitrate and oxygen column. Correspondingly, biodegradation accounted for 70 percent to 22 percent reduction of the initial BTEXTMB mass in the contaminated sediments. The data demonstrate that selected amendments can be used to enhance anaerobic bioremediation strategies. The data were presented at the 1998 Joint Conference on the Environment (WERC/WRHSRC/NMHWMS) March 31 - April 1, 1998, in Albuquerque, NM.

(S. Hutchins(RSKERC)580-436-8563)



H I G H L I G H T S

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of May 18, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region IX: On May 11, 1998, Steven Acree (RSKERC) provided Project Manager Donn Zuroski with review comments on the Fourth Quarter 1997 and First Quarter 1998 monitoring reports for the Sparks Solvent/Fuel Superfund Site in Sparks, NV. The documents provided the results of a ground-water monitoring program in operation since the flood of January 1996, which was followed by the drastic rise in water elevation and subsequent changes in the remediation system. Several issues of concern were noted including the current loss of hydraulic capture, potential exacerbation of contaminant migration due to injection, and the ongoing evaluation of more aggressive remediation technologies. Detailed comments and recommendations regarding these concerns were provided.

(94-R09-001)

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

Technical Assistance to Region IX: During May 3-7, 1998, Dr. David Jewett (RSKERC) toured the Sulphur Bank Mercury Mine (SBMM) Superfund Site in Clear lake, CA, with RPM Carolyn d'Almeida, participated in site characterization field activities, and assisted in the installation of additional monitoring wells prior to a tracer test conducted by the University of California at Davis (UCD). During the visit, issues pertaining to the collection of data were discussed with UCD Clear Lake Environmental Research Center scientists. In other meetings, drilling activities and ground-water flow were discussed with site geologist Scott Emerson-Price (ICF/Kaiser), and the fate and transport of mercury with Dr. Paul Lechler (Dynamac Corp. geochemistry consultant).

(97-R09-006)

(D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region X: On April 30, 1998, Dr. Eva Davis (RSKERC) visited the Wyckoff/Eagle Superfund Site in Bainbridge Island, WA, with RPM Christina Ngo. Other participants included Bob Stamnes (Region X), Marta Richards (NRMRL-Cincinnati), and Ken Scheffler and Tim McComack (CH₂M Hill). The former wood treatment facility, which is contaminated with creosote, PCP, and carrier oils used in the wood treating process (i.e., No. 2 fuel oil), is located adjacent to Eagle Harbor. NAPLs in the subsurface below the processing area are seeping into the harbor. The proposed remedial plan, which required placing a cap on the site, containing the NAPLs with a slurry wall, and recovering the oil by pumping, is on hold pending the results of a feasibility study for an alternative remedial technology involving in-situ steam injection. Other discussions included the characteristics and distribution of contaminants, an evaluation of thermal technologies, and information gained at the Visalia Pole Yard where steam is currently being used to recover creosote.

(98-R10-001)

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

TECHNOLOGY TRANSFER ACTIVITIES

During May 6-8, 1998, the Technology Support Center (TSC) presented a Natural Attenuation of Ground-Water Contamination training course in Kansas City, MO, with discussions focusing on sorption, dilution, volatilization, and biodegradation processes, as well as monitoring requirements to demonstrate that these processes are taking place. The students were also involved with hands-on experience using BIOSCREEN as a decision support system in reviewing natural attenuation proposals. About sixty-two students, representing Regional and State Superfund, RCRA, and UST programs, attended the course. Dr. Mary Randolph (RSKERC) served as course moderator, while the instructors included Dr. John Wilson (RSKERC), Barbara Wilson and Dr. Daniel Pope (Dynamac), and Dr. Ron Sims (Utah St. Univ.). The course will be presented again in St. Paul, MN, (June 2-4) and Region IV (August 25-27).

(M. Randolph(RSKERC)580-436-8616)



H I G H L I G H T S

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of May 25, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region II: On May 14, 1998, Steven Acree (RSKERC), Dr. Bruce Pivetz (ManTech), and Dr. Varadhan Ravi (Dynamac) met at the Liberty Industrial Finishing Superfund Site in Melville, NY, to discuss concerns related to the implementation of pilot scale tests of ground-water recirculation and in-situ metals precipitation technologies. Also attending the meeting were representatives from Region II, State of New York, regional water district, Coltec Corporation, and contractors to the responsible parties. The major concerns of the meeting focused on proposed monitoring efforts to determine the effectiveness of these technologies. A site visit was conducted after the meeting. It is expected RSKERC will review work plans and reports as they become available.

(98-R02-003)

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

Technical Assistance to Region IV: In a continuing technical assistance effort at the Petroleum Products Corporation Superfund Site in Broward County, FL, Steven Acree and Dr. Don Kampbell (RSKERC) provided RPM Galo Jackson with review comments on the conceptual design of a bioslurper system for the facility. The May 19, 1998, comments stated that, in many respects, it appeared that the system was well engineered and that the technology would result in some product removal. It was suggested, however, that sustainable recovery rates for the more viscous products may be relatively low or minimal, and that additional efforts may be required to achieve significant removal of the contaminants. A number of detailed comments were offered on issues such as the possible need to use thermal enhancements or excavation to recover products in the higher viscosity range, a phased approach to the installation of the system, removal well spacing, and the need to monitor product recovery rates.

(98-R04-001)

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

Technical Assistance to Region IX: In response to a request for continuing technical assistance from RPM Jeff Dhont, Steven Acree (RSKERC) prepared review comments on a field sampling plan at the Montrose Superfund Site in Torrance, CA. The May 20, 1998, response stated that the proposed studies, combined with data from previous recovery tests, will provide useful information for screening-level evaluations of DNAPL removal and assist in the calculation of contaminant mobility under various assumed removal scenarios. As at most DNAPL sites, this information will be useful in forming conceptual models for product recovery. It was suggested that the proposed study proceed and that determinations regarding the need for more detailed investigations be deferred pending an evaluation of the resulting data.

(95-R09-015)

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



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of June 1, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: In response to a March 20, 1998, request from RPM Leslie Brunner, Randall Ross (RSKERC) and Rick Stransky and Dr. Bruce Pivetz (ManTech) provided a technical review regarding ground-water containment at the Maryland Sand, Gravel, and Stone Site in Elkton, MD. The primary focus of the review was to evaluate ground-water capture in the vicinity of trenches SO1 and SO2. It appeared that hydraulic gradients have increased between the trenches and nearby wells, gradients adjacent to the trenches are inward toward the trenches, and lowered ground-water elevations and some dewatering has occurred in wells near the trenches. It was unclear, however, if the capture zones overlap sufficiently to prevent water and contaminants from passing between the trenches. A number of suggestions were offered for a more detailed capture zone analysis.
(98-R03-009) (R. Ross(RSKERC)580-436-8611)

Technical Assistance to Region IV: On May 22, 1998, Jerry Jones (RSKERC) and Dr. Ann Azadpour (Dynamac) provided RPM Jon Bornholm with review comments on a revised feasibility study for the Flanders Filters Superfund Site in Washington, NC. A number of issues were discussed in detail including the basic conditions necessary to confirm that natural attenuation processes are taking place, the selection of predictive models, statistical analysis of data, sampling frequency and location, and sampling parameters.
(98-R04-003) (J. Jones(RSKERC)580-436-8593)

Technical Assistance to Region IV: On April 29, 1998, RPM Randa Chichakli requested review comments of the Remedial Action Work Plan for the Taylor Road Landfill Superfund Site in Hillsborough County, FL. Specifically, the request was made with respect to the trend analysis of data used to evaluate the occurrence of natural attenuation. In the May 27, 1998, response, Jerry Jones (RSKERC) and Drs. Jin-Song Chen and Michael Fishman (Dynamac) pointed out that the site's hydrogeology was not clear with respect to flow direction, ground-water levels, and flow velocity. Also, the rationale for selecting the location of four new monitoring wells was not indicated and their location on different figures was not consistent. Trend analyses and the occurrence of natural attenuation were discussed in detail including problems associated with a short period of monitoring. It was suggested that fate and transport modeling also be considered in the evaluation of natural attenuation.
(98-R04-005) (J. Jones(RSKERC)580-436-8593)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Hicks, John R., Todd H. Wiedemeier, and David E. Moutoux (Parsons Engineering), John T. Wilson and Donald H. Kampbell (RSKERC), and Jerry E. Hanson (Brooks AFB). "Case Study of the Air Force Protocol to Evaluate Natural Attenuation of Chlorinated Solvents in Groundwater." 2nd Tri-Service Env. Tech Workshop, 10-12 June 1997.
(D. Kampbell(RSKERC)580-436-8564)

Ye, Ming-Yu, and William G. Lyon (ManTech) and Candida West (RSKERC). "Analysis of Ferric and Ferrous Ions in Soil Extracts by Ion Chromatography." J. Liq. Chrom. & Rel. Tech., 21(4), 1998.
(R. Cosby(RSKERC)580-436-8533)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of June 8, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region IV: On June 2, 1998, Dr. Scott Huling (RSKERC) and Dr. Bruce Pivetz (ManTech) provided RPM Giezelle Bennett with review comments concerning a treatability study and natural attenuation evaluation draft final report for the General Electric/Shepherd Farm Superfund Site in East Flat Rock, NC. It was pointed out that the natural attenuation data evaluation indicated that the degradation of chlorinated hydrocarbons was significantly limited, however, one of the conclusions of the report was that natural attenuation is sufficient and that enhanced biodegradation was not necessary or feasible. It was recommended that some interpretations of the data be revisited to more convincingly demonstrate that natural attenuation will be adequate to remediate ground-water contamination. The pump-and-treat program to recover the most contaminated area of the plume will lessen some of the burden imposed on the proposed natural attenuation remedy, but will not mitigate all of the concerns raised in the review comments.

(97-R04-001)

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

BATTELLE CONFERENCE

Several NRMRL representatives made technical presentations at The First International Conference on Remediation of Chlorinated and Recalcitrant Compounds in Monterey, CA, May 18-21, 1998. The Conference was sponsored by Battelle along with a number of co-sponsors and other participating organizations including EPA. The gathering, which included 254 technical presentations and 44 poster displays, featured former California Governor Edmund G. "Jerry" Brown, Jr. as the keynote speaker.

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Kampbell, Donald H. (RSKERC), Jerry E. Hanson (Brooks AFB), and Mano K. Husain (Hickman AFB). "Natural Attenuation and Bioslurping at Diego Garcia." Proceedings of 2nd Tri-Service Env. Tech Workshop in St. Louis, MO, June 10-12, 1997.

(D. Kampbell(RSKERC)580-436-8564)

Puls, Robert W. and Cynthia J. Paul (RSKERC). "Discrete-Level Ground-Water Monitoring System for Containment and Remedial Performance Assessment Objectives." J. of Environ. Eng. June 1998.

(R. Puls(RSKERC)580-436-8543)

TECHNOLOGY TRANSFER ACTIVITIES

During June 2-4, 1998, the Technology Support Center (TSC) presented a Natural Attenuation of Ground-Water Contamination training course in St. Paul, MN, with discussions focusing on sorption, dilution, volatilization, and biodegradation processes, as well as monitoring requirements to demonstrate that these processes are taking place. The students were also involved with hands-on experience using BIOSCREEN as a decision support system in reviewing natural attenuation proposals. Thirty-two students, representing hazardous and solid wastes programs with the State of Minnesota and one Regional II employee, attended the course. Dr. Mary Randolph (RSKERC) served as course moderator, while the instructors included Dr. John Wilson (RSKERC), Barbara Wilson and Dr. Daniel Pope (Dynamac), and Dr. Ron Sims (Utah St. Univ.). The course will be presented again in Region IV August 25-27, 1998.

(M. Randolph(RSKERC)580-436-8616)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of June 15, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region VII: On June 4, 1998, in a continuing technical assistance effort at the Ogallala Superfund Site in Ogallala, NE, Dr. David Jewett (RSKERC) and Dr. Rashid Islam (ManTech) provided RPM Victor Lyke with two computer simulations used to estimate the time of travel for ground water. The computer simulation methods, particle tracking and mass transport modeling, relied upon data and results from the calibrated, steady-state ground-water flow model which was developed for the Ogallala area by the RSKERC Center for Subsurface Modeling Support (CSMoS) last year. It was pointed out that the results presented in this modeling study are conservative as neither model included contaminant retardation or reduction processes.

(97-R07-003)

(D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region IX: The BKK Landfill (BKK) is a 583-acre RCRA facility consisting of a closed hazardous waste landfill and an active municipal solid waste landfill. The facility is located in West Covina, CA, in the middle of a residential area. The Technology Support Center has been providing assistance at the site since 1993. On June 4, 1998, Steven Acree (RSKERC) provided RPM Carmen Santos with comments regarding a document titled "Draft Statement of Basis." In general, the document provided a good representation of site conditions, remedial objectives, and remedial options in support of a proposed remediation plan. Detailed comments and recommendations were offered on several issues including areas in which remediation to stated standards is technically impracticable, misleading statements regarding the control of contaminant migration downgradient from the landfill, areas of ground-water contamination where corrective measures are not proposed, and mechanisms of natural attenuation.

(98RC09-001)

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

TECHNOLOGY TRANSFER ACTIVITIES

The First International Conference on Remediation of Chlorinated and Recalcitrant Compounds was held in Monterey, CA, May 18-21, 1998. ***Several NRMRL representatives made technical presentations including:***

Dominic DiGiulio (RSKERC) - "Use of Diffusion Modeling to Aid Assessment of Rate-Limited Vapor Transport for SVE Closure,"

Chunming Su (RSKERC/NRC) - "Temperature Effect on Reductive Dechlorination of Trichloroethene by Zero-Valent Metals,"

Guy Sewell (RSKERC) - "Performance Evaluation of an In Situ Anaerobic Bioremediation System for Chlorinated Solvents,"

Varadhan Ravi (Dynamac) - "Evaluating the Natural Attenuation of Transient-Source Compounds in Groundwater,"

Lynn Wood (RSKERC) - "NAPL Extraction from a Contaminated Aquifer: Field Evaluation of Alternatives," and

Scott Huling (RSKERC) - "Oxidation of Chlorinated Organics via Fenton-Generated Hydroxyl Radicals."

Participating in the poster sessions were:

Eva Davis (RSKERC) - "Research Issues for Thermal Remediation,"

Eva Davis (RSKERC) - "Hot Water Injection for the Remediation of Oily Wastes,"

Don Kampbell (RSKERC) - "Real-Time Assay for TCE in Water Samples,"

Michael Fishman (Dynamac) - DNAPL Infiltration and Distribution in Subsurface: 2-D Experiment and Modeling Approach," and

Michael Fishman (Dynamac) - "Flushing of Residual PCE by IPA Alcohol: A 2-D Experiment's Result."

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Kampbell, Donald H. (RSKERC) and Steve A. Vandegrift (ManTech). "Analysis of Methane, Ethane, and Ethylene in Ground Water by a Standard Gas Chromatographic Technique." Jour. of Chrom. Sc., Vol. 36. May 1998.

(D. Kampbell(RSKERC)580-436-8564)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of June 29, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region II: On April 14, 1998, RPM Carla Struble requested technical assistance in evaluating the effectiveness of a funnel-and-gate with reactive zero valent iron to remediate a chlorinated solvent ground-water plume that is migrating off the Seneca Army Depot Activity (SEDA) in Romulus, NY. On June 22, 1998, Dr. David Burden (RSKERC) and Dr. Hai Shen (Dynamac) provided recommendations for a feasibility study including detailed discussions concerning the need to characterize the contaminated plume, hydrogeology, stratigraphy, and geochemistry. Suggestions were also offered with respect to model simulations, monitoring, costs, regulatory considerations, and health and safety. It was pointed out that, to date, twelve full-scale applications for this technology have been approved for installation in the field, and some have already shown the potential for the treatment of ground-water plumes contaminated with chlorinated solvents.

(98-R02-009)

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

Technical Assistance to Region III: In response to a May 18, 1998, request from RPM John Banks, Dr. David Burden (RSKERC) and Dr. Sam Lee (Dynamac) provided comments regarding the installation of an additional monitoring well at the Old City of York Landfill Superfund Site in York County, PA. In the June 11, 1998, response it was suggested that an additional well in the proper location would be helpful in defining the flow and contaminant migration pathways and eventually assist in attempts to demonstrate that natural attenuation processes are taking place in the event that NA is selected as the remedial technology for this site.

(98-R03-011)

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

Technical Assistance to Region III: On June 17, 1998, Dr. David Burden (RSKERC) and Dr. Ann Azadpour (Dynamac) provided RPM John Banks with additional technical assistance at the Old City of York Landfill Superfund Site in York County, PA. The comments were directed at the viability of using natural attenuation at the site and recommendations concerning the geochemical parameters to be monitored and the data set that would be necessary to complete a natural attenuation study. A number of general and specific comments and observations were provided. In general, it was suggested that the preponderance of evidence does not support the viability of natural attenuation for the remediation of chlorinated solvents.

(98-R03-011)

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

Technical Assistance to Region V: In a continuing technical assistance effort at the Refuse Hideaway Landfill Site in Madison, WI, Drs. Mary Gonsoulin and John Wilson (RSKERC) provided RPM Beth Reiner with a review of hydrogen analysis results of ten field samples. The June 22, 1998, review contained a data summary table and comments pointing out those locations where the hydrogen concentration was adequate for the reductive dechlorination of PCE and TCE and those areas where these processes are not expected to be occurring.

(97-R05-006)

(M. Gonsoulin(RSKERC)580-436-8616)

Technical Assistance to Region X: On June 19, 1998, Dr. Eva Davis (RSKERC) provided RPM Christina Ngo with review comments on the "Focused Feasibility Study for Thermal Remediation Technologies" for the Wyckoff Soil and Groundwater Operable Units at the Wyckoff/Eagle Harbor Superfund Site in Bainbridge Island, WA. In general, the report did a good job of evaluating the thermal techniques of steam injection and soil heating for the recovery of creosote and related contaminants present at the site. A number of issues were discussed in detail including costs, the need to clarify the different recovery mechanisms occurring in the two different thermal techniques, the estimated time for remediation, residuals that may be expected from thermal remediation, and problems associated with the shallow depth to contamination.

(98-R10-001)

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



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of July 6, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region II: On May 7, 1998, RPM Angela Carpenter requested an evaluation of the conclusions of a pilot test report concerning natural attenuation and the applicability of natural attenuation enhanced by the use of an oxygen release compound (ORC) as remedial alternatives at the Maywood Chemical Superfund Site in Maywood, NJ. In review comments dated June 24, 1998, Dr. David Burden (RSKERC) and Dr. Daniel Pope (Dynamac) stated that the natural attenuation of BTEX compounds is likely to be significant under common aquifer conditions, however, the rate of biodegradation may not be sufficient to achieve remedial goals. Generally, it would be expected that the addition of oxygen would result in the microorganisms degrading the BTEX compounds at a faster rate. It was pointed out that much of the oxygen supplied from an ORC is likely to be used for the oxidation of reduced alternative electron acceptors thereby requiring the addition of ORCs substantially in excess of that required for the remediation of contaminants at the site.

(98-R02-007) (D. Burden(RSKERC)580-436-8606)

Technical Assistance to Region III: Following the June 17, 1998, technical assistance comments and subsequent conference call with Region III concerning the viability of natural attenuation at the Old City of York Landfill Superfund Site in York County, PA, Dr. David Burden (RSKERC) and Dr. Ann Azadpour (Dynamac) provided RPM John Banks with summary comments of the technical issues involved. The June 22, 1998, comments were intended to clarify the need for addressing the fundamentals required to conduct a natural attenuation investigation. Those issues included the need to characterize the plume boundaries and direction of ground-water flow, and the importance of defining site geochemistry. It was also suggested that, due to the unique aspects of the site, it may be more cost-effective to consider enhanced bioremediation as a remedial alternative.

(98-R03-011) (D. Burden(RSKERC)580-436-8606)

WORKSHOPS

Dr. Stephen Hutchins (RSKERC) was invited to participate in the Environmentally Acceptable Endpoints Workshop organized by the American Academy of Environmental Engineers held June 9-10, 1998, in Baltimore, MD. The workshop was funded by the Department of Defense Strategic Environmental Research and Development Program (SERDP) and was designed to identify sequestration, bioavailability, and transformation research issues for energetics (explosives, propellants, etc.), chlorinated organics, and metals. Results from the workshop will be incorporated into a special report for SERDP and will be used to guide the issuance of future RFPs.

(S. Hutchins(RSKERC)580-436-8563)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Hutchins, S.R. and D.E. Miller (RSKERC), and A. Thomas (Tyndall AFB). "Combined Laboratory/Field Study on the Use of Nitrate for In Situ Bioremediation of a Fuel-Contaminated Aquifer." Environmental Science and Technology. (32), 1998.

(S. Hutchins(RSKERC)580-436-8563)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of July 13, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: On May 4, 1998, RPM Derrick Golden requested review comments on a document entitled "Report Demonstrating the Technical Impracticability of Restoring Groundwater at the Hocomonco Pond Site," which was prepared by the PRP consultant. There has been a continuing technical assistance effort at the Westborough, MA, site since 1991. The June 30, 1998, response from Dr. David Burden (RSKERC) and Dr. Michael Fishman (Dynamac) stated that the report appeared reasonable and the justification for granting a Technical Impracticability Waiver was well presented. Discussed in detail were issues concerning DNAPL fate and transport modeling, the need to present the relative merits and cost estimates of thermal and other remediation technologies, and a suggested deficiency in site characterization information.

98-R01-003)

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

Technical Assistance to Region II: On July 1, 1998, Steven Acree (RSKERC), and Dr. Bruce Pivetz and Rick Stransky (ManTech) provided RPM Lorenzo Thantu with review comments concerning proposed remediation activities at the Liberty Industrial Finishing Superfund Site in Farmingdale, NY. The review focused on pilot-scale field tests of two ground-water recirculation techniques, a laboratory treatability study for metals removal by chelation, and a field test involving in-situ precipitation of inorganic contaminants. In general, the work plan incorporated changes that were suggested during an RSKERC site visit on May 14, 1998. Detailed comments were made in areas including estimates of hydraulic conductivity anisotropy, techniques to evaluate the dimensions of the circulation cell, and the duration of the pilot circulation tests.

(98-R02-003)

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

Technical Assistance to Region IV: On June 25, 1998, Steven Acree and Dr. Don Kampbell (RSKERC) provided RPM Galo Jackson with review comments on the remedial action plan for the Petroleum Products Corporation Superfund Site in Broward County, FL. The document described the design of a full-scale system for free-product recovery. In general, the proposed system will result in additional product removal and, ultimately, reduce the potential for LNAPL mobility. It was pointed out that the initial recovery rates may be significantly above current recovery rates based, in part, on the increased number of wells in the recovery system. However, sustainable recovery rates, particularly for the more viscous products, may be relatively low or minimal. Detailed comments were provided in areas such as bioslurper technology and well spacing.

(98-R04-001)

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

Technical Assistance to Region IV: On July 1, 1998, Dr. Mary Gonsoulin (RSKERC) and Dr. Bruce Pivetz (ManTech) provided RPM Donna Wilkinson with a technical review of the Baseline Intrinsic Bioremediation/Natural Attenuation Investigation Work Plan for the United Technologies Corporation (Pratt & Whitney) Site in Palm Beach County, FL. In general, the document addressed the concerns expressed in a March 17, 1998, RSKERC site visit and a March 26, 1998, review of a preliminary draft of the work plan. It was suggested, however, that maps of ground-water analytical results also provide more specific ground-water flow direction information to give a better understanding of upgradient, cross- gradient, and downgradient locations. Detailed comments were given with respect to the location of a number of sampling locations.

(98RC04-001)

(M. Gonsoulin(RSKERC)580-436-8616)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Hutchins, Stephen R. and Dennis Miller (RSKERC), H.G. Sweed, P.S. Bedient, J.M. Thomas, C.H. Ward, and M.R. Wiesner (Rice Univ.), and John A. Bantle (Okla. St. Univ.). "Pilot Demonstration of Nitrate-Based Bioremediation of Fuel-Contaminated Aquifer at Eglin AFB, FL: Site Characterization, Design, and Performance Evaluation." Published by USAF, February 1998, NTIS No. ADA332940.

(S. Hutchins(RSKERC)580-436-8563)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of July 20, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region II: On May 15, 1998, RPM Joseph Gowers requested comments concerning the natural attenuation of lead and cadmium at the NL Industries Inc. Superfund Site in Pedricktown, NJ. The PRP consultant concluded that the effectiveness of natural attenuation at removing contaminants from ground water has been demonstrated by a decrease in concentration with no significant migration and recommended that future action be to confirm that ground-water contaminants will continue to be naturally attenuated. On July 9, 1998, Dr. David Burden (RSKERC) and Dr. Jin-Song Chen (Dynamac) suggested that, while the conclusions and recommendations of the consultant appeared to be reasonable, it is too early to assume that the natural attenuation of lead and cadmium is occurring without further examining geochemical data and fully characterizing the site hydrogeology and attenuation mechanisms. A number of technical comments and recommendations were offered.

(98-R02-008)

(D. Burden(RSKERC)580-5436-8606)

Technical Assistance to Region III: The Lord-Shope Site, located in Girard Township, PA, consists of a four-acre capped landfill and surrounding contaminated soil. Prior to capping, an estimated 4 million cubic feet of waste were disposed of on the privately owned site between 1959 and 1979. On April 6, 1998, RPM David Turner requested that RSKERC review the report "Long-Term Monitoring and Intrinsic Remediation Report for the Lord-Shope Landfill Site." On July 9, 1998, Dr. David Burden (RSKERC) and Dr. Daniel Pope (Dynamac) suggested that the existing site characterization data and monitoring network were not sufficient for a monitored natural attenuation remedy. Numerous recommendations were made to improve the investigation including modeling activities, defining changes in ground-water flow, tracer studies, additional monitoring locations, and the use of H₂ to determine if reductive dechlorination is possible.

(98-R03-010)

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

Technical Assistance to Region IV: In a continuing technical assistance effort at the Flanders Filter Site in Washington, NC, Jerry Jones (RSKERC) and Dr. Ann Azadpour (Dynamac) provided RPM Jon Bornholm with comments concerning the PRP's response to a May 22, 1998, RSKERC review of a proposed feasibility study. The July 10, 1998, comments focused on sampling frequency and parameters in terms of establishing statistical validity for natural attenuation, conditions required for reductive dechlorination to take place, and the required frequency for measuring terminal electron acceptors.

(98-R04-003)

(J. Jones(RSKERC)580-436-8593)

Technical Assistance to Region VI: A meeting was held July 2, 1998, at the Region VI office to discuss ground-water issues at the South Cavalcade Superfund Site in Houston, TX. Participants at the meeting included RPM Glenn Celerier and Joe Kordzi (Region VI), Dr. Scott Huling (RSKERC), Dr. Bruce Pivetz and Rick Stransky (ManTech), and representatives from the Texas Natural Resources Conservation Commission, Beazer Corp., HSI GeoTrans Inc., Key Environmental Inc., and Ground Water Inc. The ROD currently specifies pump-and-treat remediation, however, natural attenuation is under evaluation. Several issues were discussed including the heterogeneous distribution of DNAPLs, how well the proposed model domain represented the entire site, and the need for additional site characterization activities. It was agreed that if preliminary results indicate a significant reduction in contaminants in the natural attenuation study area, additional site characterization and a long-term monitoring work plan would be required.

(95-R06-005)

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

Technical Assistance to Region VI: On March 31, 1998, Senior Project Manager Michael Overbay requested technical assistance relating to a natural attenuation of TCE demonstration at a RCRA site on England AFB in Alexandria, LA. In a July 6, 1998, response, Steven Acree, Dr. John Wilson, and Dr. Alan Noell (RSKERC), and Dr. Daniel Pope (Dynamac) stated that, in general, it appeared that the contaminant distribution and hydrogeology were not well defined. It did not appear that the proposed studies would achieve the stated objectives regarding an estimation of contaminant biotransformation rates and establishing a network of wells along contaminant flowlines with a reasonable degree of certainty. It was also suggested that the proposed monitoring wells and pump tests would not be adequate to define site conditions sufficiently for the use of standard biodegradation modeling techniques.

(98RC06-002)

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



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of July 27, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region VI: On March 31, 1998, Senior Project Manager Michael Overbay requested assistance concerning a natural attenuation demonstration study at a RCRA site designated SS-45 at England Air Force Base in Alexandria, LA. On July 22, 1998, Steve Acree, Dr. John Wilson, and Dr. Alan Noell (RSKERC), and Dr. Daniel Pope (Dynamac) attended a meeting at the facility to discuss a work plan for evaluating natural attenuation processes at the site. In addition to RSKERC, Region VI, and England AFB, representatives from the Louisiana Department of Environmental Quality and Air Force contractors attended the meeting. Major issues included the lack of sufficient hydrogeologic information to support the study and concerns with proposed investigative approaches to demonstrate natural attenuation. Revisions to the work plan were discussed in detail. It is anticipated that RSKERC will be requested to review revisions to the work plan as well as other submittals.
(98RC06-002) (S. Acree(RSKERC)580-436-8609)

Technical Assistance to Region IX: On July 23, 1998, in a continuing technical assistance effort at the Sulphur Bank Mercury Mine (SBMM) in Clearlake Oaks, CA, Dr. David Jewett (RSKERC) provided RPM Carolyn d'Almeida with information concerning a hydraulic characterization of the site. Hydraulic testing of the western waste rock pile at the SBMM site has been proposed to characterize subsurface flow from Herman Pit to Clear Lake and dissolution of mercury from the waste rock and subsequent transport to the aquatic system. Seven potential test wells were identified along with the justification for their selection.
(97-R09-006) (D. Jewett(RSKERC)580-436-8560)

TECHNOLOGY TRANSFER ACTIVITIES

Dr. Scott G. Huling (RSKERC) and Dr. Bruce Pivetz (ManTech) participated in the preparation of an Applied Bioremediation monograph for the American Academy of Environmental Engineers. While they co-authored a chapter entitled "Performance Evaluation," Dr. Huling contributed a chapter entitled "Land Treatment," and Dr. Pivetz wrote a chapter entitled "Emerging Technology - Phytoremediation." The document consists of 554 pages, 75 tables, and 120 figures. Other authors include R. Ryan Dupont (Utah St. Univ.), Clifford J. Bruell (Univ. of Mass.), Douglas C. Downey (Parsons Engr. Science), Michael C. Marley (Xpert Design and Diagnostics, Inc.), and Robert D. Norris (Eckenfelder, Inc.).
(S. Huling(RSKERC)580-436-8610)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Ross, Randall R. (RSKERC) and Milovan S. Beljin (Univ. of Cincinnati). "Evaluation of Containment Systems Using Hydraulic Head Data." J. of Environ. Eng. June 1998.
(R. Ross(RSKERC)580-436-8611)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of August 3, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region VIII: As part of a continuing technical assistance effort at the Petroleum/Ekotek Superfund Site in Salt Lake City, UT, Steven Acree provided RPM Russell Leclerc with review comments on a draft field sampling plan and ground-water tracer study. The July 24, 1998, comments stated that, in general, the plan appeared to be well conceived for characterizing the rate and direction of ground-water flow and the field-scale effects of dispersion. It was recommended that the design of the tracer study be finalized following the three-dimensional characterization of aquifer properties and contaminant distribution. A number of detailed suggestions were offered with respect to the tracer study.

(93-R08-003)

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

Technical Assistance to Region IX: On July 28, 1998, Steven Acree (RSKERC) attended a meeting in Los Angeles, CA, to provide assistance in the evaluation of site characterization activities and proposed ground-water flow modeling at the Charnock and Arcadia Sites in Santa Monica, CA. Also attending the meeting were representatives from Region IX and their consultants, City of Santa Monica, Southern California Water Company, and the PRPs and their consultants. Items discussed were results of hydrogeologic characterization, refinement to the conceptual model, and the numerical simulation of ground-water flow within the Charnock sub-basin. Planned simulations and supporting analyses were also discussed. It is anticipated that RSKERC will be requested to review documents describing proposed ground-water flow modeling.

(97RC09-001)

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

Technical Assistance to Region X: At the request of RPM Christina Ngo, Dr. Eva Davis (RSKERC) attended the National Remedy Review Board (NRRB) meeting in Seattle, WA, on July 21, 1998, for discussions concerning the Wyckoff/Eagle Harbor Superfund Site on Bainbridge Island, WA. The site had been used for the treatment of utility poles resulting in creosote and pentachlorophenol being the main contaminants of concern. The RPM presented a proposed tiered evaluation of the use of steam injection to enhance the recovery of the contaminants. The approach involves an initial step of bench-scale testing to determine residual soil concentrations and numerical modeling to estimate heating and recovery rates. The second step will involve a pilot-scale field project to assess the potential for creosote recovery in the field. If these investigations indicate that sufficient contaminant mass can be recovered, the remedy will proceed with steam injection. Dr. Davis provided technical information on the steam injection process as well as information based on experiences at the Southern California Edison Pole Yard in Visalia, CA, where steam injection is being used to recover creosote.

(98-R10-001)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Davis, Eva L. (RSKERC) and Gorm Heron (Tech. Univ. of Denmark). "Research Issues for Thermal Remediation." Proceedings, The First International Conference on Remediation of Chlorinated and Recalcitrant Compounds, California. May 18-21, 1998.

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

Hutchins, Stephen R. and Dennis E. Miller (RSKERC) and Alison Thomas (Tyndall AFB). "Combined Laboratory/Field Study on the Use of Nitrate for In Situ Bioremediation of a Fuel-Contaminated Aquifer." Environ. Sci. Technol. 32(12), 1998.

(S. Hutchins(RSKERC)580-436-8563)

Puls, Robert W. (RSKERC). "Remediation of Ground Water Using In-Situ Permeable Reactive Barriers: Chromate and Other Inorganic Contaminants." Water Resources and the Urban Environment. June 1998.

(R. Puls(RSKERC)580-436-8543)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of August 10, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: In response to a July 9, 1998, request, Dr. Eva Davis provided RPM Steven Donohue with review comments on the Draft Remedial Action Report for the UGI Columbia Gas MGP Site in Columbia, PA. The report described a removal action at the site that utilized the Contained Recovery of Oily Waste ("CROW") process to recover coal tar. The August 4, 1998, response covered a wide variety of detailed issues including the location of tars, enhanced recovery modeling, a statistical analysis of the data, and the recovery efficiency.
(98-R03-013) (E. Davis(RSKERC)580-436-8548)

Technical Assistance to Region IV: On August 5, 1998, Dr. Scott Huling (RSKERC) and Dr. Bruce Pivetz (ManTech) provided RPM Gizelle Bennett with a review of a document entitled "Response to EPA Comments" by a consultant concerning an earlier RSKERC review of a treatability study and natural attenuation report for the GE/Shepherd Farm NPL Site in East Flat Rock, NC. The purpose of the report was to demonstrate that monitored natural attenuation, in conjunction with pump-and-treat in areas of higher concentration, would be sufficient to prevent chlorinated aliphatic hydrocarbons from reaching a receptor creek. The main concern expressed in the response was the fate of cis-DCE at the site, particularly the contention that the aerobic biodegradation of the contaminant will occur without the addition or presence of an electron donor as a cometabolic substrate. Other comments were made concerning a BIOSCREEN modeling effort.
(97-R04-001) (S. Huling(RSKERC)580-436-8610)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Davis, Eva L. (RSKERC). "Hot Water Injection for the Remediation of Oily Wastes." Proceedings, The First International Conference on Remediation of Chlorinated and Recalcitrant Compounds, California. May 18-21, 1998.
(E. Davis(RSKERC)580-436-8548)

Puls, Robert W. (RSKERC). "Permeable Reactive Barrier Research, National Risk Management Research Laboratory, USEPA." Proceedings, 1998 NATO/CCMS Pilot Study Meeting. February 23-28, 1998. Vienna, Austria. May 1998.
(R. Puls(RSKERC)580-436-8543)

Weaver, James W. (RSKERC) and Freda Porter-Locklear (Univ. of NC). "Estimating the Rate of Natural Bioattenuation of Ground Water Contaminants by a Mass Conservation Approach." Society for Industrial and Applied Mathematics. 40(1), 1998.
(E. Langford(RSKERC)580-436-8551)

Ingle, Davis S. and Mike Hightower (DOE), and Guy W. Sewell (RSKERC). "Cost and Performance Report: In Situ Anaerobic Bioremediation Pinellas Northeast Site, Largo, Florida." Published by DOE (in cooperation with Clean Sites, Inc., and the EPA Technology Innovation Office) and coordinated by Sandia National Laboratories. April 1998.
(G. Sewell(RSKERC)580-436-8566)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of August 17, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: On May 18, 1998, RPM Steve Mangion requested technical assistance with respect to the transport and fate of chlorinated solvents, including PCBs and non-chlorinated hydrocarbons, at the General Electric Site in Pittsfield, MA. On August 12, 1998, Steven Acree (RSKERC) responded with review comments on a time critical site characterization plan required to support the remedial design. General comments were directed at the distribution and migration of DNAPLs, ground-water flow and contaminant transport modeling, techniques for evaluating the potential presence of NAPLs, geophysical testing, and the sampling of sediments and other geologic materials. A number of specific comments were offered concerning soil borings and monitoring wells, hydrogeologic testing, and water level measurements.

(98-R01-004)

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

Technical Assistance to Region III: On June 19, 1998, Region III requested technical assistance in evaluating the feasibility of changing from a pump-and-treat remedial system to monitored natural attenuation at the Richmond Works in Berkeley Heights, NJ. On August 11, 1998, Dr. Mary Gonsoulin (RSKERC) and Barbara Wilson (Dynamac) provided RPM Deborah Goldblum with a technical review of a report titled "Evaluation of Natural Attenuation at the Richmond Works." It was pointed out that reductive dechlorination occurs most readily under methanogenic conditions and that the concentrations of methane are too low at this site for these conditions to predominate. It was also stated that the concentrations of ethane and ethene are too low to indicate the reductive dechlorination of vinyl chloride. The rate of natural attenuation was discussed at length. It was suggested that geochemical scores intended to determine whether reductive dechlorination is an important mechanism for natural attenuation of chlorinated solvents are low in source area monitoring wells and further evaluation of the site for natural attenuation of TCA should emphasize abiotic processes.

(98-R03-012)

(M. Gonsoulin(RSKERC)580-436-8616)

Technical Assistance to Region VII: On June 3, 1998, the Region requested the review of an engineering evaluation and cost analysis of ground-water remediation at a former fire training area at Marshall Army Airfield in Fort Riley, KS. The report evaluates different technological alternatives including pump-and-treat with irrigation, air sparging/soil vapor extraction with nitrogen gas injection, in-well vapor stripping, and permeable treatment walls. The permeable treatment wall, with a performance period of 33 years, is the recommended technology for ground-water remediation. An August 10, 1998, response by Dr. David Burden (RSKERC), and Dr. Michael Fishman and Barbara Wilson (Dynamac), stated that it was difficult to determine if the objectives were to contain contamination or to restore ground-water quality. It was also pointed out that there was not sufficient information to support the proposed preferred alternative in terms of its effectiveness and environmental benefits.

(98-R07-006)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Bradley, P.M. and F.H. Chapelle (USGS), and J.T. Wilson (RSKERC). "Field and Laboratory Evidence for Intrinsic Bioremediation of Vinyl Chloride Contamination in a Fe(III)-Reducing Aquifer." *Journal of Contaminant Hydrology*. June 1997.

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



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of August 24, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region IV: On August 14, 1998, Dr. David Burden (RSKERC), and Drs. Daniel Pope and Michael Fishman (Dynamac), provided RPM Craig Zeller with comments concerning proposed NAPL removal and plume containment activities at the Koppers Charleston Plant in Charleston, SC. It was agreed that the selection of the model MODFLOW was adequate to evaluate the movement of ground-water and suggested using the model NAPL for simulating the movement and recovery of DNAPLs. The reason for using this modeling approach is to evaluate remediation alternatives. In discussing natural attenuation, it was pointed out that the proposed evaluation will be suitable for a preliminary screening to determine if it is advisable to invest in a more thorough investigation; however, a determination of the contribution of biological degradation to the control of the dissolved plume will require an extensive investigation over several years.

(98-R04-002)

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

Technical Assistance to Region VII: During August 11-12, 1998, Dr. David Jewett (RSKERC), along with RPM Ken Rapplean, made a site visit at the Coleman Operable Unit at the 29th and Mead Site in Wichita, KS, to gain a better understanding of local factors influencing site conditions as well as neighboring facilities that may serve as sources of contamination passing through the subsurface. The Preliminary Design-Final Soil Remedy, currently in the review process, focuses on SVE for remediation. The site visit preceded an August 17, 1998, conference call involving Region VII, Kansas Department of Health and Environment, NRMRL-Cincinnati, and the PRP.

(93-R07-002)

(D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region VII: In a continuing technical assistance effort, the RSKERC Center for Subsurface Modeling Support (CSMoS) has conducted ground-water flow and contaminant transport modeling at the Ogallala Water Supply NPL Site in Ogallala, NE. The objectives of the project are to model existing ground-water flow and contaminant transport conditions at the site, extrapolate these findings into the future, and simulate the impact of potential remedial options in cleaning up contaminated ground water. On August 17, 1998, Dr. David Jewett (RSKERC), and Dr. Lonnie Kennedy and Mr. Enamul Hoque (ManTech), provided RPM Victor Lyke with a response to a PRP consultant's comments of that modeling investigation. Rebuttals to a number of comments were offered including dynamic plume equilibrium, time required for remediation, model calibration, and model input parameters.

(97-R07-003)

(D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region IX: On August 13, 1998, Dr. Eva Davis (RSKERC) provided RPM Richard Procnier with review comments on a proposal to remove creosote from an aquitard by injecting steam into an underlying aquifer at the Southern California Edison Company's Pole Yard Site in Visalia, CA. Based on the results of a model study representing conditions at the site, the proposed injection should be capable of recovering creosote from the intermediate aquitard. Issues discussed included an injection pressure which would not fracture the overburden, establishing the chemical quality of surrounding wells including water supplies, and the ability of the existing monitoring system to monitor heating of the targeted area.

(98-R09-002)

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



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of August 31, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: On August 19, 1998, in a continuing technical assistance effort at the Massachusetts Military Reservation on Cape Cod, MA, Dr. David Burden (RSKERC), and Drs. Daniel Pope and Michael Fishman (Dynamac) provided RPM Mike Jasinski with comments concerning a proposed remedial response at landfill-1, which is one of the sources of ground-water contamination at the military facility. A number of issues were discussed including the characterization of the source area, the variability of biodegradation processes across the plume, uncertainty in calculated biodegradation rates, and model calibration. Although there is a reasonable indication that natural attenuation by biodegradation is occurring at some points in the plume, sufficient evidence was not presented to demonstrate that the specific remediation goals would be met. The source area is largely uncharacterized, the variability of biodegradation processes and rates were not taken into account, and the calibration of the model is inadequate for predictive purposes.

(97-R01-004)

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

Technical Assistance to Region IV: In response to a request for technical assistance from RPM Galo Jackson, Steven Acree (RSKERC) and Dr. Daniel Pope (Dynamac) provided review comments on a natural attenuation evaluation interim report for the Sydney Mine NPL Site in Brandon, FL. Much of the review concentrated on the use of dissolved hydrogen to indicate the prominent terminal electron acceptor in the degradation process. Since hydrogen is produced by a wide variety of microorganisms as an intermediate product of anaerobic metabolism, the concentration of hydrogen is related to the predominant transformation processes which include denitrification, iron(III) reduction, sulfate reduction, and methanogenesis. Other review comments concerned the degradation of benzene, the statistical significance of data collected in two rounds of sampling, importance of geochemical sampling, and future investigations.

(96-R04-003)

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

TECHNOLOGY TRANSFER ACTIVITIES

During August 25-27, 1998, the Technology Support Center (TSC) presented a Natural Attenuation of Ground-Water Contamination training course in Atlanta, GA, with discussions focusing on sorption, dilution, volatilization, and biodegradation processes, as well as monitoring requirements to demonstrate that these processes are taking place. The students were also involved with hands-on experience using BIOSCREEN as a decision support system in reviewing natural attenuation proposals. Thirty-seven students, representing UST programs in Region IV and the states of GA, NC, SC, MS, AL, and FL attended the course. Dr. Mary Gonsoulin (RSKERC) served as course moderator, while the instructors included Dr. John Wilson (RSKERC), Barbara Wilson and Dr. Daniel Pope (Dynamac), and Dr. Ron Sims (Utah St. Univ.).

(M. Gonsoulin(RSKERC)580-436-8616)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of September 14, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region IV: On July 2, 1998, RPM John Blanchard requested review comments on a proposed ground-water and DNAPL containment strategy for the Cabot/Koppers Superfund Site in Gainesville, FL. The proposal presented conceptual design sketches of a passive slurry-wall containment as well as the results of preliminary computer model runs illustrating how the containment would work. On September 9, 1998, Dr. David Burden (RSKERC), and Drs. Varadhan Ravi and Michael Fishman (Dynamac) stated that, based on the limited information provided, source containment using a soil-bentonite slurry wall appeared to be a reasonable approach for this site. Although the modeling exercise could not be evaluated in detail due to the lack of supporting information, modeling concepts were discussed including input data, assumptions, and limitations which could serve as the basis for assessment of the modeling approach and results.

(98-R04-006)

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

Technical Assistance to Region VII: On September 3, 1998, at the request of RPM Ken Rapplean, Dr. David Jewett (RSKERC) provided Mr. Donn Lentz (Fluor Daniel GTI, Inc.) with recommendations for SVE system performance monitoring at the Coleman Operable Unit (29th and Mead Superfund Site) in Wichita, KS. It was pointed out that the use of vapor extraction wells for monitoring can provide a false impression of the success of an SVE system and recommended data be collected from vapor probes. The use, design, and location of vapor probes was discussed in depth. Performance monitoring was also discussed including the collection of baseline data, sampling frequency, VOC detection, and the implications of a VOC vapor rebound when venting is terminated.

(93-R07-002)

(D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region IX: During August 25-27, 1998, Dr. David Jewett (RSKERC) participated in a technical meeting at UC-Davis concerning the Sulphur Bank Mercury Mine site, in Clearlake Oaks, CA. The meeting focused on updates of recent field activities and an initial discussion of remedial action objectives and alternatives. In addition to Region IX, representatives from the University, ICF Kaiser, Corps of Engineers, California Regional Water Quality Control Board and Toxic Substances Control Board, Lake County, and Elem Indian Colony participated in the discussions. Continuing assistance will consist of the preparation of a GIS map of potential surface and ground-water sampling locations, the coordination of a water quality monitoring plan, and to provide technical assistance in aquifer characterization investigations including flow meter tests.

(97-R09-006)

(D. Jewett(RSKERC)580-436-8560)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Smith, Marvin D., Gary F. Stewart, Randolph L. Perry, William A. Holloway, Jackie D. Holman, Jr., Mike D. Smith, Charles D. Tautfest, Jr., and Gary Overton (Okla. St. Univ.) "Potential for Invasion of Underground Sources of Drinking Water Through Mud-Plugged Wells: An Experimental Appraisal." EPA Report. EPA/600/R-98/075.

(J. Jones(RSKERC)580-436-8593)

Young, Steven C., Hank E. Julian, and Hubert S. Pearson (TVA), and Fred J. Molz and Gerald K. Boman (Auburn Univ.). "Application of the Electromagnetic Borehole Flowmeter." EPA Report. EPA/600/R-98/058.

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



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of September 21, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: On September 15, 1998, Steven Acree (RSKERC) provided OSC Dean Tagliaferro with review comments of a geophysical work plan for the General Electric Site in Pittsfield, MA. The plan proposed the use of ground penetrating radar and sub-bottom seismic profiling along eight transects across the Housatonic River to better define geologic structures that may influence the distribution of NAPLs and the remedial design. It was suggested that the proposed techniques may provide essential information, however, the proposed number of transects may limit the value of the information during remedial activities. Detailed comments were offered in a number of areas including techniques for obtaining additional transects, and the comparison of geophysical profiles with adjacent boring logs.

(98-R01-004)

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

Technical Assistance to Region II: On September 15, 1998, in a continuing technical assistance effort at the Ciba-Geigy Toms River, NJ, Site, Dr. David Jewett (RSKERC) and Dr. Elise Striz (ManTech) reviewed a document titled "Draft Sensitivity Analysis Technical Memorandum." Overall, the document was found to be well written and clearly outlined a logical protocol for conducting a sensitivity analysis of important parameters used in a contaminant transport model. It was suggested that the sensitivity modeling procedure remain flexible because the interrelationship between the parameters and their combined impact on contaminant transport may not become clear until the actual simulations are conducted. Detailed comments were provided concerning the solid-water partition coefficient, effective porosity, first-order biodegradation rate, recharge from precipitation, and vapor-phase transport.

(95-R02-003)

(D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region III: On August 5, 1998, RPM Jack Potosnak requested review comments on a natural attenuation study proposal for the West Virginia Ordnance Works in Point Pleasant, WV. Specifically, the request concerned the suitability of natural attenuation as a remedial alternative for TNT-contaminated ground water. On September 10, 1998, Dr. Mary Gonsoulin (RSKERC), and Barbara Wilson and Dr. Hai Shen (Dynamac) stated that the natural attenuation of nitroaromatic explosives is a new and unproved technology. A review of the literature suggests that the applicability of natural attenuation to this class of explosives may be limited by incomplete degradation, lack of energy sources in ground water, complexity of the isomers mixture, and unfavorable geochemical and microbial conditions. There is evidence that TNT attenuation in ground water is negligible under aerobic conditions, and its incomplete degradation under anaerobic conditions results in a significant accumulation of amino metabolites. Detailed comments and suggestions were offered with respect to the need for site characterization studies and a remedial investigation.

(98-R03-014)

(M. Gonsoulin(RSKERC)580-436-8616)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of October 5, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region VII: On September 3, 1998, the TSC provided the Region with recommendations concerning performance monitoring of an SVE system at the Coleman Operable Unit (29th and Mead Superfund Site) in Wichita, KS. On October 1, 1998, Dr. David Jewett (RSKERC) provided additional information in response to comments on those recommendations by the PRP's consultant. Discussed in detail were problems associated with the false impression of system success resulting from the use of vapor extraction wells for monitoring, the number and location of vapor probes, the need for soil sampling analyses prior to system closure, and the frequency of monitoring periods.

(93-R07-002)

(D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region IX: On September 22, 1998, a meeting was held at Williams AFB in Phoenix, AZ, to discuss ground-water contamination at OU-2. Participants included Dr. Scott Huling (RSKERC), Sean Hogan (Region IX), Dr. Bruce Pivetz and Rick Stransky (ManTech), and representatives from the Arizona Department of Environmental Protection, URS, IT Corporation, AFCEE U.S. Air Force, BEM, HydroGeologic, and Williams Gateway Airport. The ROD currently specifies ground-water pump-and-treat, however, natural attenuation is currently under evaluation. Several issues were discussed including the heterogeneous distribution of LNAPLs, LNAPL recovery, prediction of plume life, and the feasibility study. A treatability study report was distributed shortly before the meeting and was intended by the USAF to contain information described in the USAF natural attenuation evaluation protocol. The report is currently under evaluation.

(98-R09-003)

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

RESEARCH IN PROGRESS

On September 23, 1998, Dr. Scott Huling (RSKERC) was an invited guest speaker by the University of Arizona Chemical and Environmental Engineering Department regarding laboratory research results pertaining to the Fenton mechanism and in-situ oxidation of ground-water contaminants. Research results were presented indicating that heterogeneous reactions involving hydrogen peroxide and ferrous hydroxide which oxidizes sorbe 2-chlorophenol. Transformation reactions involve dehalogenation, hydroxylation and hydrogen abstraction, and can result in byproducts including chloride and several carboxylic acids. Limitations of Fenton oxidation were described including insufficient Fe(II), competition kinetics, limited reactions rate kinetics, and non-productive hydrogen peroxide reactions. Techniques were discussed which can minimize these two limiting factors. A treatment system was proposed which could be used to treat ground water contaminated with mixed wastes such as halogenated compounds, polycyclic aromatic hydrocarbons, and fuel compounds such as BTEX.

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



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of October 12, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region II: During September 29 to October 3, 1998, Dr. David Jewett (RSKERC) made a site visit to the Ciba-Geigy Superfund Site in Ocean County, NJ, to observe field investigations delineating NAPL and dissolved contaminant plumes emanating from the former drum disposal area at the Toms River Site. Several items concerning ground-water flow and contaminant transport modeling were reviewed including capture zones, model verification, and impact of iron fouling on ground-water extraction. Additional assistance will be required with respect to continuing site characterization and modeling efforts.

(95-R02-003)

(D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region VI: In response to an August 26, 1998, request from Region VI, Dr. Scott Huling (RSKERC) provided the Texas Natural Resources Conservation Commission with review comments concerning a proposed enhanced evapotranspiration cap at the GULF Coast Waste Disposal Authority, Campbell Bayou Facility in Texas City, TX. The October 5, 1998, comments stated that the proposed cap design provides a reasonable alternative to the conventional compacted clay cap design. A number of issues were discussed, and a number of topic clarifications were requested in areas including the proposed cap plant species, soil and waste characteristics, and an evaluation of the effectiveness of the enhanced evapotranspiration cap.

(98RC06-003)

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

Technical Assistance to Region IX: On October 5, 1998, Dr. David Burden (RSKERC) and Drs. Jin-Song Chen and Michael Fishman (Dynamac) provided Region IX with technical review comments on a corrective measures study for the Romic Environmental Technologies RCRA Facility in East Palo Alto, CA. In general, it was noted that the document provided a reasonable process for identifying potential remedies at the facility. Due to the complexity of site conditions, however, it was suggested that more detailed analyses are required in a number of areas including the effect of the heterogeneity in soil and hydrogeologic properties on the implementability of remedial options, ground-water flow and contaminant transport modeling, and the use of capping in conjunction with other remedial technologies.

(98RC09-002)

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

STAFF ACHIEVEMENTS

Randall Ross (RSKERC) recently completed the requirements for the Doctor of Philosophy Degree in Environmental Science at the University of Oklahoma. Working under the direction of Dr. Baxter Vieux in the Department of Civil and Environmental Engineering, Dr. Ross conducted research leading to a dissertation titled, "Determination of Leakage From Subsurface Containment Systems Using Informational Entropy and Hydraulic Signature Assessment Methods." The results of this research contribute to the available arsenal of cost-effective technologies for the protection of ground water resources at hazardous waste disposal sites.

SCIENTIFIC AND TECHNICAL PUBLICATIONS

DiGiulio, Dominic C. (RSKERC), Mark Brusseau (Univ. of Arizona), and Varadhan Ravi (Dynamac). "Use of Modeling to Aid Assessment of Rate-Limited Vapor Transport for SVE Closure." Proceedings, First International Conference on Physical, Chemical, and Thermal Technologies, Remediation of Chlorinated and Recalcitrant Compounds. May, 1998. Monterey, CA.

(D. DiGiulio(RSKERC)580-436-8605)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of October 19, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: On October 7, 1998, Steven Acree (RSKERC) attended a meeting in Portland, MA, to discuss site characterization studies performed in support of decisions regarding the implementation of a pilot test of source removal technologies in fractured rock at the Quarry Site on Loring AFB in Aroostock County in Northeastern Maine. Also attending the meeting were representatives from Region I, State of Maine, U.S. Air Force, and consultants to the Air Force and EPA. The meeting focused on results of recent studies and drum removal activities, characterization of data gaps, and proposed investigations to fill the data gaps which included a definition of the extent of NAPL distribution and hydraulic properties of the fractured system.

(98-R01-005)

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

Technical Assistance to Region I: On September 4, 1998, RPM Mike Nalipinski requested technical assistance in the review of a work plan for a DNAPL site in fractured rock at Loring AFB in Aroostock County in Northeastern Maine. In a response dated October 8, 1998, Steven Acree (RSKERC), and Drs. Michael Fishman and Hai Shen, and Barbara Wilson (Dynamac) stated that, in general, the investigations appeared to be using appropriate techniques for the purpose of evaluating the implementation of a pilot test of source removal technologies and recognized many of their limitations as a result of the complex setting. One of the recommendations was that more emphasis be placed on the use of cross-borehole techniques for characterizing hydraulic properties at the scale of the potential pilot tests. Detailed comments were provided in a number of areas including the evaluation of dominant fracture patterns and fracture density, geophysical logging, cross contamination during drilling, and the lateral extent of NAPL migration.

(98-R01-005)

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

Technical Assistance to Region IX: On October 7, 1998, Dr. Scott Huling (RSKERC), and Dr. Bruce Pivetz and Rick Stransky (ManTech) provided RPM Sean Hogan with review comments on the Focused Feasibility Study outline for the Williams AFB Superfund Site in Phoenix, AZ. Several comments and recommendations were also provided concerning discussions between RSKERC, Region IX, Arizona Department of Environmental Quality, and U.S. Air Force during a September 22, 1998, meeting at Williams AFB. Those areas receiving detailed comments and recommendations included the nature and extent of contamination, conceptual site model, remedy implementation, pilot and treatability studies, free product reduction, and the screening of remedial alternatives.

(98-R09-003)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Powell, Robert M. (Powell & Assoc.), Robert W. Puls (RSKERC), David W. Blowes (Univ. of Waterloo), John L. Vogan (EnviroMetal Tech.), Robert W. Gillham (Univ. of Waterloo), Patricia D. Powell (Powell & Assoc.), Dale Schultz and Rich Landis (Dupont), and Timothy Sivavec (GE Corp. R&D Center). "Permeable Reactive Barrier Technologies for Contaminant Remediation." EPA Report EPA/600/R-98/125.

(R. Cosby(RSKERC)580-436-8512)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of November 2, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region IX: During October 19-21, 1998, Dr. Scott Huling (RSKERC) and Dr. Bruce Pivetz (ManTech) attended a site visit and meeting at the Del Monte Superfund Site in Oahu, HI, where ground water and a municipal drinking water well have been contaminated from a spill of ethylenedibromide and dichloropropane. Also attending the meeting were representatives from Del Monte Food Products, Inc. and John Mink (Mink and Associates). The phytoremediation of pesticide contaminated soil and ground water is currently under evaluation. A phytoremediation unit designed with a liner and leachate collection system has been constructed and operated since May, 1998. *Koa Haole* plants have grown approximately one foot per month and water applied to the phytoremediation unit has exceeded that from the land treatment control plot by a factor of three. A reduction in pesticide concentrations occurred in both treatment units and a mass balance is currently under preparation. Transpiration of pesticides is under evaluation via air monitoring at the site and through a radiolabeled pesticide laboratory study being conducted at the University of Washington. Potential improvements in operation and monitoring were discussed. A meeting was also held at the Region IX Office to brief the staff on developments at the site.

(98-R09-001)

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

Technical Assistance to Region IX: During October 21-22, 1998, Steven Acree (RSKERC) attended a meeting concerning MtBE ground-water contamination at the South Lake Tahoe MtBE Site in South Lake Tahoe, CA. The contamination has been responsible for the shut down of 10 of 34 wells that supply water to the community of South Lake Tahoe. Also attending the meeting were representatives from the Lahontan Regional Water Quality Control Board, South Tahoe Public Utility District, and Region IX. The focus of the meeting was to discuss the status of investigations and remedial design at approximately six leaking underground storage tank sites where MtBE contamination has resulted in the shut down of the water supply wells. Also discussed was a schedule for RSKERC to provide assistance in reviewing actions designed to rapidly contain and remediate the sources of contamination and allow the operation of impaired wells. A meeting was held with the South Tahoe Public Utility District to discuss available information regarding well field conditions, site characterization studies that have been performed and are currently being planned, and plans for reinstating water capacity.

(99RC09-001)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Huling, Scott G. (RSKERC), Robert G. Arnold and Raymond A. Sierka (Univ. of Arizona), and Matthew R. Miller (East Central Univ.). "Measurement of Hydroxyl Radical Activity in a Soil Slurry Using the Spin Trap -(4-Pyridyl-1-oxide)-*N-tert*-butylnitron." Environ. Sci. Technol. (32). 1998.

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

TECHNOLOGY TRANSFER ACTIVITIES

During October 5-7, 1998, Dr. David Burden (RSKERC) attended the MODFLOW '98 International Conference sponsored by the International Ground Water Modeling Center (IGWMC) at the Colorado School of Mines in Golden, CO. MODFLOW '98 focused on the ground-water model MODFLOW along with its add-ons, extensions, plug-ins, spin-offs, and shells. The purpose of the conference was to bring together the developers and users of MODFLOW, and related modeling programs, to present the latest innovations in modeling applications and to explore the needs and directions for future developments. Dr. Burden chaired a session titled *Ground Water Management and Remediation Design Optimization* and served on the organizing committee which selected the oral and poster presentations. The conference was attended by more than 200 people with over 100 oral presentations and 25 poster presentations.

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



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of November 9, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: In a continuing technical assistance effort at Loring AFB in Aroostock County, ME, Steven Acree (RSKERC) provided RPM Mike Nalipinski with a review of a document which presented the required data and decision matrix for determining whether a pilot test of NAPL removal technology is implemented in fractured rock at the Quarry Site. The October 28, 1998, comments stated that, in general, the criteria and matrix provided a logical framework for evaluating the applicability of the pilot remediation test. Several issues related to the relative importance of different aspects of site characterization in the formulation of the decision matrix were discussed in detail including a definition of NAPL distribution, volume, and accessibility.

(98-R01-005)

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

Technical Assistance to Region II: On October 28, 1998, Steven Acree (RSKERC) provided RPM Mary Logan with review comments on a draft remedial action plan for Operable Unit III at Brookhaven National Laboratory in Upton, NY. The proposed remedy relies on source reduction, hydraulic controls, and natural processes. Although several potential concerns were noted, it was pointed out that a review of the proposed remedies could only be made in a general nature until ongoing evaluations in several key areas at the site were completed. It was suggested that contingencies be incorporated for the application of other technologies in the event that air sparging, soil vapor extraction, and natural attenuation prove to be of limited effectiveness.

(97-R02-004)

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

Technical Assistance to Region VII: On October 29, 1998, Dr. Ann Azadpour-Keeley (RSKERC) provided Superfund Technical Liaison Robert Mournighan with comments on a natural attenuation assessment for chlorinated volatile organic compounds in ground water at the Cornhusker Army Ammunition Plant Site in Grand Island, NE. The document was brief and contained limited information. For example, it did not provide a comprehensive site characterization which must serve as the foundation of any remediation technology. The basic conditions that must be present to confirm that natural attenuation processes are taking place were discussed, in addition to the need to develop a statistical plan to assure that the results of the investigation are valid. Specific comments concerned the proper location of monitoring wells, required indicator parameters, the consistency of project objectives, and the contribution of dilution and volatilization to contaminant reduction.

(99-R07-001)

(A. Azadpour-Keeley(RSKERC)580-436-8890)

Technical Assistance to Region IX: During October 27-30, 1998, Dr. David Jewett (RSKERC) attended an EPA Mining Impacted Watershed Conference to identify potential remedial alternatives for the Sulphur Bank Mercury Mine Site in Clearlake Oaks, CA. In addition, a meeting was held with Region IX representatives to discuss how the project should proceed to address data gaps and remedial option feasibilities. A meeting was also held with Agency and industry experts to discuss advantages and disadvantages of different remedial strategies for acid mine drainage and metals contamination.

(97-R09-006)

(D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region X: On October 30, 1998, Steven Acree (RSKERC), and Dr. Bruce Pivetz and Rick Stansky (ManTech) provided Hydrologist Bernie Zavala with comments on documents concerning a work plan, bench-scale and pilot-scale testing, and in-well stripping at the Boomsnub/Airco Superfund Site in Hazel Dell, WA. The review focused on the adequacy of the stated objectives, ability of the proposed test to meet these objectives, and adequacy of the proposed monitoring plan. In general, ground-water circulation wells with in-situ air stripping of volatile organic compounds and a treatment vault for the reduction of hexavalent chromium offers the potential to be effective, implementable, and less costly than a traditional pump-and-treat system. It was pointed out, however, that these technologies are highly innovative and will require more detailed monitoring to assess their performance than more conventional technologies.

(99-R10-001)

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



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of November 16, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: The Picillo Farm Site is a portion of a former 100-acre pig farm in Kent County, RI. More than 10,000 drums of hazardous wastes and an undetermined bulk volume of liquid chemicals were disposed of into several unlined trenches on an 8-acre area of the farm. The site was discovered in 1977 when a fire and explosion occurred. The Technology Support Center has been providing technical assistance at the site since 1992. On November 10, 1998, Dominic DiGiulio (RSKERC) provided RPM Anna Krasko with review comments on a draft of the SVE closure criteria for the site. Detailed discussions were offered with respect to a Technical Impracticability Waiver versus a favorable assessment of five SVE closure factors, procedure for shut-down, estimation of total soil concentration from soil-vapor measurements, respiration testing, and the collection of soil samples for the assessment of SVE performance. (95-R01-002) (D. DiGiulio(RSKERC)580-436-8605)

Technical Assistance to Region V: EPA is seeking, through a bench-scale pilot project, an alternative to the standard excavation and shipping clean-up method for radionuclides in soil. The pilot project will be conducted using soils from Ottawa, IL, a set of sites listed on the NPL as the Ottawa Radium Sites. On October 10, 1998, Project Coordinator Larry Jensen requested technical assistance in the review of the pilot-scale biological or chemical system for the removal and concentration of radium-226 contaminants from soil. On October 29, 1998, Dr. Mary Gonsoulin (RSKERC) met with representatives from Region V, Roy F. Weston, Inc., and the University of Nevada to discuss the results of preliminary research at the University of Nevada and to visit the various sites under investigation. (99-R05-001) (M. Gonsoulin(RSKERC)580-436-8616)

Technical Assistance to Region IX: In a continuing technical assistance effort at the Montrose and Del Amo Superfund Sites in Torrance, CA, Steven Acree (RSKERC) provided RPM Jeff Dhont with a review of Shell Oil Company comments on a proposed remedy plan. The comments focused on the impact of chlorinated solvent contaminant plumes within the area of influence of the proposed remedy and the requirement for ground-water extraction for benzene. The October 28, 1998, comments stated that, in general, the technical concerns regarding the need for further characterization of chlorinated solvent contamination prior to finalization of the proposed well field are valid. However, it did not appear essential that detailed characterization of additional sites be complete and the remedies installed and operational prior to finalization of the current remedial design. In addition, modeling of remedial designs performed since the initial investigations conducted in support of the feasibility study indicate that minor changes in well placement and pumping/injection rates may mitigate the additional migration of benzene as originally predicted. (95-R09-015) (S. Acree(RSKERC)580-436-8609)

Technical Assistance to Headquarters: On October 1, 1998, Senior Environmental Scientist Ron Wilhelm (Office of Radiation and Indoor Air) requested review comments of a document titled "Selection of Partition Coefficient, K_d Values, Volume I: Overview of Technical Issues and Review of Geochemistry and Available K_d Values for Cadmium, Cesium, Chromium, Lead, Plutonium, Radon, Strontium, Thorium, Tritium, and Uranium." In a response dated November 5, 1998, Dr. Ralph Ludwig (RSKERC), and Drs. Jin-Song Chen and Sam Lee (Dynamac) stated that, in general, the document was well presented. The authors have achieved their objective of providing a "thumb-nail sketch" of the geochemistry of the selected contaminants and have made a good effort at attempting to derive K_d ranges based on the use of MINTEQ modeling and data available in the literature. It was suggested, however, that there are too many variables and combinations of interacting variables to allow for the development of reliable tables for most of the contaminants discussed. It was pointed out that the blind use of the values with limited consideration of the underlying assumptions could result in significant error for those involved in transport and fate modeling. (Misc.) (R. Ludwig(RSKERC)580-436-8603)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Puls, Robert W. (RSKERC), and David W. Blowes and Robert W. Gillham (Univ. of Waterloo). "Emplacement Verification and Long-Term Performance Monitoring for Permeable Reactive Barrier at the USCG Support Center, Elizabeth City, North Carolina." IAWS Publication No. 250, 1998. Groundwater Quality: Remediation and Protection. (R. Puls(RSKERC)580-436-8543)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of November 23, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region VII: On October 7, 1998, RPM Robert Mournighan requested review comments on a feasibility study directed at the use of natural attenuation for the remediation of ground water contaminated with chlorinated volatile organic compounds at the Cornhusker Army Ammunition Plant in Grand Island, NE. On November 13, 1998, Dr. Ann Azadpour-Keeley (RSKERC) participated in a conference call concerning her October 29, 1998, response to that request. The conference, which included representatives from the Cornhusker Plant and the U.S. Corps of Engineers and their contractors, focused on the monitoring plan as well as parameters required to demonstrate that the processes of natural attenuation are effective. It was suggested that natural attenuation would be a feasible remedial alternative at this site due to the low concentrations of contaminants, removal of the potential sources, and evidence that contaminants are not leaving the facility.

99-R07-001

(A. Azadpour-Keeley(RSKERC)580-436-8890)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Wiedemeier, Todd H., Matthew A. Swanson, David E. Moutoux, and E. Kinzie Gordon (Parsons Engineering Science Inc.), John T. Wilson, Barbara H. Wilson, and Donald H. Kampbell (RSKERC), Patrick E. Haas, Ross N. Miller, and Jerry E. Hansen (Brooks AFB), and Francis H. Chapelle (USGS). "Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents In Ground Water." EPA Report. EPA/600/R-98/128.

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

FY 1998 RSKERC TSC ACTIVITIES

During FY 1998, the RSKERC Technology Support Center (TSC) provided 118 responses to technical assistance requests at 70 CERCLA sites and 16 responses at 6 RCRA sites. These activities included the addition of 50 CERCLA facilities to the TSC tracking system, of which 24 were new sites. There were 12 RCRA facilities entered into the system of which 9 were new sites. Three miscellaneous technical assistance activities were provided including Region I, Region VIII, and Headquarters. These concerned soils venting, Minuteman II deactivation at Ellsworth AFB, and the review of three Fact Sheets. Ten technology transfer activities were provided during the year in Natural Attenuation, and an Applied Bioremediation Monograph was prepared for the American Academy of Environmental Engineering. In addition to participating in site specific technical assistance requests, the RSKERC Center for Subsurface Modeling Support (CSMoS) provided 12,199 copies of model software and responded to about 1,200 E-Mail requests. The Subsurface Remediation Information Center (SRIC) provided 3,212 RSKERC publications to all levels of government, private consultants, industry, educational institutions, and a variety of entities in foreign countries. There were forty-four publications in scientific journals, and EPA Research reports, briefing documents, and issue papers.

(J. Jones(RSKERC)580-436-8593)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of December 14, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: The Standard Chlorine Superfund Site is a chlorobenzene manufacturer in New Castle, DE. The site was placed on the NPL as a result of two major spills consisting of paradichlorobenzene and trichlorobenzene. In 1980 there was a benzene spill from a railroad tanker car. Another spill occurred in 1986 when 569,000 gallons of VOCs were released from several tank ruptures. The Biodegradation Treatability Study Work Plan (BTSWP) proposed microcosm studies to assess the feasibility of using indigenous microorganisms to degrade the contaminants, and column studies to evaluate the effectiveness of biological/physical technologies. On October 22, 1998, RPM Hilary Thornton requested review comments on a supplement to the BTSWP which would simulate the application of biopile and bioventing technologies. In a December 9, 1998, response by Dr. Mary Gonsoulin (RSKERC), a number of factors were discussed including the rates of volatilization versus biodegradation, reduced permeability in highly contaminated zones, moisture content, and temperature.

(99-R03-001)

(M. Gonsoulin(RSKERC)580-436-8616)

Technical Assistance to Region III: On December 9, 1998, Dr. Ann Azadpour-Keeley participated in a conference call with RPM John Banks and other Regional representatives concerning the Old City of York Landfill in York, PA. This is a continuing technical assistance effort to review the revised work plan for monitoring natural attenuation. Due to the low concentrations of chlorinated solvents, the issues involved a comparison between pump-and-treat systems and natural attenuation in combination with institutional controls.

(98-R03-011)

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

Technical Assistance to Region VI: England Air Force Base is located in Alexandria, LA. The site is a closed, RCRA regulated and permitted facility. The contaminant plume was delineated over several years, primarily through the use of direct push techniques. It has been shown to be approximately 5,000 feet long and 3,000 feet wide with multiple lobes, source areas, affected aquifer zones, gradient directions (including seasonal reversals), and geochemical regimes. On March 31, 1998, Senior Project Manager Michael Overbay requested technical assistance relating to a natural attenuation of TCE demonstration at the site. On December 7, 1998, following other technical assistance efforts, Steven Acree and Dr. John Wilson (RSKERC) and Dr. Daniel Pope (Dynamac) provided RPM Michael Overbay with review comments on a Work Plan for an EE/CA of Remedial Alternatives at the site. It was pointed out that the proposed investigations will result in a better understanding of the extent of contamination in several areas and the geochemical environment with respect to the potential role of biotransformation processes. However, the contaminant distribution and site hydrology are not understood in sufficient detail to support the detailed estimation of biological transformation rates discussed in the report. It was suggested that the demonstration of natural attenuation mechanisms for the control of contaminant migration will likely require long-term monitoring of more wells than would be necessary at sites where the contamination sources and transport conditions had been better defined.

(98RC06-002)

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



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of December 21, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region II: On December 14, 1998, Dr. Ann Azadpour-Keeley (RSKERC) provided Geologist Dean Maraldo with review comments concerning natural attenuation monitoring at the Colesville Landfill Superfund Site in Colesville, NY. It was pointed out that the inherent heterogeneous nature of landfills requires that site characterizations should be performed at a more detailed level for the implementation of natural attenuation than other remedial technologies, particularly since this site has also received industrial wastes. In addition to discussing the basic conditions which must be present to confirm that the processes of natural attenuation are taking place, the need for protracted and frequent sampling to assure statistical confidence was also addressed. A number of detailed concerns were expressed with respect to the distribution of hydraulic conductivity, problems associated with the biodegradation of chlorinated solvents in the presence of oxygen, availability of dissolved organic carbon to supply the required energy to degrade the contaminants of concern, and some of the conclusions reached in the report.

(98-R02-006)

(A. Azadpour-Keeley(RSKERC)580-436-8890)

Technical Assistance to Region IV: On December 15, 1998, in a continuing technical assistance effort at the GE/Shepard Farm NPL Site in East Flat Rock, NC, Dr. Scott Huling (RSKERC) and Dr. Bruce Pivetz (ManTech) provided RPM Giezelle Bennett with comments concerning an evaluation of natural attenuation and enhanced biodegradation at the site. The responses to earlier EPA comments were also discussed. In general, there is some evidence that natural attenuation has occurred or is occurring at the site, however, the persistence of *cis*-DCE, and significant migration of PCE indicate that it is not completely effective in the elimination of all contaminants and in preventing contaminant migration. A number of specific comments were made with regard to hydrogeology, baseline conditions, distribution of contaminants, estimation of contaminant mass, an estimation of attenuation rates, and contaminant transport predictions.

(97-R04-001)

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

Technical Assistance to Region VII: On December 15, 1998, Dr. Ann Azadpour-Keeley (RSKERC) took part in a conference call concerning the Cornhusker Army Ammunition Plant in Grand Island, NE. Also participating in the conference were Regional staff including RPM Robert Koke, John Cataldo (Corps of Engrs.), and consultants. The discussions, which were held in preparation of an upcoming public meeting, focused on the selection of remedial options for ground water in the vicinity of a Shop Area which is one of four operable units at the site. It was suggested, because of the low concentrations of the contaminants of concern, that the excavation of contaminated soil followed by natural attenuation and institutional controls appeared to be a reasonable remedial alternative. Also discussed were monitoring parameters which will be required to demonstrate that the processes of natural attenuation are taking place, and a monitoring program that would provide scientific credibility to the investigation.

(99-R07-001)

(A. Azadpour-Keeley(RSKERC)580-436-8890)

Technical Assistance to Region IX: In a continuing technical assistance effort at the Charnock and Arcadia Sites in Santa Monica, CA, Steven Acree (RSKERC) and Dr. Elise Striz (ManTech) provided RPM Greg Lovato with a technical review of a progress report for ground-water flow and transport modeling at the site. The December 14, 1998, comments stated that conditions are highly complex in the vicinity of the site and characterization data are not sufficient to support detailed modeling efforts with a high degree of confidence, particularly projections of future contaminant distributions. Although the migration pathways identified in the investigation are plausible, significant uncertainty exists in the results of the simulations. It was suggested that a monitoring program be designed to test the conclusions of the study and ensure the effectiveness of the remediation systems to be implemented.

(97RC09-001)

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



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of December 28, 1998**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: On October 29, 1998, RPM Alan Klinger requested technical assistance in the review of an in-situ chemical oxidation bench test proposal for the Groveland Wells Superfund Site in Groveland, MA. On December 17, 1998, Dr. Scott Huling (RSKERC) recommended that the initial focus be on bench-scale testing and that no steps be taken regarding pilot-scale or field-scale implementation until data from the bench-scale tests has been acquired, assimilated, and evaluated. It was also suggested that both aquifer solids be sampled as well as ground water be used in the tests to evaluate whether significant contaminant reduction can be accomplished in the presence of solids. Other issues discussed were project costs and the possible mobilization of metals as a result of the treatment process.

(99-R01-001)

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

Technical Assistance to Region V: On November 5, 1998, RPM Laura Evans requested review comments on a proposed soil vacuum extraction pilot-scale test report at the Muskego Sanitary Landfill in Muskego, WI. On December 18, 1998, Dr. Ralph Ludwig (RSKERC) expressed concerns about the location of the tests, number of vapor probe monitoring nests, location of well screen, and monitoring depths. In general, although the conclusions regarding the feasibility of employing soil vacuum extraction at the site may be valid, there was insufficient information provided in the report to substantiate this finding.

(99-R05-002)

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

Technical Assistance to Region VII: On December 16, 1998, Dr. Randall Ross (RSKERC), and Drs. Michael Fishman, Hai Shen, and Daniel Pope (Dynamac) provided RPM Craig Bernstein with technical review comments on a draft work plan for an aquifer tracer study at a former fire training area at Marshall Army Airfield, Fort Riley, KS. In general, the proposed investigations appeared to be using appropriate concepts for estimating flow and transport parameters, longitudinal dispersivity, and biodegradation rate constants for chlorinated solvents. Areas of concern were expressed including problems associated with the high density of the proposed tracer, the need for dimensional sampling, monitoring well locations, and the difficulty in obtaining reliable biodegradation rate constants.

(98-R07-006)

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



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of January 4, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: On December 21, 1998, Dr. Ann Azadpour-Keeley (RSKERC) provided RPM John Banks with comments on the "Alternative Ground Water Remedy Evaluation Report" for the Old City of York Landfill Superfund Site in York County, PA. In general, the document was well done and addressed both regulatory and scientific issues in a clear and concise manner. It was noted that VOC concentrations in ground water are low and confined to isolated areas near extraction wells used for pump-and-treat remediation. Because of deed restrictions and the fact that ground water is not being used for drinking purposes, it was suggested that biodegradation may not be the primary remedial alternative for the removal of chlorinated solvents, and that dilution and dispersion may be the leading processes at the site. It was suggested that ground-water extraction and treatment be discontinued due to its apparent inefficiency.

(98-R03-011)

(A. Azadpour-Keeley(RSKERC)580-436-8890)

Technical Assistance to Region VII: In response to a request during a conference call on December 15, 1998, Dr. Ann Azadpour-Keeley (RSKERC) provided RPM Robert Koke with a list of monitoring parameters needed to evaluate natural attenuation at the Cornhusker Army Ammunition Plant Site in Grand Island, NE. In the December 20, 1998, response, it was pointed out that a sampling plan should essentially identify the location, time, procedure, and constituents which should be determined to demonstrate that the processes of natural attenuation are taking place. It was suggested that dissolved molecular H₂ may provide another line of evidence that biodegradation is taking place since levels higher than 1 nM could indicate that reductive dechlorination is taking place.

(99-R07-001)

(A. Azadpour-Keeley(RSKERC)580-436-8890)

Technical Assistance to Region IX: During December 5-18, 1998, Dr. David Jewett (RSKERC) carried out a number of activities in California. A poster presentation entitled "Characterization of Physical and Chemical Heterogeneities of Mine Waste and Their Influence on Mercury Transport at the Sulphur Bank Mercury Mine" was given at the AGU Fall Meeting in San Francisco, CA. He also visited the Sulphur Bank site in Clear Lake, CA, to determine the extent of mine waste piles and identify the locations of older monitoring wells. Additional technical assistance at the site is expected to be the participation in hydrogeologic and site characterization studies, the development of a conceptual model, and the evaluation of remedial action objectives. He also participated in technical review meetings at UC-Davis.

(97-R09-006)

(D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region X: The Boomsnub/Airco Superfund Site, in Hazel Dell, WA, is currently undergoing an RI/FS. A list of candidate technologies has been developed for remedial action for two primary types of contaminants including hexavalent chromium and VOCs. On December 18, 1998, Steven Acree (RSKERC) and Dr. Bruce Pivetz (ManTech) provided Hydrologist Bernie Zavala with review comments on the results of bench and column tests of chromium fixation systems. The potential for reactions between oxygen, sulfur, iron, and chromium compounds increases the complexity of the chromium fixation. Also, the addition of air for in-well stripping will increase dissolved oxygen levels to some degree, leading to more oxygenated conditions at the entry point into the fixation systems. There will be reactions that favor the process of chromium (VI) reduction, and other reactions that decrease the efficiency of the system or lead to adverse effects. It was suggested that if the system does not perform as well as expected, a more extensive review should be made of the potential reactions and processes occurring within the systems.

(99-R10-001)

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



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of January 25, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: On January 13, 1999, Dominic DiGiulio (RSKERC) and Dr. Varadhan Ravi (Dynamac) provided RPM Ray Cody with technical comments concerning the conceptual design of a bioventing system at the Solutia Landfill RCRA Site in Springfield, MA. It was pointed out that well spacing and injection rate design are determined such that there is adequate air flow (greater than 0.001 cm/s) between the wells. This criterion was derived based on laboratory experiments and mass transfer considerations. It has been shown that the traditional approach of spacing wells based on the radius of influence is flawed and the proper SVE design should be based on air-flow patterns and velocities. In addition, the required injection rates for two different well spacings were determined as requested. A number of references were provided as well as a discussion on the applicability of various models.

(99RC01-001)

(D. DiGiulio(RSKERC)580-436-8605)

Technical Assistance to Region II: On January 15, 1999, Dr. David Jewett (RSKERC) participated in a technical review of a contaminant transport model for the Ciba-Geigy Superfund Site. Also attending the meeting, in Toms River, NJ, were representatives from Ciba Specialty Chemicals, Region II, and contractors. The purpose of the meeting was to review the objectives of the model and its current status, important input parameters, and a presentation of available results.

(95-R02-003)

(D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region IX: On December 31, 1998, Steven Acree (RSKERC) and Dr. Elise Striz (ManTech) provided RPM Greg Lovato with technical review comments on the Evaluation of Site Characterization and Remedial Design at the South Lake Tahoe, CA, MtBE Site. In general, the available information was not sufficient to fully evaluate the effectiveness of the remediation system with regard to the capture of contaminant plumes under current or future conditions. This evaluation was further complicated by significant changes in system operations that occurred during the start-up period. It was also noted that insufficient details regarding ground-water flow modeling efforts had been provided to support a detailed evaluation or to allow confidence in the results. Detailed comments were provided concerning the distribution of contaminants, characterization of hydraulic gradients and conductivity, other potential sources of contamination, modeling studies, and design of an infiltration gallery.

(99RC09-001)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Islam, M. Rashidul (ManTech), and David G. Jewett, Joseph R. Williams, and Mohamed Hantush (RSKERC). "Calibration of Groundwater Flow and Contaminant Transport Modeling for Ogallala, Nebraska." Symposium Publication. 1998 ASCE International Water Resources Conference, Memphis, TN.

(D. Jewett(RSKERC)580-436-8560)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of February 1, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region IV: On January 28, 1999, Dr. David Burden (RSKERC) and Dr. Elise Striz (ManTech) provided Environmental Scientist John Johnston with a follow-up review evaluation of the "Revised Baseline Risk Assessment" for the South Boulevard Properties, Inc., RCRA Site in Charlotte, NC. The comments focused on the ground-water flow and solute transport models as well as the summary and conclusions of the report. Although the revised report showed that an attempt was made to address the original RSKERC comments dated March 3, 1998, a number of concerns remained with respect to the justification of many aspects of the ground-water flow and solute transport models. (98RC04-002) (D. Burden(RSKERC)580-436-8606)

Technical Assistance to Region IX: On January 25, 1999, Dr. David Jewett (RSKERC) provided RPM Ellen Manges with review comments on a ground-water geochemistry proposal for the Sulphur Bank Mercury Mine Superfund Site in Lake County, CA, which was prepared by the University of California at Davis. It was pointed out that the proposal was extremely brief and that an assessment of its validity in implementing and evaluating remedial actions at the site was not possible without more information. A number of concerns were expressed including the objectives of the study, collection of water quality samples, anticipated results, components of flow, costs, project output information, and a time table for conducting the work. (97-R09-006) (D. Jewett(RSKERC)580-436-8560)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Lendvay, J.M., M.L. McCormick, M.J. Barcelona, and P. Adrians (Univ. Of Mich.), W.A. Sauck (Western Mich. Univ.), and D.H. Kampbell and J.T. Wilson (RSKERC). "Geophysical Characterization, Redox Zonation, and Contaminant Distribution at a Groundwater/Surface Water Interface." Water Resources Research. 34(12), Dec. 1998. (D. Kampbell(RSKERC)580-436-8564)

Ravi, Varadhan, and Jin-Song Chen (Dynamac), John T. Wilson (RSKERC), Jeffrey A. Johnson (Envir. Systems & Tech., Inc.), William Gierke (Golder Assoc., Inc), and Leanne Murdie (Univ. Of Waterloo). "Evaluation of Natural Attenuation of Benzene and Dichloroethanes at the KL Landfill." Bioremediation Jour. 2(3&4), 1998. (D. Burden(RSKERC)580-436-8606)

Sewell, Guy W. (RSKERC), Mary F. DeFlaun (Envirogen, Inc.), Nam H. Baek (Occidental Chem.), Ed Lutz (DuPont), Brent Weesner (ConsuTec, Inc.), and Bill Mahaffey (Pelorus Environ. & Biotechnol.) "Performance Evaluation of an In Situ Anaerobic Biotreatment System for Chlorinated Solvents." Proceedings - The First Conference on Remediation of Chlorinated and Recalcitrant Compounds. Monterey, CA. May 18-21, 1998. (G. Sewell(RSKERC)580-436-8566)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of February 8, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: On January 28, 1999, in a continuing technical assistance effort at the Picillo Farm Site in Kent County, RI, Dominic DiGiulio (RSKERC) provided RPM Anna Krasko with the results of his investigation concerning the possibility of relocating proposed piezometer-vapor probe clusters to allow a better delineation of soil contamination as a function of depth. Also discussed were soil samples and analyses, and testing during drilling.

(95-R01-002)

(D. DiGiulio(RSKERC)580-436-8605)

Technical Assistance to Region II: On December 7, 1998, RPM John DeMurley requested review comments on a draft work plan concerning an in-situ chemical oxidation pilot study to remove PCE and TCE from ground water at the 126-acre Fort Dix Landfill in Wrightstown, NJ. In a response dated February 2, 1999, Dr. Scott Huling (RSKERC) provided comments and calculations related to the proposed concentration and reaction rate of H_2O_2 , monitoring baseline conditions, and the proposed sequence of events. In addition, suggestions were offered concerning the oxidation of contaminants in the presence of aquifer material, the duration of monitoring, and the possible effect of the transport and fate of metals present in the pilot study area.

(99-R02-001)

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

Technical Assistance to Region IX: On January 22, 1999, a meeting was held at Williams AFB in Phoenix, AZ, to discuss ground-water contamination at OU-2. Participants included Rick Stransky (ManTech), Dr. Ravi Varadhan (Dynamac), Sean Hogan (Reg. IX), and representatives from the Arizona Department of Environmental Protection, URS, IT Corporation, US Air Force, BEM, HydroGeologic, and Williams Gateway Airport. The ROD currently specifies a ground-water pump-and-treat remediation system, however, natural attenuation is under evaluation. Technical discussions focused on the distribution of LNAPLs in terms of a conceptual model as well as methods to estimate their volume.

(98-R09-003)

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

Technical Assistance to Region X: On February 1, 1999, in a continuing technical assistance effort at the Boomsnub/Airco Superfund Site in Hazel Dell, WA, Steven Acree and Dr. Randall Ross (RSKERC), and Dr. Bruce Pivitz (ManTech) provided Hydrogeologist Bernie Zavala with comments on a feasibility study report. In general, the report was found to be well written and well organized. It proposed a commendable approach of a continuing pump-and-treat system for the overall ground-water plume while other remedial alternatives are used to address "hot spots." Although it appeared that there were no significant deficiencies or data gaps, there were some points that required clarification prior to the selection and implementation of remedial alternatives. They included the use of a surrogate concentration for hexavalent chromium, methods for in-situ soil flushing, chlorinated hydrocarbon degradation products and degradation rates, and chromium reduction chemistry.

(99-R10-001)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Su, Chunming and Robert W. Puls (RSKERC). "Kinetics of Trichloroethene Reduction by Zero-Valent Iron and Tin: Pretreatment Effect, Apparent Activation Energy, and Intermediate Products." Environ. Sci. & Tech. 33(1). 1999.

(R. Puls(RSKERC)580-436-8543)

Kampbell, Don H. (RSKERC) and Marko Stefanovic (ECU). "Real-Time Assay for TCE in Water Samples." Proceedings - The First Conference on Remediation of Chlorinated and Recalcitrant Compounds. Monterey, CA. May 18-21, 1998.

(D. Kampbell(RSKERC)580-436-8564)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of February 15, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region II: On January 20, 1999, RPM Trevor Anderson requested review comments on a ground-water model and ground-water treatability study report which was prepared by the New Jersey Department of Environmental Protection (NJDEP) for the five-acre Imperial Oil Co./Champion Chemicals Site in Morganville, NJ. In a response dated February 2, 1999, Dr. Ralph Ludwig (RSKERC) pointed out that the study was difficult to evaluate due to a lack of data. Limited comments were provided with respect to the ground-water modeling study including boundary conditions, calibration, location of well screens, free product, and the location of pumping wells. Detailed comments were also offered with respect to a proposed bench-scale study.

(99-R02-002)

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

Technical Assistance to Region X: On February 1, 1999, Dr. Randall Ross and Steven Acree (RSKERC), Drs. Hai Shen and Daniel Pope (Dynamac), and Dr. Bruce Pivitz (ManTech) provided RPM Debbie Yamamoto with comments regarding the Draft Final Engineering Evaluation/Cost Analysis for the BOC Gases Soil OU at the Boomsnub/Airco Superfund Site in Hazel Dell, WA. It was noted that both in-well stripping with soil vapor extraction, and in-situ air sparging with soil vapor extraction are capable of removing significant quantities of VOCs from the saturated and unsaturated zones. It was also suggested that the remedial alternatives may also be capable of preventing the downgradient migration of VOCs in ground water if properly designed and implemented. It was pointed out, however, that there are numerous underlying assumptions which, if invalid, would result in failure of the remedy to meet the objectives in the time frames stated. Some of the issues discussed were the characterization of the source area, residual phase NAPLs, and the effective radius of influence of the two remedial alternatives.

(99-R10-001)

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

Technical Assistance to Region X: On February 3, 1999, Steven Acree and Dr. Randall Ross (RSKERC) attended a meeting in the Region 10 Office to assist in evaluating remedial options including recirculation well and reactive wall technologies at the Boomsnub/Airco Superfund Site in Hazel Dell, WA. Also discussed were the Engineering Evaluation/Cost Analysis for the BOC Gases Operable Unit and the results of an ongoing pilot test of the recirculation well technology. Others attending the meeting were representatives from the Washington Department of Ecology, BOC Gases facility, Region 10, and contractors to Region 10 and BOC Gases. A site visit was conducted on February 4.

(99-R10-001)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Falta, Ronald W. (Clemson Univ.). "Using Phase Diagrams to Predict the Performance of Cosolvent Floods for NAPL Remediation." Ground Water Monitoring and Remediation. 3(18). 1998.

(L. Wood(RSKERC)580-436-8552)

Jawitz, James W., Michael D. Annable, and P.S.C. Rao (Univ. of FL). "Miscible Fluid Displacement Stability in Unconfined Porous Media: Two Dimensional Flow Experiments and Simulations." Jour. of Contaminant Hydrology. Vol. 31. 1998.

(L. Wood(RSKERC)580-436-8552)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of February 22, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: In a continuing technical assistance effort at the Dover Gas Light Superfund Site in Dover, DE, Dominic DiGiulio (RSKERC) provided the Region with review comments on the design of a soil venting system. The February 4, 1999, comments included copies of two papers which have been submitted for publication. The first deals with mass flux modeling and contains a strategy for soil venting closure which addresses most of the problems contained in the proposed design. The second paper addresses many of the problems associated with radius of influence (ROI) venting designs. Based on detailed calculations concerning the expected behavior of the proposed system, it was suggested that air injection at the site be abandoned in favor of air extraction until most of the VOCs have been removed.

(98-R03-003)

(D. DiGiulio(RSKERC)580-436-8605)

Technical Assistance to Region III: On February 18, 1999, Steven Acree and Dr. Bob Puls(RSKERC) provided RPM Ron Davis with review comments concerning a remedial design work plan for a permeable reactive subsurface barrier wall at the Arrowhead Plating Site in Montross, VA. In general, permeable reactive barrier technology has the potential to provide containment for the principal chlorinated compounds found in ground water at the site. Remaining data gaps include potential ground-water flow velocities and maximum contaminant concentrations to be treated. Although additional investigations of these parameters are proposed, more detailed characterization may be required in the most contaminated areas to increase confidence in the design parameters.

(98-R03-004)

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

Technical Assistance to Region VIII: On February 9, 1999, Steven Acree (RSKERC) attended a meeting in the Region 8 Office to discuss a three-dimensional characterization of contaminant distribution and aquifer properties at the Petroleum/Ekotek Superfund Site in Salt Lake City, UT. The information is in support of remedial action activities and long-term monitoring plans which are under evaluation. Also attending the meeting were representatives from the State of Utah, Region 8, and responsible parties.

(93-R08-003)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Davis, J.A., J.A. Coston, D.B. Kent, and C.C. Fuller (USGS). "Application of the Surface Complexation Concept to Complex Mineral Assemblages." Environ. Sci. Technol. Vol. 32. 1998.

(R. Puls(RSKERC)580-436-8543)

Pope, Gary A., Kamy Sepehrnoori, Mukul M. Sharma, Daene C. McKinney, and Gerald E. Speitel Jr. (Univ. of TX, Austin), and Richard E. Jackson (Duke Engr. and Services, Inc.). "Three-Dimensional NAPL Fate and Transport Model." EPA Report. EPA/600/R-99/011.

(J. Cho(RSKERC)580-436-8547)

Yortsos, Yanis C. and Katherine Shing (Univ. of Southern California). "Evaluation and Analysis of Microscale Flow and Transport During Remediation." EPA Report. EPA/600/R-99-022.

(J. Cho(RSKERC)580-436-8547)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of March 8, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: On January 20, 1999, RPM Kathy Davies requested review comments on the feasibility of monitored natural attenuation by biodegradation at the Dover Gas Light Site in Dover, DE. In a response dated March 4, 1999, Dr. Ann Azadpour-Keeley (RSKERC) pointed out that, due to an insufficiency of data, it appeared that the report did not successfully demonstrate the potential for the biological reduction of the contaminants of concern. It was suggested, however, that other natural attenuation processes such as dilution and volatilization will continue to be positive factors in terms of contaminant reduction. Issues discussed in detail included the parameters required to determine the efficacy of natural attenuation at this site, problems associated with the presence of DNAPLs, and the need to demonstrate statistical confidence in the data.

(99-R03-003)

(A. Azadpour-Keeley(RSKERC)580-436-8890)

Technical Assistance to Region VIII: On February 17, 1999, Drs. Scott Huling and Ralph Ludwig (RSKERC) attended a meeting in Denver, CO, concerning the Rocky Mountain Arsenal Federal Facility. Other participants included Larry Kimmel and Rich Muza (Region 8), and representatives from the Fish and Wildlife Service, U.S. Army, Colorado Department of Public Health and the Environment, HSI GeoTrans, Inc., Morrison-Knudson, Foster-Wheeler, Gannet-Fleming, and U.S.G.S. After a tour of the site, Dr. Huling made a presentation concerning the potential use of an innovative technology involving Fenton oxidation and permeable reactive barriers. Several issues were discussed including competition kinetics between target and non-target compounds, pre-treatment strategies, plume interception, and bench-scale testing. It was noted, because of the wide range of unique compounds present in ground water and the variability in their physical and chemical characteristics, that a sequencing of technologies would probably be the most effective remedial approach. The potential use of the proposed technology is currently under evaluation.

(99-R08-001)

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

Technical Assistance to Region IX: On February 23, 1999, Dr. Scott Huling (RSKERC), Rick Stransky and Dr. Bruce Pivetz (ManTech), and Dr. Ravi Varadhan (Dynamac) provided RPM Sean Hogan with an estimate of the volume of subsurface NAPLs at Williams Air Force Base in Phoenix, AZ. The estimate was intended to be used as an independent comparison with that developed by the Air Force and provide an analysis of the Air Force approach to making these calculations. A critique of the Air Force approach was also offered in the form of a discussion of pertinent issues and assumptions.

(98-R09-003)

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

Technical Assistance to Region X: On March 4, 1999, Dr. David Jewett (RSKERC) and Enamul Hoque (ManTech) provided RPM Michael Fagan with review comments on a PESTAN modeling report developed for the Okanogan Airport RCRA Facility in Okanogan, WA. In addition to providing general comments concerning the PESTAN model, input data and the need for a sensitivity analysis were specific issues discussed with respect to the application of the model at this site. Although the PESTAN model is an appropriate screening tool for initial solute transport estimations when input data are limited, it is not recommended for detailed site evaluations. Other issues discussed included uncertainty problems associated with the use of input data derived from the literature.

(99RC10-001)

(D. Jewett(RSKERC)580-436-8560)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of March 15, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Headquarters: On, February 2, 1999, Senior Environmental Scientist Ron Wilhelm (Office of Radiation and Indoor Air) requested review comments on the applicability of unsaturated zone models to radio nuclide transport including the ability of these models to handle first order decay as well as their ability to handle parent-daughter decay. In a response dated March 4, 1999, Dr. David Jewett (RSKERC) provided a critique of eleven applicable models using the Center for Subsurface Modeling Support (CSMoS) Online Model Database.

(99-R00-002)

(D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region II: On January 28, 1999, RPM Paul Ingrisano requested review comments of the "Final Report, Groundwater Natural Restoration Study" at the Naval Air Engineering Center (NAEC) Superfund Site in Lakehurst, NJ. On March 8, 1999, Dr. Ann Azadpour-Keeley (RSKERC), and Dr. Bruce Pivetz and Rick Stransky (ManTech) complimented the authors of the report on providing adequate considerations for the spatial density of the monitoring wells, statistical analysis, and a comprehensive approach which demonstrated their awareness of the central issues involved in assessing various natural attenuation processes. The reviewers commented that the report did not conclusively demonstrate that the plume had reached steady state. An apparent downgradient expansion of PCE and TCE concentrations, and uncertainties regarding the availability of electron donors to drive biodegradation processes, indicate that plume shrinkage may not occur as projected in the report. Detailed comments were offered concerning a number of technical issues.

(99-R02-003)

(A. Azadpour-Keeley(RSKERC)580-436-8890)

Technical Assistance to Region III: On March 4, 1999, Dr. Mary Gonsoulin (RSKERC) and Dr. Daniel Pope (DYNAMAC) provided RPM David Turner with comments concerning a long-term monitoring and intrinsic remediation report for the Lord-Shope Landfill Site in Girard Township, PA. In general, the trend of decreasing contaminant concentrations at the site was encouraging and suggested that source control and remediation measures currently in place were having a significant effect, and that the presence of degradation products indicated that biodegradation of the contaminants of concern was taking place. However, due to the limited ground-water monitoring network, lack of information concerning the three-dimensional plume configuration, and complex site hydrogeology, it is difficult to assess the potential effect of natural attenuation.

(98-R03-010)

(M. Gonsoulin(RSKERC)580-436-8616)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Annable, Mike, P.S.C. Rao, Kirk Hatfield, and Windy Graham (Univ. of FL), and A.L. Wood and C.G. Enfield (RSKERC). "Partitioning Tracers for Measuring Residual NAPL: Field-Scale Results." Jour. Environ. Eng. 124(6). June 1998.

(L. Wood(RSKERC)580-436-8552)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
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Status Report for the Week of March 29, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region II: On December 28, 1998, RPM Kevin Willis requested review comments on a conceptual model and calibration report for the Fulton Avenue Superfund Site in central Nassau County in Garden City, NY. In a response dated March 15, 1999, Dr. David Burden (RSKERC), and Drs. Michael Fishman and Daniel Pope (Dynamac) stated that the effort should only be considered as a first-step modeling exercise since, as presented, it does not include site specific parameters and site details such as public water supply wells which play a significant role in ground-water flow. Detailed comments were offered with respect to input parameters, boundary conditions, and model calibration. (99-R02-004) (D. Burden(RSKERC)580-436-8606)

Technical Assistance to Region II: During March 21-24, 1999, Dr. David Jewett (RSKERC) attended a meeting in Toms River, NJ, at the Ciba-Geigy Superfund Site to participate in a technical review focusing on the draft contaminant transport model calibration report. He also attended a public meeting addressing ground-water concerns in the vicinity of the site. The results of the ground-water flow model were also presented at this meeting. (95-R02-003) (D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region IX: Meetings were held March 3-4, 1999, in Phoenix, AZ, to discuss the estimated volume of LNAPLs at Williams AFB. Participants included Sean Hogan (Region 9), Dr. Scott Huling (RSKERC), Dr. Bruce Pivetz and Rick Stransky (ManTech), Dr. Ravi Varadhan (Dynamac), and representatives from the Arizona Department of Environmental Protection, URS, IT Corporation, US Air Force, and BEM. The primary discussion focused on the continuous source zone conceptual model presented by EPA. Continuous zones of LNAPL were assumed to extend from the main source area through the unsaturated zone into the saturated zone and then move laterally. The approach assumed eight lithologic layers with varying porosity, thickness, LNAPL saturations and saturation gradients (inner core, outer core, fringe/lobe). Although the conceptual model assumed continuous zones of LNAPLs, the role of preferential pathways was considered in the analysis using the fraction of area affected. (98-R09-003) (S. Huling(RSKERC)580-436-8601)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Kovacs, D.A. (ManTech) and D.H. Kampbell (RSKERC). "Improved Methods for the Storage of Groundwater Samples Containing Volatile Organic Analytes." Arch. Environ. Contam. Toxicol. (36), 1999. (D. Kampbell(RSKERC)580-436-8564)

Ryan, Joseph N., Rebecca A. Ard, and Robin D. Magelky (Univ. of CO), and Menachem Elimelech, Ning Sun, and Ne-Zheng Sun (Univ. of CA). "Colloid Mobilization and Transport in Contaminant Plumes: Field Experiments, Laboratory Experiments, and Modeling." EPA Environmental Research Brief. EPA/600/S-99/001. (R. Puls(RSKERC)580-436-8543)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of April 5, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: On February 24, 1999, RPM Carolyn Pina-Springer requested assistance in the evaluation of natural attenuation at the Barkhamsted New Hartford Landfill in Barkhamsted, CT. On March 29, 1999, Dr. Ann Azadpour-Keeley (RSKERC) provided an evaluation of current sampling data from the site, its accuracy, the degree to which it represents site conditions, and the evaluation of natural attenuation. In addition to pointing out a number of inconsistencies with respect to the data, specific and detailed comments were offered concerning conclusions drawn from that data. A number of suggestions were offered in the areas of sampling protocols, processes of natural attenuation, and activities which should be undertaken in order to demonstrate that natural attenuation is a viable remedial alternative at the site.

(99-R01-003)

(A. Azadpour-Keeley(RSKERC)580-436-8890)

Technical Assistance to Region IX: On February 2, 1999, RPM Debbie Lowe requested review comments on a "Soil Vapor Extraction Optimization Plan" which was developed for the Sharpe Army Depot Site in Lathrop, CA. On March 26, 1999, Dominic DiGiulio (RSKERC) stated that, although little information was provided for an assessment of the remedial system, it appeared that the design was based on radius of influence measurements while performance monitoring and closure were based on soil gas concentrations and vapor asymptotes in extraction wells. A suggested approach for the assessment of soil vapor extraction performance and closure was provided based on site characterization, design, performance monitoring, rate-limited vapor transport, and mass flux to and from ground water.

(99-R09-001)

(D. DiGiulio(RSKERC)580-436-8605)

PUBLIC SERVICE ACTIVITIES

Drs. Steve Schmelling and Ann Azadpour-Keeley (RSKERC) are members of the City of Ada's Arbuckle-Simpson Aquifer Protection Committee. On March 26, 1999, the Committee met with Duane Smith, Director of the Oklahoma Water Resources Board, and David Dillon with the Oklahoma Department of Environmental Quality to discuss water rights, water quality protection plans, and the development of an aquifer educational program.

On March 26, 1999, representatives from RSKERC served as judges at the 1999 Oklahoma State Science and Engineering Fair at East Central University. They included Drs. Ann Azadpour-Keeley, Eric Jorgensen, Paul Mayer, Peter Breidenbach, and Ann West.

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Jewett, David G. (RSKERC), Bruce E. Logan (Penn St. Univ.), and Robert G. Arnold and Roger C. Bales (Univ. of AZ). "Transport of *Pseudomonas Fluorescens* Strain P17 Through Quartz Sand Columns as a Function of Water Content." *Journal of Contaminant Hydrology* (36). 1999.

(D. Jewett(RSKERC)580-436-8560)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of April 12, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: On April 6, 1999, Dr. John Wilson (RSKERC) provided RPM Romuald Roman with review comments of geochemical data in ground water at the Butz Landfill Site in Monroe County, PA. It was suggested that there was a significant indication of reductive dechlorination of TCE to cis-DCE and to vinyl chloride. By comparing data at this site with observations at similar sites, and the results of mathematical models, it appeared that biological reductive dechlorination of TCE is on-going in ground water at the site and the concentration of TCE in the plume should exhibit a substantial and statistically significant downward trend throughout the entire plume within five years with the implementation of a pump-and-treat system in the source area of ground-water contamination.

(92-R03-003)

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

Technical Assistance to Region VIII: On March 5, 1999, Project Manager Deborah Sherer requested review comments concerning the technical adequacy of a proposed plan for the utilization of natural attenuation at the FMC Corporation Site in Kemmerer, WY, as well as suggestions on how to improve the plan for future monitoring of dissolved semi-volatile contaminants in ground water. In an April 2, 1999, response, Dr. Ann Azadpour-Keeley (RSKERC) and Barbara Wilson (Dynamac) stated that, although the document failed to demonstrate the fundamental lines of evidence that natural attenuation is a remedy for ground-water remediation, a great deal of detailed monitoring of several geochemical and microbiological parameters has been accomplished which will be extremely valuable in the evaluation of future remedial progress. In addition to providing detailed guidance with respect to the actions necessary to evaluate the processes of natural attenuation, it was suggested that there is evidence that this could be a viable remedy for the site. If visual and statistical methods confirm a stable or shrinking plume, validation monitoring of the contaminants of concern and the geochemical indicators of biological activity should be conducted quarterly for two years.

(99RC08-001)

(A. Azadpour-Keeley(RSKERC)580-436-8890)

Technical Assistance to Region IX: On March 30, 1999, Steven Acree (RSKERC) attended a meeting in Carson City, NV, to evaluate contaminant plume capture at the Sparks Solvent/Fuel Site in Sparks, NV. Also attending the meeting were representatives from Region 9 and their consultants, State of Nevada, and the responsible parties and their consultants. Discussions involved the re-configuration of an extraction well and ground-water treatment system, and preliminary evaluation of hydraulic capture based on modeling results. An improvement of the monitoring network to better evaluate contaminant capture has been completed. Data will be obtained and reviewed in the following quarter to support these assessments.

(94-R09-001)

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



HIGHLIGHTS

**National Risk Management Research Laboratory
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Status Report for the Week of April 19, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: On February 25, 1999, RPM Byron Bah requested technical assistance with respect to a Technical Impracticability (TI) Waiver at the Solvents Recovery Services of New England Superfund (SRSNE) Site in Southington, CT. On April 12, 1999, Dr. Randall Ross (RSKERC) provided review comments regarding a Draft Feasibility Study (FS) and stated that, in general, the FS was thorough and presented reasonable grounds for the selection of the proposed remedies. Based on the site history, nature and distribution of NAPLs in the subsurface, and complex geology of the site, it appeared that the arguments for a TI Waiver might be justified. However, several specific points were noted including the methods used in estimating the volume of subsurface material impacted by NAPLs, and the reasons for NAPL removal.

(99-R01-004)

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

Technical Assistance to Region VIII: On April 8, 1999, Drs. Scott Huling and Ralph Ludwig (RSKERC) attended a meeting at the Rocky Mountain Arsenal in Denver, CO. Also attending the meeting were representatives from Region 8, Fish and Wildlife Service, U.S. Army, Colorado Department of Public Health and the Environment, HSI GeoTrans, Inc., Morrison-Knudson, Foster-Wheeler, Gannett-Fleming, and USGS. The purpose of the meeting was to provide input regarding a draft work plan prepared by Drs. Scott Huling, Ralph Ludwig, and Ann Azadpour-Keeley (RSKERC) to conduct bench-scale testing of two remediation technologies to be used in sequence. The two technologies are adsorption/oxidation and reductive dehalogenation using zero valent iron. Several issues were discussed including the sequencing of technologies, methylene chloride production, bench-scale study location, indicator parameters, analytical support, milestones, and schedules. It was determined that the EPA led bench-scale study would involve joint collaboration with the USGS (Denver, CO) regarding reductive dehalogenation of methylene chloride, and eventually, a treatment train design. The wide range of unique and toxic organic compounds present in the ground-water plume at the site presents significant difficulties in defining an acceptable treatment process. Assuming the bench-scale study provides acceptable results, in-situ implementation of the treatment process is planned.

(99-R08-001)

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

Technical Assistance to Region VIII: On April 9, 1999, in a continuing technical assistance effort at the Petrochem/ Ekotek Superfund Site in Salt Lake City, UT, Steven Acree (RSKERC) provided RPM Russell Leclerc with review comments on a three-dimensional ground-water study technical memorandum. In general, the report fairly presents the results of recent studies performed to better characterize three-dimensional contaminant distribution and transport. Several comments with respect to certain aspects of the interpretation of the data were provided for consideration. These included tests to determine the continuity of an aquitard between upper and lower aquifers, effects of a partial abandonment of long-screened wells, the possibility of other sources of contamination, ambient flowrate data, and the role of dispersion in decreases in contaminant concentration.

(93-R08-003)

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

Technical Assistance to the U.S. Forest Service: On April 8, 1999, Dr. David Jewett (RSKERC) attended a meeting in Indianapolis, IN, to discuss the Central Nevada Ecosystem Management Project: Restoring and Maintaining Riparian Ecosystem Integrity. Others attending the meeting were Dr. Jeanne Chambers (U.S. Forest Service, Reno, NV) and Dr. Jerry Miller (Indiana Univ./Purdue Univ., Indianapolis). Topics discussed consisted of a conceptual model of ground-water flow and the development of a computer model including grids for the model domains, water balances, boundary conditions, layers and conductivities, and ground and surface water interactions. Also discussed were the use of isotope geochemistry to identify different water sources and delineate ground-water flow paths. Naturally occurring radioactive isotopes were discussed in terms of their use in determining the age of various water sources.

(Misc.)

(D. Jewett(RSKERC)580-436-8560)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Fang, Jiasong and Michael J. Barcelona (Univ. of MI). "Structural Determination and Quantitative Analysis of Bacterial Phospholipids using Liquid Chromatograph/Electrospray Ionization/Mass Spectrometry." Jour. of Microbiological Methods. (33) 1998.

(S. Schmelling(RSKERC)580-436-8540)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of April 26, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region II: At the Onondaga/Ley Creek Site in Syracuse, NY, a modeling investigation is under way to show that 100-year and 500-year floods will not adversely impact a landfill cap on the site and that the cap does not change floodplain elevations, flood velocities, or flood storage capacity. On February 3, 1999, RPM Robert Nunes requested technical assistance with respect to the reliability of the modeling effort. On April 16, 1999, Dr. David Jewett (RSKERC), and Drs. Sam Lee and Michael Fishman (Dynamac) provided preliminary review comments on a hydraulic analysis and floodplain assessment report and indicated that additional comments would be provided after data input files were received and simulations conducted with the HEC-RAS program. General and detailed comments were provided with respect to sensitivity analysis, model calibration, and input data considerations.

(99-R02-006)

(D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region V: On April 12, 1999, Dr. Ralph Ludwig (RSKERC), and Drs. Jin Song Chen and Hai Shen (Dynamac) provided RPM Jane Neumann with review comments of *Draft Technical Memorandums #1 and #2 - Crestwood Area Site - Area-Wide Groundwater Contamination - City of Glendale, WI*. Although the documents demonstrated evidence of the processes of natural attenuation by the reductive dehalogenation of PCE, they did not provide defensible evidence that the PCE/TCE/DCE/VC plume is not currently expanding. Since conclusions regarding the leading edge plume dynamics cannot currently be made, the use of natural attenuation as a stand-alone remedial option cannot be supported at this time. Detailed comments were offered with respect to additional monitoring needs, significance of geochemical parameters, and ground-water flow.

(99-R05-004)

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

Technical Assistance to Region IX: On April 13, 1999, Steven Acree (RSKERC) provided RPM Greg Lovato with comments concerning an aquifer test work plan (USA Gasoline Station No. 7) at the South Lake Tahoe, California, MtBE Site in South Lake Tahoe, CA. In general, the basic procedures specified in the plan appeared to be in conformance with accepted practices. However, it was not clear that certain aspects of the performance of such tests in this complex setting (i.e., estimated anisotropy) have been fully considered. Comments and recommendations were provided in a number of areas including slug tests and pumping tests.

(99RC09-001)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Fang, Jiasong and Michael J. Barcelona (Univ. of MI), and Candida West (RSKERC). "The Use of Aromatic and Phospholipid-Ester-Linked Fatty Acids for Delineation of Processes Affecting an Aquifer Contaminated with JP-4 Fuel." ACS Symposium Series 671, American Chemical Society. 1997.

(S. Schmelling(RSKERC)580-436-8540)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of May 3, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region II: On February 2, 1999, Dr. Scott Huling (RSKERC) provided RPM John DeMurley with review comments on an in-situ chemical oxidation pilot study work plan to remediate PCE and TCE in ground water at the Fort Dix Superfund Site in Fort Dix, NJ. On April 28, 1999, Dr. Huling provided additional remarks in response to a critique of the earlier comments by the site contractor. Several technical issues remained unresolved including the volume of H₂O₂ injected into the subsurface, rate of mixing, and long-term monitoring requirements.

(99-R02-001)

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

Technical Assistance to Region V: In response to a March 8, 1999, request from RPM Jane Neumann, Dr. Scott Huling (RSKERC) reviewed a document entitled "Effectiveness Evaluation Report, GeoCleans Inc. (GCI) Initial Treatment Report, Barrett West Property, Crestwood Area Site, Glendale Wisconsin." The April 28, 1999, review comments stated that expectations for the complete mineralization of chlorinated compounds appeared to be unrealistic, therefore full-scale treatment is not warranted for the site at this time. Detailed technical review comments and recommendations were also provided.

(99-R05-004)

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

Technical Assistance to Region IX: During April 18-25, 1999, Dr. David Jewett (RSKERC) attended the Integrated Mining and Land Reclamation Planning Workshop in Reno, NV, and participated in an on-site technical meeting in Clear Lake, CA, at the Sulphur Bank Mercury Mine Superfund Site. Issues discussed at the meeting were new and innovative technologies for additional site characterization and subsurface modeling, revising the feasibility study, additional data requirements, future work, and anticipated work schedules.

(97-R09-006)

(D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region IX: On April 29, 1999, in a continuing technical assistance effort at Williams Air Force Base in Phoenix, AZ, Dr. Scott Huling (RSKERC) pointed out to RPM Sean Hogan that a re-evaluation of site data has been under way to revise the LNAPL volume estimate used in the continuous source zone model CSZM. The re-evaluation includes analyses of the points raised by the Air Force in the March 3-4, 1999, meeting between the Air Force, EPA, and the Arizona Department of Environmental Quality and various consultants. In addition, a number of data gaps and other issues were identified including water level information, LNAPL thickness measurements, TPH content, soil vapor probe data, and pump tests.

(98-R09-003)

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

Technical Assistance to Region X: On April 29, 1999, Dr. Randall Ross and Steven Acree (RSKERC) provided Hydrologist Bernie Zavala with comments concerning a draft ground-water flow and solute transport modeling report for the Boomsnub/Airco Superfund Site in Hazel Dell, WA. The comments generally reflect issues discussed during an April 27, 1999, conference call including Peter Contreras and Dr. Milovan Beljin (Dynamac consultants) with contributions by Dr. Elise Striz (ManTech). Although the model procedure follows what is considered to be standard practice, there are several instances where the selection and rationale for input parameters need to be clarified. It was suggested that concerns about boundary conditions, input values, and calibration should be addressed to increase confidence in the use of the model. A number of detailed comments were made concerning the objectives of the modeling effort, hydraulic conductivity values, recharge rates, and source terms.

(99-R10-001)

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

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



HIGHLIGHTS

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TECHNICAL ASSISTANCE

Technical Assistance to Region II: On May 3, 1999, Dr. David Jewett (RSKERC) and Dr. Elise Striz (ManTech) provided RPM Kevin Willis with a review of Blasland, Bouck & Lee, Inc. responses to a January 20, 1999, EPA technical review of the Port Washington L-4 Landfill Ground-Water Modeling Study in Port Washington, NY. It was pointed out that the ground-water flow and solute transport model will be an important tool for predicting contaminant fate and migration and for assessing the potential for remedial alternatives. Therefore, it is critical that decisions on modeling assumptions and parameters be justified early on to dispel uncertainty about site evaluation and model development. The modeling approach also needs to be flexible and to be visualized over a broader region in order to incorporate important factors influencing ground-water flow and contaminant fate and transport.

(97-R02-006)

(D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region V: On May 4, 1999, Dr. Scott Huling (RSKERC) provided On-Scene Coordinator Steve Renninger with review comments on a laboratory treatability work plan for the Valleycrest Landfill Site in Dayton, OH. Several comments and recommendations were offered which addressed specific technical issues and deficiencies including volatile losses and emissions during the pre-processing stage of the waste, sample collection, and the addition of KMnO_4 to the test reactor.

(99-R05-003)

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

Technical Assistance to Region VI: On March 29, 1999, RPM Chris Villarreal requested review comments on a revised work plan for a ground-water investigation at the Crystal Chemical Company Site in Houston, TX, to determine if the proposed work would meet the stated objectives. On May 3, 1999, Dr. Ralph Ludwig (RSKERC) pointed out that the plan appeared to be adequate in defining the limits of arsenic contamination in ground water. It was also suggested that arsenic does not degrade and that the only processes capable of lowering the concentration of the contaminant are sorption, dilution, and dispersion. Modeling efforts at predicting the behavior and fate of an expanding plume would require a better definition of the source term, hydrogeology, and geochemistry.

(99-R06-001)

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

Technical Assistance to Region VIII: On May 4, 1999, in a continuing technical assistance effort at the Petrochem/Ekotek Superfund Site in Salt Lake City, UT, Steven Acree (RSKERC) provided RPM Russell Leclerc with review comments on a proposed plan to further define an upper aquifer at the site. In general, geologic logging of additional boreholes would provide better support for conceptualization of the hydrostratigraphic framework for the site, but would not be sufficient to reliably estimate field-scale hydraulic communication and the potential for contaminant transport across the upper aquifer. If the proposed borings indicate these sediments are relatively continuous throughout this portion of the site, additional studies designed to better evaluate field-scale hydraulic properties may be warranted.

(93-R08-003)

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

Technical Assistance to the Office of Wastewater Management: On April 29, 1999, Dr. David Jewett (RSKERC) provided Project Manager Joyce Hudson (Office of Wastewater Management) with a technical review of the "La Pine National Decentralized Wastewater Treatment and Disposal Draft Work Plan" prepared by the Oregon Department of Environmental Quality, Deschutes County Health Division, and USGS. Detailed comments were provided with respect to the strengths and weaknesses of the plan which was considered to be well designed and written. It was suggested that the plan has merit and, based on the personnel and facilities available to the participating agencies, has a high probability of accomplishing the stated objectives.

(Misc.)

(D. Jewett(RSKERC)580-436-8560)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Wilson, John T. (RSKERC). "Performance Monitoring for Natural Attenuation of Contaminants in Aquifers." Keynote Address. Contaminated Site Remediation Conference in Fremantle, Western Australia. March 21-25, 1999.

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



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of May 17, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region VIII: On May 4, 1999, in a continuing technical assistance effort at the Petrochem/Ekotech Superfund Site in Salt Lake City, UT, Steven Acree (RSKERC) provided RPM Russell Leclerc with review comments on a ground-water tracer field sampling plan. In general, the plan appeared to be appropriate for the determination of ground-water flow rate and direction in the upper aquifer. However, an increased monitoring frequency may be required to better estimate longitudinal dispersivity. Detailed comments were offered with respect to well construction and tracer injection as well as tracer monitoring.

(93-R08-003)

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

Technical Assistance to Region X: On May 12, 1999, Steven Acree (RSKERC) and Dr. Bruce Pivetz (ManTech) provided Hydrologist Bernie Zavala with comments on a treatability and pilot test report for the Boomsnub/Airco Superfund Site in Hazel Dell, WA. The report effectively summarized the treatability studies and pilot tests completed to date. Although details and rationale were lacking in some sections, the discussions and most conclusions generally were appropriate. With respect to the pilot test of recirculation well technology, the reactive iron and reductant addition appeared to be effective in reducing Cr(VI) to Cr(III). However, the chemical reactions, processes, and mobility of the treated chromium within the aquifer were not fully explained and would warrant further study prior to final design. Data for the chlorinated volatile organic compounds indicated that the technology may result in contaminant concentration reductions in the vicinity of the well. However, the establishment of a ground-water circulation cell capable of reducing average contaminant concentrations to potential action levels was not fully demonstrated. Laboratory tests with reactive iron indicate that the permeable reactive barrier concept would be effective, although there are questions regarding the design calculations and implementability at the required depths.

(99-R10-001)

(S. Acree(RSKERC)580-435-8609)

Technical Assistance to the National Park Service: On May 7, 1999, Dr. Eva Davis (RSKERC) provided Charles Rafkind (National Park Service) with review comments on a 90 percent Remedial Design Package for Remediation of Petroleum Oil Lubricants (POL) at the Navy Special Fuel Oil (NSFO) Tank Farm in Yorktown, VA. Although it did not appear that there were issues affecting Park Service lands, there was concern that the placement of trenches and wells in parts of the plume which impact the U.S. Coast Guard will not be adequate to capture hydrocarbons as the area is heated. Other comments concerned the need for additional wells, ground-water monitoring, and system heat losses.

(Misc.)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Jia, C., K. Shing, and Y.C. Yortsos (Univ. of Southern CA.). "Visualization and Simulation of Non-Aqueous Liquids Solubilization in Pore Networks." Jour. of Contaminant Hydrol. (35) 1999.

(J. Cho(RSKERC)580-436-8547)

Fang, Jiasong and Michael J. Barcelona (Univ. of MI). "Biogeochemical Evidence for Microbial Community Change in a Jet Fuel Hydrocarbons-Contaminated Aquifer." Organic Geochemistry. (29) 1998.

(S. Schmelling(RSKERC)580-436-8540)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of June 14, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region II: On June 5, 1999, in a continuing technical assistance effort at the Ciba-Geigy Superfund Site in Toms River, NJ, Dr. David Jewett (RSKERC) and Dr. Elise Striz (ManTech) provided RPM Romona Pezzella with review comments on a draft contaminant transport model calibration report. It was pointed out that, although no ground-water flow and solute transport model will reproduce exact conditions and concentrations in the subsurface, approximating the relative impact of potential remedial alternatives may still be accomplished. The model should be a good tool for evaluating the impact of source removal and remedial technologies as well as for optimizing a ground-water extraction and recharge system. A number of general, specific, and editorial comments were offered.

(95-R02-003)

(D. Jewett(RSKERC)580-436-8560)

RESEARCH IN PROGRESS

A new website (www.epa.gov/ada/bioremed.html) has been created to provide a summary of RSKERC's research program on the use of nitrate as an alternate electron acceptor for the bioremediation of fuel-contaminated aquifers. This links to several other files detailing both laboratory and field work over a ten-year period and provides summaries of the individual research projects, data graphics, photos, abstracts of published articles and reports, additional unpublished data, and a research bibliography. It can also be accessed (select "Research") through the RSKERC home page (www.epa.gov/ada/kerrcenter.html).

(S. Hutchins(RSKERC)580-436-8563)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Barbaro, Jeffrey R., Barbara J. Butler, and James F. Baker (Univ. of Waterloo). "Biotransformation of Gasoline-Contaminated Groundwater Under Mixed Electron-Acceptor Conditions." EPA Report. EPA/600/R-99/012.

(S. Hutchins(RSKERC)580-436-8563)

TECHNOLOGY TRANSFER ACTIVITIES

During June 1-3, 1999, sponsored by the Department of Health and Environmental Control, the Technology Support Center (TSC) presented a Monitored Natural Attenuation Course in Columbia, South Carolina, with discussions focusing on sorption, dilution, volatilization, and biodegradation processes, as well as monitoring requirements to demonstrate that these processes are taking place. The students were also involved with hands-on experience using BIOSCREEN as a decision support system in reviewing natural attenuation proposals. Thirty-six students attended the course. Dr. Mary Gonsoulin (RSKERC) served as course facilitator while the instructors included Dr. John Wilson (RSKERC), Barbara Wilson and Drs. Daniel Pope and Kelly Hurt (Dynamac), and Dr. Ron Sims (Utah St. Univ.).

(M. Gonsoulin(RSKERC)580-436-8616)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of June 21, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region VI: On April 23, 1999, RPM Ernest Franke requested assistance regarding pump-and-treat activities and the natural attenuation of TCE at the Industrial Transformers site in Houston, TX. On June 16, 1999, Dr. Scott Huling (RSKERC) and Dr. Bruce Pivetz and Rick Stransky (ManTech) provided a preliminary analysis of remedial activities and current conditions at the site, and commented on technical concerns and proposals made by Region VI and the Texas Resource Conservation Commission. Despite 42 months of a pump-and-treat operation, the complete capture and removal of contaminated ground water has not occurred and the plume continues to expand. It appears that part of the problem results from an uncertainty of the distribution of contaminants. Detailed comments were offered with respect to a review of site data and conceptual model refinement, additional site assessment, a modification of the current remedial system, and long-term remedial planning.
(99-R06-002) (S. Huling(RSKERC)580-436-8610)

Technical Assistance to Region VIII: On June 10, 1999, Dr. Scott Huling (RSKERC) provided RPM Larry Kimmel with a revised work plan for a ground-water treatment system at the Rocky Mountain Arsenal Superfund Site in Denver, CO. The revision was based on comments by a number of reviewers including Region VIII, U.S. Army, USGS, Colorado Department of Public Health and the Environment, and consultants. A point-by-point response to all comments was provided on a wide variety of issues. In addition, ongoing laboratory studies were discussed.
(99-R08-001) (S. Huling(RSKERC)580-436-8610)

Technical Assistance to Region IX: On June 10, 1999, Dr. Scott Huling (RSKERC), Rick Stransky and Dr. Bruce Pivetz (ManTech), and Dr. Ravi Varadhan and Barbara Wilson (Dynamac) provided RPM Sean Hogan with an evaluation of natural attenuation at Williams Air Force Base in Phoenix, AZ, based on a review of a number of site related reports and documents. Overall, the reviewed material demonstrates that the USAF has committed a substantial amount of time and effort to remedial activities at the site. Various types of data have been collected for a long period of time from a number of locations. The reports demonstrate that there is evidence that natural attenuation processes are occurring at the site, but significant concerns remain regarding the suitability of monitored natural attenuation for the remediation of the fuel-contaminated saturated zone. Detailed comments were offered in a number of areas including site characterization, remediation, and monitoring.
(98-R09-003) (S. Huling(RSKERC)580-436-8610)

RESEARCH IN PROGRESS

Review comments have been received concerning the draft "BIOCHLOR: Natural Attenuation Decision Support System" software and user's manual being developed by Dr. Carol Aziz (Groundwater Services, Inc.). The purpose of the computer package is for use as a screening tool for the preliminary evaluation of natural attenuation at chlorinated solvent release sites.
(D. Jewett(RSKERC)580-436-8560)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of June 28, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: The Microwave Development Laboratory (MDL) Site is located in Needham, MA. The site has a mile-long plume of TCE which the State is attempting to address via ground-water modeling and the installation of a permeable reactive barrier. On June 25, 1999, Dr. David Jewett (RSKERC), and Dr. Elise Striz and Enamul Hoque (ManTech) provided Peter Richards (Massachusetts Department of Environmental Protection) with comments on a draft contaminant fate and transport modeling assessment for the site. The MDL site and Rosemary Brook watershed represent a complex region with significant surface water hydrogeologic features that impact ground-water flow and contaminant transport. A major concern is the use of local site characterization data to describe ground-water flow and contaminant transport across a broader region. In particular, the assignment of no-flow boundary conditions to the entire model and the lack of measured hydrologic data for Rosemary Brook and the adjacent wetland areas appeared to have been critical factors complicating model calibration. Additional detailed comments were provided along with a list of recommendations which addressed additional site characterization data needs to revise the ground-water flow and solute transport model.

(99-R01-002)

(D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region II: On June 21, 1999, Dr. David Jewett (RSKERC) and Dr. Elise Striz (ManTech) provided RPM Romona Pezzella with review comments on a report discussing possible sources of ground-water contamination at the Ciba-Geigy Superfund Site in Toms River, NJ. The report suggested an alternative explanation for discrepancies between the results of a contaminant transport model and contaminant concentration data from subsurface water quality samples. The explanation centered around the possible presence of DNAPLs beneath a drum disposal area. The RSKERC comments suggested that the evidence used to draw this conclusion did not justify the extensive drilling and risk of cross contamination associated with characterizing the potential source of DNAPLs. Comments supporting this view were offered in considerable detail.

(95-R02-003)

(D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region IV: On June 24, 1999, Dr. Scott Huling (RSKERC), and Drs. Bruce Pivetz and William Lyon (ManTech) provided RPM Giezelle Bennett with comments on the 60 percent design for ground-water remediation at the General Electric/Shepherd Farm's Superfund Site in East Flat Rock, NC. In general, the report appeared well organized and sufficiently detailed. It presented the relevant history and conditions at the site, and the information provided at this stage of the design process indicated that the remedial action objectives and ground-water remediation goals could be met. One issue requiring clarification concerned contaminant mass-in-place calculations. Detailed comments were offered in a number of areas.

(99-R04-003)

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

Technical Assistance to Region IX: On June 23, 1999, Dr. Scott Huling (RSKERC) and Dr. Bruce Pivetz, Rick Stransky, and Dr. William Lyon (ManTech) provided RPM Sean Hogan with a technical review of a draft focused feasibility study report for Williams Air Force Base in Phoenix, AZ. The review comments addressed a variety of issues including the effect of a rising water table on NAPLs, a SVE system, aquifer characteristics, and suggested improvements in graphics contained in the report.

(98-R09-003)

(S. Huling(RSKERC)580-436-8593)

Technical Assistance to Region X: On June 24, 1999, Steven Acree (RSKERC) provided Hydrogeologist Bernie Zavala with comments on the preliminary results of an enhanced density-driven convection pilot study at the Boomsnub/Airco Superfund Site in Hazel Dell, WA. In general, it appeared that the available data were not sufficient to support detailed interpretations concerning the transport characteristics of hexavalent chromium in the subsurface. It was suggested that additional studies would be required to define the dominant processes controlling the transport and fate of hexavalent chromium at this site including investigations to better characterize three-dimensional contaminant and hydraulic conductivity distributions, sorption of hexavalent chromium in this geochemical system, and the performance of the pilot-scale recirculation system.

(99-R10-001)

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



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of July 12, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: On July 8, 1999, Dr. Mary Gonsoulin (RSKERC) and Dr. Hai Shen (Dynamac) provided RPM Darius Ostraushas with review comments on the technical specifications for ground-water remediation at the Dover AFB in Dover, DE. It was suggested that tracer studies and model simulations be used to provide information for the design of a proposed ground-water circulation system to prevent the contaminated plume from escaping from the treatment zone. Other issues of concern included the efficient delivery of nutrients to the treatment zone, the selection of electron donors, and problems associated with the possible presence of DNAPLs.
(97-R03-002) (M. Gonsoulin(RSKERC)580-436-8616)

Technical Assistance to Region IV: On June 30, 1999, Steven Acree (RSKERC) and Dr. Daniel Pope (Dynamac) provided RPM Galo Jackson with review comments on the Phase II Natural Attenuation Evaluation, Round 2.0 Work Plan for the Sydney Mine NPL Site in Brandon, FL. In general, the revised plan is much improved over the previous version. However, it still appeared probable that sufficient data to support the quantitative assessment of natural attenuation rates would not be obtained during Round 2.0 activities. It was pointed out that the revised plan still includes too few samples to define the core of the plume and that vertical profiles would be required to obtain the data necessary to estimate apparent rates of contamination degradation within a reasonable degree of certainty. It was also suggested that contaminants appear to have migrated to significant depths in the lower part of the geologic unit and additional monitoring at these locations may ultimately be required.
(96-R04-003) (S. Acree(RSKERC)580-436-8609)

Technical Assistance to Region IV: On June 30, 1999, Dr. David Burden (RSKERC) and Dr. Varadhan Ravi (Dynamac) provided RPM John Blanchard with technical review comments concerning a ground-water migration and particle tracking model for the evaluation of a biotreatment containment wall at the Cabot/Koppers Superfund Site in Gainesville, FL. It was suggested that the use of the models MODFLOW and MODPATH appeared to be appropriate and the calibration approach and results for both steady and transient modes was reasonable. Although the overall approach seemed to be acceptable, there were several concerns which needed to be addressed including the source concentration of naphthalene, a model sensitivity analysis, and the need for a detailed explanation of how the biotreatment containment wall functions.
(98-R04-006) (D. Burden(RSKERC)580-436-8606)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of July 19, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region II: In a continuing technical assistance effort at the Liberty Industrial Finishing Superfund Site in Farmingdale, NY, Steven Acree (RSKERC), and Dr. Bruce Pivetz and Rick Stansky (ManTech) provided RPM Lorenzo Thantu with technical review comments on field- and bench-scale pilot tests for a ground-water circulation well and metals treatment technologies. The July 12, 1999, comments stated that, while there are concerns associated with the flow field design, the pilot studies provided data which indicated that circulation cells can be developed at the site and that the contaminants of concern can be removed from ground water using the proposed technologies. A number of specific suggestions were offered concerning capture zones, the removal efficiency of cadmium, and avoiding areas where free-phase petroleum products were found during the installation of the pilot boring.

(98-R02-003)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Kenny, Jonathan E. (Tufts Univ.). "Laser Fluorescence EEM Probe for Cone Penetrometer Pollution Analysis." EPA Report. EPA/600/R-99/041.

(B. Lien(RSKERC)580-436-8555)

Grosso, Nancy R., Laurie Plante Leitzinger, and Craig Bartlett (DuPont Environ. Remediation Services). "Site Characterization of Area 6, Dover Air Force Base, in Support of Natural Attenuation and Enhanced Anaerobic Bioremediation Projects." EPA Report. EPA/600/R-99/044.

(S. Schmelling(RSKERC)580-436-8540)

Yeh, Gour-Tsyh, and Hwai-Ping Cheng (Penn, St. Univ.) "3DHYDROGEOCHEM: A 3-Dimensional Model of Density-Dependent Subsurface Flow and Thermal Multispecies-Multicomponent HYDROGEOCHEMical Transport." EPA Report. EPA/600/R-98/159.

(T Short(RSKERC)580-436-8544)

Klier, N.J., G.M. Klecka, E.J. Lutz, and M.E. Witt (Dow Chem. Co.), E.J. Lutz and D.E. Ellis (DuPont), and F.H. Chappelle (USGS). "The Groundwater Geochemistry of Area 6, Dover Air Force Base, Dover Delaware." EPA Report. EPA/600/R-99/051.

(S. Schmelling(RSKERC)580-436-8540)

Pope, Daniel F. (Dynamac), and Jerry N. Jones (RSKERC). "Monitored Natural Attenuation of Petroleum Hydrocarbons." EPA Remedial Technology Fact Sheet. EPA/600/F-98/021.

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

Pope, Daniel F. (Dynamac), and Jerry N. Jones (RSKERC). "Monitored Natural Attenuation of Chlorinated Solvents." EPA Remedial Technology Fact Sheet. EPA/600/F-98/022.

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



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of August 2, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to OSWER: On July 19, 1999, Dr. David Jewett (RSKERC), and Dr. Elise Striz, Enamul Hoque, and Jason Kinsey (ManTech) provided Kenneth Lovelace (OSWER) with the results of a comprehensive search for models which can simulate the fate and transport of radionuclides in the vadose zone. The search identified models which were capable of first-order decay, including parent-daughter decay series, and which were suitable for the soil screening guidance document. The search also gathered information on the relative complexity of the models. The RSKERC Center for Subsurface Modeling Support (CSMoS) also reviewed the models used in the original soil screening guidance document to determine if any of these models had been revised to include parent-daughter decay. In addition, CSMoS evaluated the feasibility and the level of effort needed to modify existing EPA models to include parent-daughter decay. (99-R00-002) (D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region III: On July 12, 1999, RPM Victor Janosik requested assistance concerning the evaluation of a proposed laboratory protocol for a bench-scale study of the microbial degradation of chlorinated hydrocarbons in ground water at the former Westinghouse Transformer Plant in Sharon, PA. On July 21, 1999, Dr. Ann Azadpour-Keeley (RSKERC) pointed out that the proposed work would not simulate conditions at the site including the lack of a solid matrix for bacterial sorption, temperature, electron donors and acceptors, and that the presence of oxygen was not conducive to the degradation of highly chlorinated organics. It was suggested that the investigators start by reviewing the RI/FS to obtain site characterization data which would enable the development of a conceptual model, thereby identifying the important processes and salient parameters that are representative of the site. (99-R03-004) (A. Azadpour-Keeley(RSKERC)580-436-8890)

Technical Assistance to Region IX: On July 29, 1999, Steven Acree (RSKERC), Dr. Elise Striz and Enamul Hogue (ManTech), and Dr. Hai Shen (Dynamac) provided RPM Greg Lovato with review comments on a transport modeling study for MTBE cleanup levels at the Charnock and Arcadia Sites in Santa Monica, CA. The modeling study presented a simplistic, conservative prediction method to determine the concentration of MTBE in ground water for the purpose of establishing the soil cleanup level. The estimation was determined using a methodology which coupled the mass loadings at the water table predicted by the VLEACH model with a mixing zone model to predict concentrations in ground water. Three comments concerning the method used to calculate recharge, the need to use an updated version of the VLEACH model, and the applicability of the method for setting cleanup levels at individual sites were offered for consideration. (97RC09-001) (S. Acree(RSKERC)580-436-8609)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

DiGiulio, Dominic C. (RSKERC), Varadhan Ravi (Dynamac), and Mark Brusseau (Univ. of AZ). "Evaluation of Mass Flux to and from Ground Water Using a Vertical Flux Model (VFLUX): Application to the Soil Extraction Closure Problem." Ground Water Monitoring and Remediation. Spring, 1999. (J. Jones(RSKERC)580-436-8593)

McCaulou, Douglas R. (Hydro Geo Chem, Inc.) and Scott G. Huling (RSKERC). "Compatibility of Bentonite and DNAPLs." Ground Water Monitoring and Remediation. Spring, 1999. (D. Burden(RSKERC)580-436-8606)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of August 16, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region IV: On August 9, 1999, Dr. Randall Ross (RSKERC) provided review comments on the "Groundwater 1998 Effectiveness Report" and "RCRA Facility Investigation/Confirmatory Sampling Investigation Work Plan" for the Macalloy Corporation Site in Charleston, SC. In general, there was no definite evidence that the pump-and-treat system is preventing the off-site migration of contaminated ground water, and the efforts to characterize the distribution of contaminants and hydrogeologic control influencing their fate and transport were inadequate. However, the characterization activities proposed in the RFI/CSI Work Plan should reduce the level of uncertainty associated with the current conceptual model of the spatial distribution of contaminants in the subsurface and the processes controlling their transport.

(99RC04-001)

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

Technical Assistance to Headquarters: On July 29, 1999, Dr. Randall Ross (RSKERC) and Dr. Kelly Hurt (Dynamac) provided Deana Crumbling (EPA Headquarters) and Juan Para (Region III) with comments on a Direct Push/Monitoring Well Comparison Study at the Hanscom Air Force Base in Bedford, MA. It was suggested that the report was not well written and contained technical flaws. Detailed comments were offered in a number of areas including problems associated with hydrogeologic variability, well installation techniques, water level elevations, biological variability, purging and sampling methods, and QA/QC.

(Misc.)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Chattopadhyay, Sandip (NRC) and Robert W. Puls (RSKERC). "Fate of Pathogenic Microorganisms in Soil." Proceedings, Fifth International In-Situ and On-Site Bioremediation Symposium. April 19-22. 1999. San Diego, CA.

(R. Puls(RSKERC)580-436-8541)

Hong, Jihua (NRC) and Guy W. Sewell (RSKERC). "Organic Electron Donors for Microbial Cr(VI) Reduction." Proceedings, Fifth International In-Situ and On-Site Bioremediation Symposium. April 19-22. 1999. San Diego, CA.

(G. Sewell(RSKERC)580-436-8566)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of August 23, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region IV: On July 9, 1999, Craig Zellar requested review comments on the proposed sampling strategy for soil and ground water as described in the "RCRA Facility Investigation/Confirmatory Investigation Work Plan for the Macalloy smelting facility in Charleston, SC." On August 17, 1999, Dr. Ralph Ludwig (RSKERC) stated that the work plan appeared relatively thorough. It was suggested that, although the authors of the work plan acknowledged hydrogeological and geochemical data gaps, these should be addressed in large measure by the proposed extensive investigation. A number of detailed suggestions were offered, particularly with respect to that information required to assess the processes of natural attenuation.

(99RC04-001)

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

Technical Assistance to Region VI: On August 18, 1999, Dr. Scott Huling (RSKERC), Dr. Bruce Pivetz and Rick Stansky (ManTech), and Dr. Kelly Hurt (Dynamac) provided RPM Ernest Franke with review comments regarding the "Draft Workplan for Sol Lynn/Industrial Transformer Superfund Site, Houston, Texas, Phase I" which was prepared by the USGS. It was suggested that the proposed work plan will be useful for understanding site processes, however, it is less certain that the activities and expense associated with natural attenuation evaluation are appropriate at this time. Based on a preliminary review, unfavorable site conditions exist regarding the use of natural attenuation including high chlorinated solvent concentrations, no identified carbon source, potential high-conductivity zones, and the probability of nearby receptors. It was recommended that a comprehensive, integrated review and analysis of site data be performed, and the construction of an improved site conceptual model be prepared prior to the initiation of site characterization activities.

(99-R06-002)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Wilson, Barbara H. and Hai Shen (Dynamac), Jong Cho (RSKERC), and James Vardy (USGS). "Use of BIOSCREEN to Evaluate Natural Attenuation of MTBE." Battelle Conference. San Diego, CA. April 19-22, 1999.

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

Hurt, Kelly (Dynamac), and John T. Wilson and Jong S. Cho (RSKERC). "Anaerobic Biodegradation of MTBE in a Contaminated Aquifer." Battelle Conference. San Diego, CA. April 19-22, 1999.

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

Cho, Jong Soo and John T. Wilson (RSKERC). "Hydrocarbon and MTBE Removal Rates During Natural Attenuation Application." Battelle Conference. San Diego, CA. April 19-22, 1999.

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



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of August 30, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: On August 20, 1999, Drs. Ann Azadpour-Keeley and Eva Davis (RSKERC) provided RPM Victor Janosik with review comments concerning a plan to demonstrate the treatability of an array of contaminants, including NAPLs, at the former Westinghouse Transformer Plant in Sharon, PA. The proposal includes two in-situ remediation technologies and enhanced extraction methods. A number of issues were discussed including the addition of aerobic organisms for the remediation of chlorinated compounds, the use of emulsifiers and bio-surfactants, and the proposed time required to achieve project goals. Other issues of concern were the use of heat to remove PAHs and PCBs, and the proposed method for measuring the solubility of the NAPL in water.

(99-R03-004)

(A. Azadpour-Keeley(RSKERC)580-436-8890)

Technical Assistance to Region IV: On August 19, 1999, Dr. Ralph Ludwig (RSKERC) provided RPM Graig Zellar with technical comments concerning a supplemental ground-water characterization work plan for the former Ashpoo Phosphate/Fertilizer Works in Charleston, SC. Since ground-water geochemistry is important in the design of a reactive permeable barrier system, the work plan should describe how the parameters will be measured in the field and how samples will be collected before being sent to an analytical laboratory. Other issues included sample filtration to determine the importance of colloidal transport versus dissolved phase transport, and the measurement of water table elevations during tidal cycles.

(99-R04-001)

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

Technical Assistance to Region VII: On August 23, 1999, Dominic DiGiulio (RSKERC) provided RPM Bill Lowe with VFLUX calculations to estimate the percent mass of PCE contamination in the vadose zone that could reasonably be expected to be lost via volatilization at the Harcros Chemicals Company, Kansas City, KS. A time-dependent lower boundary condition using available ground-water data was chosen in lieu of a zero-gradient boundary condition to provide environmentally conservative estimates of mass flux to ground water. It was pointed out that the initial soil concentration profile largely determines the fraction of mass eventually escaping to the atmosphere.

(99RC07-001)

(D. DiGiulio(RSKERC)580-436-8605)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Puls, Robert W. (RSKERC), Robert M. Powell (Powell & Assoc.), Cynthia J. Paul (RSKERC), and David Blowes (Univ. Of Waterloo). "Ground Water Remediation of Chromium Using Zero-Valent Iron in a Permeable Reactive Barrier." American Chemical Society Symposium. San Francisco, CA. April 13-17, 1997.

(R. Puls(RSKERC)580-436-8543)

Brusseau, Mark L., John E. McCray, Gwynn Johnson, and Xiaojiang Wang (Univ. Of AZ), and A.L. Wood and C. Enfield (RSKERC). "Field Test of Cyclodextrin for Enhanced In-Situ Flushing of Multiple-Component Immiscible Organic Liquid Contamination: 1. Project Overview and Initial Results." American Chemical Society Symposium. San Francisco, CA. April 13-17, 1997.

(Lynn Wood(RSKERC)580-436-8552)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of September 6, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: On August 27, 1999, Drs. Ann Azadpour-Keeley and Scott Huling (RSKERC) provided RPM Victor Janosik with technical review comments concerning a draft bench-scale testing work plan at the former Westinghouse Transformer Plant in Sharon, PA. It was suggested that the most important data to be generated by the proposed study would be pre- and post-oxidation contaminant concentrations which will be used to evaluate treatment performance. Based on the information provided, it was unclear whether appropriate steps would be taken to accurately quantify target contaminant concentrations and mass. Issues of concern involved the number of samples and how they represented the site conditions, concentration variability, moisture content, and phase distribution of the contaminants.

(99-R03-004)

(A. Azadpour-Keeley(RSKERC)580-436-8890)

Technical Assistance to Region IV: In a continuing technical assistance effort at the GE/Shepherd Farm NPL Site in East Flat Rock, NC, Dr. Scott Huling (RSKERC) provided RPM Giezelle Bennett with a critique of a consultant's response to earlier EPA review comments on the 60 percent design for ground-water remediation at the site. The August 30, 1999, critique suggested that, in general, the EPA comments had been satisfactorily addressed including additional information and revised text. Remaining concerns include the method for calculating contaminant mass, and the need for an additional water and sediment sampling location.

(97-R04-001)

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

Technical Assistance to Region IV: On September 1, 1999, Dr. Mary Gonsoulin (RSKERC) and Dr. Daniel Pope (Dynamac) provided RPM Jon Bornholm with comments on the "Second Look Proposal Report Record of Decision Operable Unit 3 Farm Chemicals, Twin Sites Areas Aberdeen Pesticides Dump Sites, Aberdeen, NC." It has been proposed to abandon the recommended pump-and-treat system and use monitored natural attenuation (MNA) and phytoremediation as the site remedy. It was suggested that, although there is evidence of significant biodegradative natural attenuation processes, it will be necessary to conduct an MNA evaluation in order to estimate the effectiveness of this remedial alternative in achieving site-related remedial goals.

(99-R04-004)

(M. Gonsoulin(RSKERC)580-436-8616)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

McGregor, Rick (Water Tech. Int.), David Blowes (Univ. Of Waterloo), Ralph Ludwig (RSKERC), Eric Pringle (Water Tech. Int.), and Martin Pomeroy (Environ. Can.). "Remediation of a Heavy Metal Plume Using a Reactive Wall." Battelle Conference. San Diego, CA. April 19-22, 1999.

(J. Jones(RSKERC)580-436-8593)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of September 13, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region II: In a continuing technical assistance effort at the Liberty Industrial Finishing Superfund Site in Farmingdale, NY, Steven Acree (RSKERC) provided RPM Lorenzo Thantu with comments concerning remedial system design. The September 3, 1999, comments suggested that the design may overestimate the size of ground-water circulation cells resulting in significant gaps between cells. This configuration may allow ground water, with contaminant concentrations greater than current action levels, to migrate downgradient of the site boundary. In addition, data obtained during the pilot test demonstrate that cell dimensions will be much more complex than modeling predictions. This will necessitate a more intensive performance monitoring effort than currently proposed in order to provide confidence in the system performance.

(98-R02-003)

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

Technical Assistance to Region IV: On September 1, 1999, Dr. Mary Gonsoulin (RSKERC) and Dr. Daniel Pope (Dynamac) provided RPM Jon Bornholm with comments concerning the Fairway Six Area at the Aberdeen Pesticides Superfund Dump Site in Aberdeen, NC. It has been proposed to abandon the recommended pump-and-treat system and use monitored natural attenuation (MNA) and phytoremediation as the site remedy. It was suggested that, although there is evidence of significant biodegradative natural attenuation processes, it will be necessary to conduct an MNA evaluation in order to estimate the effectiveness of this remedial alternative in achieving site-related remedial goals. In addition to describing several factors that must be considered in determining whether MNA is an appropriate remedy for soil and ground water at the site, detailed comments were made in areas such as degradation rate calculations and uncertainties associated with model predictions.

(99-R04-004)

(M. Gonsoulin(RSKERC)580-436-9616)

Technical Assistance to Region IX: On September 9, 1999, in a continuing technical assistance effort at the BKK Landfill Site in West Covina, CA, Steven Acree (RSKERC) provided Project Manager Carmen Santos with comments on a report concerning a remedy decision for contaminated ground water. In general, the document provided a relatively clear description of the chosen remedy and the deliberation process. Issues discussed included ground-water remediation standards, containment of leachate and contaminated ground water using a pump-and-treat system, and the expected performance of containment wells.

(98RC09-001)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Shi, Y., J.M. Bahr, M.D. Zwolinski, M.E. Schreiber, and W.J. Hickey (Univ. of WI), and G.W. Sewell (RSKERC). "Molecular Analysis of Microbial Community Structures in Pristine and Contaminated Aquifers: Field and Laboratory Microcosm Experiments." Applied and Environmental Microbiology. May 1999. Vol 65, No. 5.

(G. Sewell(RSKERC)580-436-8993)

Hamed, Maged M. and Philip B. Bedient (Rice Univ). "Reliability-Based Uncertainty of Groundwater Contaminant Transport and Remediation." EPA Report. EPA/600/R-99/028.

(M. Randolph(RSKERC)580-436-8616)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of September 27, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: On September 10, 1999, Dr. David Jewett (RSKERC), and Dr. Elise Striz and Enamul Hoque (ManTech) provided RPM Jane Dolan with comments on a fate and transport review and recommendations document for the Massachusetts Military Reservation on Cape Cod, MA. Based on the information provided, it was suggested that the screening models SESOIL and AT123D are too simplistic to perform the complex modeling required and that a more advanced level of software such as MODFLOW and MT3D would be more appropriate. It was pointed out that additional site investigations to characterize the extent of contamination and isolate source areas are required along with studies to estimate the fate and transport properties of explosives including their volatility, sorption, and decay characteristics. Additional site characterization data may also help to determine if the application of any transport modeling is appropriate or that a long-term monitoring strategy might be more applicable.

(97-R01-004)

(D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region III: In a continuing technical assistance effort at the Lord Shope Superfund Site in Girard Township, PA, Dr. Mary Gonsoulin (RSKERC), and Drs. Daniel Pope and Hai Shen (Dynamac) provided RPM Dave Turner with comments on a 1999 intrinsic remediation report. The September 16, 1999, review stated that it would be necessary to establish goals for monitored natural attenuation (MNA) before it could be determined if that remedial alternative is appropriate. It was suggested that any MNA evaluation should be conducted through a rigorous investigation which is designed to provide a good qualitative and quantitative understanding of the natural attenuation processes taking place at the site. It was pointed out that the current activities are not sufficient for describing natural attenuation processes and should not be relied upon to justify any decision to use MNA to achieve remedial goals at the site.

(98-R03-010)

(M. Gonsoulin(RSKERC)580-436-8616)

Technical Assistance to Region X: On September 16, 1999, Dr. Ann Azadpour-Keeley (RSKERC) provided Hydrogeologist Rene Fuentes with review comments on a long-term ground-water monitoring report for the Northwest Pipe & Casing Superfund Site in Clackamas, OR. Issues of concern were that data presented in the report did not fit a conceptual model for the degradation of chlorinated compounds, and that the number of monitoring wells and their distribution was not adequate to demonstrate monitored natural attenuation. Detailed comments were offered with respect to the processes involved in natural attenuation as well as the parameters required to drive these processes. A number of comments were offered concerning inconsistencies in the report, the lack of adequate site characterization studies, and the possibility of multiple plumes.

(99-R10-002)

(A. Azadpour-Keeley(RSKERC)580-436-8890)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Sims, J.L., R.C. Sims, and D.L. Sorenson (Utah St. Univ.), and S.G. Huling (RSKERC). 1999. Chapter 21, "Prepared Bed Bioreactors," Bioremediation of Contaminated Soils, American Society of Agronomy Monograph Series, Agronomy No. 37.

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

Sims, J.L., R.C. Sims, and D.L. Sorenson (Utah St. Univ.), and S.G. Huling (RSKERC). 1999. Chapter 25, "Bioremediation of Soils Contaminated with Wood Preservatives," Bioremediation of Contaminated Soils, American Society of Agronomy Monograph Series, Agronomy No. 37.

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



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of October 4, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: On September 28, 1999, in a continuing technical assistance effort at the Gilson Road Site in Nashua, NH, Dr. Randall Ross (RSKERC) provided RPM Byron Mah with an evaluation of the "Draft Gilson Road Superfund Site Five Year Review." Overall, the document presented a concise overview of events and conditions following the termination of pump-and-treat operations at the site. A number of suggestions were offered in areas including increasing trends in contaminant concentrations, subsequent decrease in the concentration of specific contaminants, changes in the ground-water flow regime after pumping, and the estimated mass of contaminants removed by the pump-and-treat system. It was pointed out that the location should be considered a potentially valuable research site since there are obviously significant biotic and abiotic processes taking place.

(99-R01-005)

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

Technical Assistance to The Office of Solid Waste. On September 17, 1999, Dr. David Jewett (RSKERC) and Dr. Elise Striz and Enamul Hoque (ManTech) provided Edward Hanlon (Office of Research and Science Integration) with a review of a document titled "The Vadose and Saturated Zone Modules Extracted from EPACMTP for HWIR99." In general, the document provided a good description of the vadose zone model (VZM) and the saturated zone model (SZM). Among the issues discussed were the target audience, application of the models, input and output variables, and program compilation and execution.

(Misc.)

(D. Jewett(RSKERC)580-436-8560)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Azadpour-Keeley, Ann (RSKERC), Hugh H. Russell (CHR₂ Environmental Services, Inc.), and Guy W. Sewell (RSKERC). "Microbial Processes Affecting Monitored Natural Attenuation of Contaminants in the Subsurface." EPA Issue Paper. EPA/540/S-99/001.

(J. Jones(RSKERC)580-436-8593)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of October 18, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region IV: In response to an August 25, 1999, request from RPM Galo Jackson, Dr. David Burden (RSKERC), and Dr. Hai Shen and Barbara Wilson (Dynamac) provided review comments on the "Field Investigation Report" for the Hollingsworth Solderless Terminal Superfund Site in Ft. Lauderdale, FL. The October 6, 1999, comments focused on the potential remedial actions. Due to the plume and hydrological characteristics at the site, and potential restrictions of the buildings near the contaminated areas, the proposed technologies appear to have no simple solutions for the remediation of the VOC contaminated subsurface. Detailed discussions were provided with respect to pump-and-treat and excavations technologies in addition to in-situ bioremediation, dual-phase treatment, in-situ chemical oxidation, and permeable reactive barriers. It was suggested that a comprehensive study of the site be conducted to facilitate further evaluations of the selected potential remedial alternatives. The study should include a characterization of the plume, hydrogeology, and geochemistry.

(99-R04-005)

(D. Burden(RSKERC)580-436-8937)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Lechler, Paul J. (Univ.of NV) and David G. Jewett (RSKERC). "Geochemical Features of Water-Rock Interactions at the Sulphur Bank Mine, Lake County, CA." Proceedings. Clear Lake Science and Management Symposium. Univ. of CA, Davis. Oct. 24, 1998.

(J. Jones(RSKERC)580-436-8593)

FY 1999 RSKERC ACTIVITIES

During FY99, there were 97 Superfund **technical assistance** activities at 53 sites and 19 RCRA activities at 14 sites. There were 31 Superfund and 7 RCRA requests for assistance entered into the Technical Support Center tracking system during FY99. Of these, 21 Superfund and 7 RCRA were at new locations. Brownfield Sites in California and New Mexico were added to the review system. Eight **Miscellaneous Technical Assistance** activities have been provided to the Office of Radiation and Indoor Air, Office of Wastewater Management, Office of Solid Waste, National Park Service, and U.S. Forest Service. These involved metal Kd values, radio nuclide subsurface transport modeling, ecosystem restoration, wastewater treatment and disposal, and effect of Navy ground-water remediation plans on park lands. Two **training seminars** have been given on the natural attenuation of ground-water contamination, and ground-water modeling. The Center for Subsurface Modeling Support (**CSMoS**) has distributed about 12,118 models. In addition, about 654 technical assistance responses have been provided to telephone and E-Mail requests. The Subsurface Remediation Information Center (**SRIC**) has provided 1,819 RSKERC publications in response to 585 requests to all levels of government, private consultants, industry, educational institutions, and foreign countries. There were forty-eight **publications** in scientific journals, and EPA Research reports, briefing documents, and issue papers. Additionally, there were 65 oral and poster presentations made.



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of October 25, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to the Office of Solid Waste: On October 19, 1999, Dr. David Jewett (RSKERC) provided Edward Hanlon (Office of Research and Science Integration) with review comments on the vadose and saturated zone sections of the Draft HWIR99 Risk Characterization Report. These sections of the document presented the spatial and temporal scales, assumptions, methodologies, and limitations for the models of the Multimedia, Multipathway, and Multireceptor Risk Assessment (3MRA). The comments identified issues of concern including an identification of the target audience, model sensitivity to input parameters, and also suggested editorial changes.

(99-R00-004)

(D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region IX: During October 4-8, 1999, Dr. David Jewett (RSKERC) attended a technical review meeting in Sacramento, CA, for the Sulphur Bank Mercury Mine Superfund Site, and made a site visit in Clear Lake, CA. The primary focus of the meeting was to review the hydrogeologic work plan for a shoreline waste pile and future site activities to characterize the hydrogeologic framework for the site. Discussions were also directed toward mercury fate and transport characterizations in the subsurface. During the site visit, proposed monitoring well locations were investigated. Other participants included representatives from Region 9, NRMRL-Cincinnati, Army Corps of Engineers, State of California, Lake County Health Department, and consultants.

(97-R09-006)

(D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region IX: On October 14, 1999, Steve Acree (RSKERC) and representatives from Region 9 and the State of Nevada met at the Sparks Solvent/Fuel Site in Sparks, NV, to discuss the status of a ground-water extraction system used to capture a plume of contamination. The system is not currently performing to design capacity, and preliminary evaluations, based on modeling results, do not indicate that capture is being consistently maintained. Data needs and methods for increasing system effectiveness were discussed.

(94-R09-001)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Hantush, Mohamed M. (RSKERC), Victor Murray (ManTech), and Miguel A. Marino (Univ. of CA, Davis). "Leaching Models for Subsurface Pollution Assessment in Agroecosystems." Proceedings. 1999 ASCE-CSCS Environmental Engineering Conference. Norfolk, VA. July 25-28, 1999.

(M. Hantush(RSKERC)580-436-8531)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of November 1, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region VI: In 1995, the City of Santa Fe, NM, purchased a 50-acre rail yard site that was the original terminus for the Atchison, Topeka, and Santa Fe Railroad. The City requested decision-making support from EPA on the optimal site characterization technology to use on a city-owned Brownfields property. On October 29, 1999, Drs. Randall Ross and David Burden (RSKERC) provided RPM Monica Smith with review comments on an environmental site assessment and preliminary evaluation of ground-water impacts. The heterogeneous nature of the sediments underlying the site and the complex ground-water flow regime will likely require additional investigations to better understand the hydrogeologic conditions which control the fate and transport of contaminants in the subsurface. Although the application of various geophysical techniques may provide useful information with respect to those conditions, it is probable that additional monitoring wells will be necessary. Detailed comments were offered in a number of areas including sampling techniques, aquifer pumping tests, the use of pattern diagrams to identify ground water with different geochemical characteristics, and soil gas surveys.

(99BF06-001)

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

Technical Assistance to Region VIII: In a continuing technical assistance effort at the Petroleum/Ekotek Superfund Site in Salt Lake City, UT, Steven Acree (RSKERC) provided RPM Russell Leclere with comments concerning a proposed plan to delineate the extent of a bromide tracer plume. The October 19, 1999, comments stated that the plan appeared to be appropriate for determining the northern and southern extent of the bromide tracer used during a recent test. It was also suggested that the information will be useful in determining ground-water flow directions and, possibly, provide an estimate of dispersivity. Other activities were discussed to improve the investigation including an additional sampling interval and the relocation of sampling profiles.

(93-R08-003)

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

Technical Assistance to Region IX: On October 22, 1999, Steven Acree (RSKERC) provided OSC Donn Zuroski with review comments on documents related to the Sparks Solvent/Fuel Site in Sparks, NV. In general, the information indicated that the remediation system was probably not fully capturing contaminated ground water prior to lake discharge under the current operating conditions. In addition, the only information used to evaluate capture, in the reviewed documents, were the results of simulations. It was recommended that observed contaminant concentrations and hydraulic head data be the primary means for evaluating capture. Additional comments concerned the location of well screens with respect to capture, the need for additional monitoring wells to better define the extent of the plume, and the use of phytoremediation and reinjection of treated water for enhanced remediation.

(94-R09-001)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Hantush, Mohamed (RSKERC), Zhonglong Zhang and Enamul Hoque (ManTech), and Miguel A. Marino (Univ. of CA, Davis). "Uncertainty in Leaching Potential of Nonpoint Source Pollutants with Application to a GIS." Symposium Paper. The Universities Council on Water Resources 1999 Annual Meeting. June 29-July 2, 1999. Waikoloa, HA.

(M. Hantush(RSKERC)580-436-8531)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of November 8, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: On October 30, 1999, Dr. Ann Azadpour-Keeley (RSKERC) provided RPM Carolyn Pina-Springer with comments concerning a draft sampling and analysis plan for the Barkhamsted New Hartford Landfill in Barkhamsted, CT. The review focused on whether sampling for the demonstration of natural attenuation of 4-methylphenol and 2-butanone should include parameters such as hydrogen and chloride, and identified the probable degradation products. Because the Agency does not have guidance for the contaminants of concern, it would not be necessary to determine the hydrogen concentration. Since chloride was to serve as a hydrogeological tracer and not a biochemical product, it was assumed that it would be unrelated to monitoring the degradation of chlorinated solvents. Detailed comments along with cited references were offered with respect to the expected degradation pathways of the contaminants of concern.

(99-R01-003)

(A. Azadpour-Keeley(RSKERC)580-436-8890)

Technical Assistance to Region VIII: On October 28, 1999, Steven Acree (RSKERC) attended a meeting at the Petrochem/Ekotek Superfund Site in Salt Lake City, UT, to discuss the results of a tracer test which was performed to evaluate groundwater flow direction and velocity in the vicinity of the site. The information will be used in the design of a compliance monitoring system. Additional data needs to complete the investigation were also discussed. Others attending the meeting were representatives from Region 8, State of Utah, and the responsible party.

(93-R08-003)

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

Technical Assistance to Region IX: In a continuing technical assistance effort at the South Lake Tahoe MtBE Site in South Lake Tahoe, CA, Steven Acree and Dr. Scott Huling (RSKERC) provided RPM Greg Lovato with a technical review of a site assessment and remediation feasibility work plan, and in-situ oxidation bench-scale feasibility testing. The October 29, 1999, comments suggested that, in general, the study designs and documents did not provide sufficient details for adequate reviews in several key areas such as the potential effectiveness of in-situ oxidation processes, projections of system performance with respect to the capture of injected solutions and mobilized constituents, and health and safety concerns related to the effects of increased subsurface temperatures and volatilization. With respect to the site assessment and remediation feasibility work plan, detailed comments were provided in areas including the in-situ oxidation system design and operation, demonstration of hydraulic control, and verification monitoring. Detailed comments concerning the in-situ oxidation bench-scale feasibility testing included a description of in-situ oxidation technology, soil sample preparation, and oxidation of BTEX by H_2O_2 .

(99RC09-001)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Kampbell, Don H. and John T. Wilson (RSKERC), and Dan M. McInnes (ManTech). "Determining Dissolved Hydrogen, Methane, and Vinyl Chloride Concentrations in Aqueous Solution on a Nanomolar Scale with the Bubble Strip Method." Conference Proceedings on Hazardous Waste Research. Snowbird, UT. May 18-21, 1998.

(D. Kampbell(RSKERC)580-436-8564)

Morse, Jeff J. and Bruce C. Alleman (Battelle), Jerry E. Hansen (AFCEE), and Don H. Kampbell (RSKERC). "Biodegradation of Polychlorinated Biphenyls at Cape Canaveral Air Station." Proceedings of Fifth International In-Situ and On-Site Bioremediation Symposium. April 19-22, 1999. San Diego, CA.

(D. Kampbell(RSKERC)580-436-8564)

Snyder, Craig and Doug Downey (Parsons), and Don Kampbell (RSKERC). "Weathering of JP-4 LNAPL Hydrocarbons at Various Fuel Release Sites." Proceedings of Fifth International In-Situ and On-Site Bioremediation Symposium. April 19-22, 1999. San Diego, CA.

(D. Kampbell(RSKERC)580-436-8564)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of November 15, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region IX: On November 1, 1999, Steven Acree (RSKERC) and Dr. Kelly Hurt (Dynamac) provided RPM Steve Linder with comments concerning an aquifer characterization report at the Charnock and Arcadia Sites in Santa Monica, CA. In general, the procedures used during the performance and analysis of the pumping test and during the borehole flowmeter survey appeared to be reasonable and appropriate. It was pointed out that the interpretation of these results would be complicated by subsurface heterogeneity and, in the case of the borehole flowmeter survey, factors such as well design, construction, and development. These uncertainties were discussed in considerable detail.

(97RC09-001)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Ferry, Mark (MN PCA), and John Wilson and Don Kampbell (RSKERC). "Evaluating the Potential for Chlorinated Solvent Degradation from Hydrogen Concentration." Proceedings from Second International Conference on Remediation of Chlorinated Recalcitrant Compounds Symposium. Monterey, CA. May 22-25, 1999.

(D. Kampbell(RSKERC)580-436-8564)

RESEARCH IN PROGRESS

A unique approach of bioslurping/natural bioventing technology is being used to remediate a JP-4 jet fuel spill at an Air Force operations base on Diego Garcia Island in the Indian Ocean. An underground refueling pipeline fracture was discovered under an 18-inch reinforced concrete tarmac in 1991. It was immediately repaired. About 139,000 gallons of fuel were removed from the spill area by suction hoses. Bioslurper wells, which were installed in March 1996 and January 1997, have recovered another 40,000 gallons of floating fuel. During this three-year period, the bioslurper system was only operable for about 16 months. The bioslurper process is a vacuum-enhanced suction by a dip tube placed inside the well at the floating fuel/water table level. The removed mist mixture is piped to an oil/water separator tank. The bioslurper operation will continue after fuel recovery becomes nonproductive to serve in a bioventing mode. Fuel smears outside the influence of the bioslurper wells are being degraded by natural bioventing caused by water table oscillations of two to three feet by tidal action every 12 hours which pulls fresh air into the vadose zone and extrudes stale air. Evidences of active natural attenuation processes are being documented by measuring chemical component changes in the subsurface.

(D. Kampbell(RSKERC)580-436-8564)

TECHNOLOGY TRANSFER ACTIVITIES

During October 26-28, 1999, an "Advanced Course on Monitored Natural Attenuation of Fuel Components in Ground Water" was held in Atlanta, GA, at the Region 4 Office. Dr. John Wilson (RSKERC) and Dr. Elise A. Striz (ManTech) presented the initial version of the "Plume Scaler" program. Variations in ground-water flow direction can move plumes away from monitoring wells, giving a false impression that natural attenuation is reducing contaminant concentrations. The Plume Scaler program was developed by Dr. Striz and Dr. Zhonglong Zhang (ManTech) under the direction of Dr. Wilson. The program uses a linear regression of ground-water elevations to provide a head surface separately for all available head measurement events (i.e., monthly, etc.) at a site. The linear head surfaces are used individually in a contaminant transport model such as Bioplume III to give distinct realizations of the plume migration. The plume results for all the events are then averaged using an equal weighting scheme to provide a plume "probability" space which can be used to assess the adequacy of existing well locations and to optimize the placement of new wells for long-term monitoring of natural attenuation. There were 21 attendees representing agencies from seven states and EPA. The course moderator was Dr. Mary Randolph-Gonsoulin (RSKERC).

(M. Randolph-Gonsoulin(RSKERC)580-436-8616)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of November 22, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: On November 5, 1999, Dr. Ann Azadpour-Keeley (RSKERC) and Barbara Wilson (Dynamac) provided RPM David Turner with comments concerning a pre-remedial design and remedial alternatives for the Saegertown Superfund Site in Saegertown, PA. The focus of the review was a proposed remedy to introduce molasses into the aquifer, as a source of organic carbon, to enhance reductive dechlorination, and to suggest additional biochemical parameters which should be included in future analysis. It was pointed out that the use of molasses, although quite biodegradable, would stimulate the growth of bacteria which could result in the reduction of hydraulic conductivity. It was recommended that the use of a hydrogen releasing compound (HRC) be considered which results in the direct addition of hydrogen without the use of fermentation substrates or carbon sources.

(97-R03-003)

(A. Azadpour-Keeley(RSKERC)580-436-8890)

Technical Assistance to Region VI: On November 2, 1999, Dr. Scott Huling (RSKERC), Dr. Bruce Pivetz and Rick Stransky (ManTech), and Dr. Kelly Hurt (Dynamac) provided RPM Ernest Franke with technical review comments on a statement of work for a remedial investigation/feasibility study at the Industrial Transformer/Sol Lynn Superfund Site in Houston, TX. In general, the document included the required tasks and descriptions. Some concerns were expressed about the lack of flexibility in selecting field methods and sample locations based on an initial comprehensive data review. It was suggested that a phased approach be employed in which collected information and its interpretation from one step is used to plan succeeding steps.

(99-R06-002)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Puls, Robert W. and Cynthia J. Paul (RSKERC), and Robert M. Powell (ManTech). "The Application of In Situ Permeable Reactive (Zero-Valent Iron) Barrier Technology for the Remediation of Chromate-Contaminated Groundwater: A Field Test." Applied Geochemistry (14), 1999.

(R. Puls(RSKERC)580-436-8543)

Chattopadhyay, Sandip (NRC) and Robert W. Puls (RSKERC). "Adsorption of Bacteriophages on Clay Minerals." Environ. Science & Tech. Vol. 33, No. 20. 1999.

(R. Puls(RSKERC)580-436-8543)

TECHNOLOGY TRANSFER ACTIVITIES

During November 3-5, 1999, the Technology Support Center (TSC) presented a Monitored Natural Attenuation Course in Austin, TX, at the Texas Natural Resource Conservation Commission with discussions focusing on sorption, dilution, volatilization, and biodegradation processes, as well as monitoring requirements to demonstrate that these processes are taking place. The students were also involved with hands-on experience using BIOSCREEN as a decision support system in reviewing natural attenuation proposals. Forty students, involved in RCRA and Superfund activities, attended the course. Dr. Mary Gonsoulin (RSKERC) served as course facilitator while the instructors included Dr. John Wilson (RSKERC), Barbara Wilson, Drs. Daniel Pope and Kelly Hurt (Dynamac), and Dr. Ron Sims (Utah St. Univ.).

(M. Gonsoulin(RSKERC)580-436-8616)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of December 6, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region IX: During November 3-10, 1999, Dr. David Jewett (RSKERC) visited the Sulphur Bank Mercury Mine Superfund Site in Clear Lake, CA, to monitor ongoing drilling and site characterization activities. A meeting was also held with representatives of Region 9, U.S. Army Corps of Engineers, and consultants to discuss findings to date, assess future activities, and to identify potential locations for future drilling.

(97-R09-006)

(D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region IX: On November 18, 1999, Steven Acree (RSKERC) and Dr. Kelly Hurt (Dynamac) provided RPM Steve Linder with review comments of a site assessment report for the Charnock and Arcadia Sites in Santa Monica, CA. In general, there was insufficient data to adequately determine the potential impact of petroleum releases from the site on the Silverado Aquifer and, ultimately, the Charnock well field. It was noted that the investigation depth, changes in ground-water flow field, and degree of heterogeneity in this complex system makes the quantification of the well field impacts extremely difficult. Detailed comments were offered on these and other issues regarding the reported studies, conclusions, and recommendations.

(97RC09-001)

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

Technical Assistance to Region X: On November 18, 1999, Dr. Ann Azadpour-Keeley (RSKERC) provided RPM Al Goodman with a response to the site contractor's review of her September 16, 1999, comments on a long-term monitoring report at the Northwest Pipe & Casing Site in Clackamas, OR. The response concerned a number of issues including geochemical requirements for the reductive dechlorination of chlorinated compounds, the number of wells needed at the site to demonstrate monitored natural attenuation, sampling frequency, and the statistical presentation of data.

(99-R10-002)

(A. Azadpour-Keeley(RSKERC)580-436-8890)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Puls, Robert W. (RSKERC), and David W. Blowes and Robert W. Gillham (Univ. of Waterloo). "Long-Term Performance Monitoring for a Permeable Reactive Barrier at the USCG Support Center, Elizabeth City, North Carolina." *Journal of Hazardous Materials* (68), 1999.

(R. Puls(RSKERC)580-436-8543)

Paul, Cynthia J., Faruque A. Khan, and Robert W. Puls (RSKERC), and James Vardy (USCG). "Characterization and In-Situ Remediation of Chromium-Contaminated Soils and Sediments at the USCG Support Center, Elizabeth City, NC." *Proceedings: 1999 Joint ASCE-CSCE Environmental Engineering Conference*. Norfolk, VA. July 25-28, 1999.

(R. Puls(RSKERC)580-436-8543)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of December 13, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region IV: In a continuing technical assistance effort at the Flanders Filters Site in Washington, NC, Dr. Ann Azadpour-Keeley (RSKERC), and Barbara Wilson and Drs. Jin-Song and Sam Lee (Dynamac) provided RPM Jon Bornholm with a review of a remedial design/remedial action work plan. The November 18, 1999, comments focused on whether or not sufficient information would be collected to confirm that natural attenuation is occurring. It was suggested that natural attenuation could be considered a remedy for ground water due to the low concentrations of chlorinated contaminants of interest. Although the contaminant concentrations have been declining and daughter products have been measured in some of the wells, no geochemical information has been collected that would support natural attenuation. A number of detailed comments were provided on a variety of issues including sampling techniques, the removal of contaminant sources, ground-water modeling, and the statistical analysis of data.

(98-R04-003)

(A. Azadpour-Keeley(RSKERC)580-436-8890)

Technical Assistance to Region IV: On November 30, 1999, Dr. Ralph Ludwig (RSKERC) provided RPM William Joyner with review comments on a draft remedial investigation report for the Columbia Nitrogen Site in Charleston, SC. In general, the investigation appeared to be well conducted, and the existing wells should serve as a good starting point for the evaluation of ground-water contamination at the site. Recommendations were offered in areas such as sampling techniques, well locations, the need for a better understanding of pyrite slag locations, variations in hydraulic conductivity, and the parameters required to evaluate metals transport and fate mechanisms.

(00-R04-003)

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

Technical Assistance to Region X: On October 22, 1999, RPM Bernie Zavala requested technical assistance in the review of a work plan for the performance and implementation of monitored natural attenuation in the Trans Plume at the Western Processing Site in Kent, WA. On November 30, 1999, Dr. John T. Wilson (RSKERC) presented calculations concerning the expansion of the contaminant plume if a pump-and-treat system is turned off in the year 2000. Also discussed were the parameters required to evaluate the performance of monitored natural attenuation and the modification of monitoring locations.

(00-R10-001)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Chattopadhyay, Sandip and Samuel J. Traina (Ohio St. Univ.). "Spectroscopic Study of Nitrogen Heterocyclic Compounds on Phyllosilicates." *Langmuir* (15). 1999.

(S. Mravik(RSKERC)580-436-8553)

Nkedi-Kizza, P. and K.D. Brown (Univ. of FL). "Sorption, Degradation, and Mineralization of Carbaryl in Soils, for Single-Pesticide and Multiple-Pesticide Systems." *Journal of Environmental Quality* (27). Nov.-Dec. 1998.

(S. Mravik(RSKERC)580-436-8553)

RESEARCH IN PROGRESS

A two-year ecosystem research investigation is being conducted at three different marinas on Lake Texoma on the southern border of Oklahoma. The main emphasis of the study is to determine if MTBE, a commonly used gasoline additive, is present in areas where there is considerable power boat activity. Other water quality parameters included in the investigation are fecal coliforms, nitrates, and some metals. The data will be integrated with other stress scenarios for developing protocols for assessing ecosystem assimilative capacities and a model for watershed management.

(D. Kampbell(RSKERC)580-436-8564)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of December 20, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region VI: On December 3, 1999, Steven Acree and Dr. John Wilson (RSKERC), and Dr. Daniel Pope (Dynamac) provided Senior Project Manager Michael Overbay with comments on a focused corrective measures study at England AFB in Alexandria, LA. In general, projections of the effectiveness of natural attenuation for the remediation of ground water within specific time frames should be considered highly uncertain because the sources of contamination were not well defined. If monitored natural attenuation is incorporated into the remedy for the site, it was recommended that restoration milestones, such as degradation rates, be established for triggering a contingency remedy, if necessary. Detailed comments were given with respect to the determination of degradation rates, geochemical conditions across the site, and the need for additional monitoring locations.

(98RC06-002)

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

Technical Assistance to Region VI: On December 7, 1999, Steven Acree and Dr. John Wilson (RSKERC), and Dr. Daniel Pope (Dynamac) attended a meeting in Dallas, TX, to discuss the Focused Corrective Measures Study for England AFB in Alexandria, LA. The discussions concerned long-term monitoring necessary to evaluate progress toward remediation objectives. Also attending the meeting were representatives from Region 6, U.S. Air Force, Louisiana Department of Environmental Quality, and Air Force contractors. Continuing assistance will consist of recommendations regarding well locations for long-term monitoring of attenuation rates and declines in contaminant concentrations.

(98RC06-002)

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

Technical Assistance to Region VIII: On November 30, 1999, Dr. Scott Huling and Kyle Jones (RSKERC) provided RPM Larry Kimmel with the results of a bench-scale treatability investigation for the Rocky Mountain Arsenal Superfund Site in Commerce City, CO. The purpose of the investigation was to determine whether diisopropylmethylphosphonate (DIMP), can be concentrated on activated carbon and oxidized in the presence of a wide array of other compounds present in ground water. Conclusions were presented concerning the measurements of DIMP in solution and the performance of oxidation treatment. Recommendations were made with respect to future activities at the site.

(99-R08-001)

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

Technical Assistance to Region IX: RPM John Lucey requested technical assistance in evaluating the stability of a ground-water contamination plume at a gasoline station on Travis AFB, CA. The site is one used by RSKERC as a natural attenuation research study location. Ground-water quality analyses have shown that MTBE decreased four to nine fold around the source area between September 1998 and June 1999. During the same time period, there was a three to six fold increase at the toe of the plume about 300 feet from the source. Although MTBE has a higher transport velocity than BTEX, neither was detected in wells 50 feet further downgradient. To date, the study has indicated that the plume has stabilized and remediation is occurring rapidly in the source area. Further sampling is scheduled in September 2000, to confirm that the toe of the plume has not moved beyond 350 feet from the source.

(Misc.)

(D. Kampbell(RSKERC)580-436-8564)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Jorgensen, Eric. E. and Timothy J. Canfield (RSKERC), and Susan C. Schock, Joan E. Colson, and K. Scott Minamyer (NRMRL, Cinn.). "Ecosystem Restoration: A National Symposium to Bring Together Restoration Practitioners and Researchers." Ecological Restoration (17). Spring & Summer, 1999.

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



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of December 27, 1999**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: On December 14, 1999, Steven Acree and Dr. Bob Puls (RSKERC), and Drs. Jin-Song Chen and Kenneth Banks (Dynamac) provided RPM Ron Davis with comments on a revised remedial design for a permeable reactive barrier at the Arrowhead Plating Site in Montross, VA. The plan proposed additional characterization of geotechnical parameters and a laboratory treatability study in support of the design of a permeable reactive subsurface barrier (PRSB). The issues of greatest concern were the variability of contaminant distribution with depth, changes in ground-water chemistry resulting from treatment, and the potential impact on surface water receptors. (98-R03-004) (S. Acree(RSKERC)580-436-8609)

Technical Assistance to Region VI: Following a December 7, 1999, meeting in Dallas, TX, Steven Acree and Dr. John Wilson (RSKERC), and Dr. Daniel Pope (Dynamac) provided Senior Project Manager Michael Overbay with a modification of earlier review comments concerning a corrective measures study at England AFB in Alexandria, LA. The modification resulted from additional information gained during the meeting. In general, projections of the effectiveness of natural attenuation for remediation, particularly with respect to restoration within specific time frames, should be considered highly uncertain. One of the greatest sources of uncertainty results from the sources of contamination being undefined. It was suggested that, if natural attenuation is incorporated into the remedial technology for this site, definite milestones be established which are accompanied by criteria for triggering the implementation of contingencies. Detailed comments were offered on a number of issues including rates of biotransformation, indicator geochemical parameters, monitoring well locations, and performance criteria. (98RC06-002) (S. Acree(RSKERC)580-436-8609)

Technical Assistance to Region VII: In a continuing technical assistance effort at the General Motors Site in Sioux City, IA, Steven Acree (RSKERC) and Barbara Wilson (Dynamac) provided RPM Nancy Swyers with review comments on a feasibility study report. The December 13, 1999, comments focused on the potential applicability of an alkane biostimulation system which has been proposed as the preferred remedial alternative. Based on the few available site data, the butane and oxygen demands to achieve established goals appear to be high and the delivery of these materials is unlikely to be uniform. Detailed comments included the quantity of butane required for cometabolism, time frame and cost of remediation, and the need to evaluate the geochemistry prior to the injection of air into ground water due to the potential of iron or manganese precipitation. (98-R07-002) (S. Acree(RSKERC)580-436-8609)

Technical Assistance to the Office of Radiation and Indoor Air: On December 13, 1999, Dr. Ralph Ludwig (RSKERC) provided the Center for Remediation Technology and Tools with review comments on an "Interim Report on Field Demonstration of Permeable Reactive Barriers to Remove Dissolved Uranium from Groundwater, Fry Canyon, Utah." The level of effort put into the demonstration was impressive and the information gained was very useful. It was suggested that the rationale for using the selected reactive media be given. Specific methodologies were discussed along with some of the data and its interpretation. (99-R00-003) (R. Ludwig(RSKERC)580-436-8603)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Davis, W.M. (US Army Engr.), C.L. Erickson and C.T. Johnson (Purdue Univ.), J.J. Delfino (Univ. of FL), and J.E. Porter (Ascl Corp.). "Quantitative Fourier Transform Infrared Spectroscopic Investigation of Humic Substance Functional, Group Composition." Chemosphere (13)12. 1999. (S. Mravik(RSKERC)580-436-8553)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of January 10, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: On December 16, 1999, Dr. Mary Gonsoulin (RSKERC), and Drs. Hai Shen and Daniel Pope (Dynamac) participated in a conference call with RPM Dave Turner, Dr. Robert Norris (Eckenfelder, Inc.), and Eugene Miller (Lord Corporation) concerning groundwater contaminants at the Lord-Shope Superfund Site in Girard Township, PA. The Lord Corporation and their consultants had proposed the injection of electron donors such as lactate into the aquifer to stimulate the reductive dechlorination of chlorinated solvents. It was suggested that slowly degrading electron donors such as benzoate be injected in addition to the lactate, and that measures be taken to reduce the potential for biofouling of the injection wells. Since monitoring was being carried out for some of the geochemical indicators for natural attenuation, there was some question concerning the extent of this activity. It was suggested that, since there were no specific goals for monitored natural attenuation (MNA), and it was not proposed as a part of the site remedy, that only limited monitoring for these indicators be carried out until this option is proposed as a part of the site remedy.

(98-R03-010)

(M. Gonsoulin(RSKERC)580-436-8616)

Technical Assistance to Region V: On December 28, 1999, Dr. Randall Ross (RSKERC), and Drs. Kelly Hurt and Hai Shen (Dynamac) provided RPM Karen Cibulskis with comments concerning a remedial design work plan for monitored natural attenuation at the Roto-Finish Superfund Site in Portage, MI. The available documents indicate that natural attenuation processes are reducing contaminant concentrations, however, the processes involved have not been adequately demonstrated or evaluated. Detailed comments were offered with respect to the adequacy of the existing monitoring network, required geochemical indicator parameters, degradation rates, and the effectiveness of a ground-water extraction system.

(00-R05-001)

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

Technical Assistance to Region IX: During December 6-10, 1999, Dr. David Jewett (RSKERC) visited the Sulphur Bank Mercury Mine Superfund Site in Clearlake, CA, to monitor long-term aquifer pumping tests to determine hydraulic properties of the subsurface environment. Minimal saturated thickness in an upper unit caused the test to be halted after approximately 30 hours. Pump limitations led to the postponement of a second test. Both tests are rescheduled for the spring in 2000. In the meantime, the contractor will proceed with short-term, single-well tests for all newly installed wells. Discussions were also held to discuss field activities to date and to verify locations for remaining drilling activities.

(97-R09-006)

(D. Jewett(RSKERC)580-436-8560)

Technical Assistance to EPA Headquarters: On December 17, 1999, Dr. David Jewett (RSKERC) provided Edward Hanlon (Office of Science Policy) with review comments on the Inorganic Hydrogen Cyanide Sector Risk Assessment Framework for OSW's Inorganic Chemicals Hazardous Waste Listing Proposed Rule.

(99-R00-006)

(D. Jewett(RSKERC)580-436-8560)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of January 17, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region IV: On January 11, 2000, Dr. David Burden (RSKERC), and Barbara Wilson and Dr. Hai Shen (Dynamac) provided RPM Humberto Guzman with comments on a draft sampling and analysis plan and draft work plan for the Capitol City Plume Superfund Site in Montgomery, AL. It was suggested that the work plan not be limited to the remedial alternatives of no-action, bioremediation, and monitored natural attenuation because of the possible presence of NAPLs. Other comments were concerned with the monitoring network, quality assurance, and field sampling.

(00-R04-001)

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

Technical Assistance to Region IV: The Columbia Nitrogen Site in Charleston, SC, is a former phosphate fertilizer plant where the soil and ground water are contaminated with heavy metals. On January 12, 2000, Dr. Ralph Ludwig (RSKERC) attended a meeting at the Regional Office to discuss data requirements for the evaluation of a permeable reactive barrier as a means of preventing the migration of metals into a tidal marsh. Also attending the meeting were representatives from Region IV, consultants, and the South Carolina Department of Environmental Quality.

(00-R04-003)

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

Technical Assistance to Region IX: On December 27, 1999, Dr. Scott Huling (RSKERC), and Rick Stransky and Dr. Bruce Pivetz (ManTech) provided review comments concerning a draft feasibility report for Williams AFB in Phoenix, AZ. Significant uncertainty exists in the analysis presented in the FFS regarding monitored natural attenuation of ground water, especially given the presence of a large volume of NAPLs. A number of factors were discussed in detail including the effects of a rising water table, NAPL mobility and volume, cleanup goals, and long-term remedial progress.

(98-R09-003)

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



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
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Status Report for the Week of February 7, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region IV: On December 23, 1999, RPM Joseph Alfano requested review comments on a Focused Feasibility Study for the Pickettville Road Landfill and Realco Site in Jacksonville, FL, specifically in those sections concerning a permeable reactive wall, bioremediation, and proposed natural attenuation. On January 31, 2000, Dr. Ralph Ludwig (RSKERC) suggested that the document addressed most of the pertinent issues related to establishing the feasibility of installing a permeable reactive barrier at the site. Comments were also offered concerning geochemical parameters proposed for the investigation, bench-scale tests, sampling and analysis plan, and the need to describe the vertical hydraulic conductivity distribution.

(00-R04-004)

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

Technical Assistance to Region VII: On January 4, 2000, RPM Scott Marquess requested review comments with respect to the installation of a permeable reactive barrier at the Lake City Army Ammunition Plant in Independence, MO. In a response dated February 4, 2000, Dr. Ralph Ludwig (RSKERC) stated that the characterization and design study were thorough and the contaminants of concern (TCE, PCE, and DCE) are amenable to treatment with zero valent iron. Specific comments concerned the effects of oxygen on precipitation reactions, potential contaminant underflow in the underlying bedrock, and the design of monitoring wells.

(00-R07-001)

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

Technical Assistance to Region IX: On January 24, 2000, Steven Acree (RSKERC), Barbara Wilson and Dr. Kenneth Banks (Dynamac), and Dr. Elise Striz (ManTech) provided RPM Kathleen Salyer with comments concerning a draft pilot program summary report for the Del Amo Superfund Site in Torrance, CA. The report gave an evaluation of the effectiveness of conventional pumping technology for LNAPL removal. The report also noted that significant uncertainty exists in projections of the effectiveness of aggressive contaminant removal technologies such as steam injection and electrical heating due to the high degree of heterogeneity at the site. Detailed comments were offered in areas such as the potential benefits of partial NAPL removal in terms of risk reduction, and ground-water flow modeling performed during the studies.

(94-R09-006)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Aziz, Carol E. and Charles J. Newell (Groundwater Services, Inc.), T. Prabhakar Clement and Yunwei Sun (Battelle Northwest), and James R. Gonzales and Patrick Haas (Brooks AFB). "BIOCHLOR: Natural Attenuation Decision Support System, User's Manual, Version 1.0." EPA Report. EPA/600/R-00/008.

(J. Jones(RSKERC)580-436-8593)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of February 14, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: In a continuing technical assistance effort at the General Electric Site in Pittsfield, MA, Steve Acree (RSKERC) provided OSC Dean Tagliaferro with review comments on a DNAPL Recovery Data and Evaluation Report. In the February 11, 2000, comments it was suggested that enhancements to the DNAPL recovery system be made including the installation of additional observation/recovery wells. Detailed comments were offered with respect to well design and location, distribution and movement of DNAPLs, and characterization assessment methods.

(98-R01-004)

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

Technical Assistance to Region I: On February 10, 2000, Dr. Ann Azadpour-Keeley (RSKERC) participated in a conference call regarding the November/December Sampling Event Data Validation Report for the Barkhamsted-New Hartford Landfill Superfund Site in Barkhamsted, CT. Other participants included Mary Jane O'Donnell (EPA Region I) and the PRP contractors. Discussions revolved around the acquisition and interpretation of chemical and geochemical data regarding natural attenuation of 2-butanone and 4-methylphenol. Although it was acknowledged that the high concentration of acetone and its co-elution with some of the constituents of concern posed a challenge, the reduction of sample dilutions by a factor of 10 for VOC analyses is required to avoid semi-quantitative data. Additional measurements will include phosphate analysis and a change in the determination of sulfide.

(99-R01-003)

(A. Azadpour-Keeley(RSKERC)580-436-8890)

Technical Assistance to Region X: On February 10, 2000, Dr. Ann Azadpour-Keeley (RSKERC) provided Region 10 with a file containing the results of a literature search concerning "biotic intrusion barriers." The technical assistance response also included EPA documents which described RCRA corrective action stabilization technologies; the design and construction of RCRA/CERCLA final covers; and requirements for hazardous waste landfill design, construction, and closure. It was also noted that the NRMRL's Land Remediation and Pollution Control Division is the center of expertise for landfill cap stabilization technologies.

(Misc.)

(A. Azadpour-Keeley(RSKERC)580-436-8890)



HIGHLIGHTS

**National Risk Management Research Laboratory
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Status Report for the Week of February 21, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: On February 14, 2000, Dr. Randall Ross (RSKERC) and Dr. Milovan Beljin (Dynamac) provided RPM Byron Mah with an evaluation of the ground-water flow regime at the Gilson Road Superfund Site in Nashua, NH. The report conveyed the findings of a synoptic ground-water elevation survey conducted by the RSKERC Technology Support Center during November 3-4, 1999. The general survey methods were presented along with the November 1999 ground-water elevations in tabular and graphical formats. The vertical hydraulic gradients were also provided. It was concluded that the ground-water flow regime associated with the containment system at the site did not appear to have changed significantly since the ground-water extraction and treatment system was terminated.

(00-R01-001)

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

Technical Assistance to Region IX: During February 7-11, 2000, Dr. David Jewett (RSKERC) participated in a technical review meeting concerning the Sulphur Bank Mercury Mine Superfund Site in Clearlake, CA. Also attending the meeting were representatives from Region 9, NRMRL, State of California, Lake County, Army Corps of Engineers, and consultants. The purpose of the meeting was to review the preliminary findings of the drilling and monitoring well installation activities, leachability studies, and draft water quality work plan. A site visit was also conducted to review work completed to date and to collect additional samples for ongoing studies. A follow-up meeting was held to clarify and schedule future characterization activities.

(97-R09-006)

(D. Jewett(RSKERC)580-436-8650)

Technical Assistance to the Office of Science Policy: On December 17, 1999, Dr. David Jewett (RSKERC) provided Edward Hanlon with a review of the Inorganic Hydrogen Cyanide Sector Risk Assessment Framework for the OSW's Inorganic Chemicals Hazardous Waste Listing Proposed Rule. Comments were offered concerning the hydraulic relationships between ground water, impoundments, and river systems. In addition, it was suggested that care be exercised in assuming lateral continuity of these units and using literature values for hydraulic conductivity. More detailed comments were made with respect to the development of worst-case scenarios including river discharge, amenable CN concentration, impoundment surface area, and impoundment operating head.

(Misc.)

(D. Jewett(RSKERC)580-436-8560)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Bakker, Mark (Univ. of NE). "Transient Dupuit Interface Flow with Partially Penetrating Features." Water Resources Research. Vol. 34, No. 11. November 1998.

(S. Schmelling(RSKERC)580-436-8540)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of February 28, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: In a continuing technical assistance effort at the Microwave Development Laboratories, Inc. Site in Needham, MA, Dr. David Jewett (RSKERC) and Dr. Elise Striz (ManTech) provided Peter Richards (MA Dept. of Environ. Protection) with comments on a consultant's response to an earlier RSKERC review of a ground-water flow and contaminant transport and fate modeling study at the site. The February 18, 2000, comments discussed the need and cost of additional site characterization information to improve the model, factors affecting the conclusions of the study, and the results of modeling for the site performed by the RSKERC Center for Subsurface Modeling Support (CSMoS).

(99-R01-002)

(D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region IX: On February 24, 2000, Dr. David Jewett (RSKERC) provided RPM Ellen Manges with comments concerning a work plan for additional investigations at the Sulphur Bank Mercury Mine Superfund Site in Clearlake Oaks, CA. Based on a review of the document and the discussions held during a meeting on February 7, 2000, it appears that the water quality sampling strategy is well designed. Detailed comments were provided in areas such as the primary mechanisms for mercury flux, water sampling in wetlands, geochemical models, and model sensitivity analyses.

(97-R09-006)

(D. Jewett(RSKERC)580-436-8560)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Hutchins, S.R. and S.D. Acree (RSKERC). "Ground Water Sampling Bias Observed in Shallow, Conventional Wells." Ground Water Monitoring and Remediation. 20(1). 2000.

(S. Hutchins(RSKERC)580-436-8563)

Wilson, John T. and Jong Soo Cho (RSKERC), Barbara Wilson (Dynamac), and James A. Vardy (USGS). "Natural Attenuation of MTBE in the Subsurface under Methanogenic Conditions. EPA Report. EPA/600/R-00/006.

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



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of March 6, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: In a continuing technical assistance effort at the Barkhamsted New Hartford Landfill Superfund Site in Barkhamsted, CT, Dr. Ann Azadpour-Keeley (RSKERC) and Dr. Elise Striz (ManTech) provided RPM Carolyn Pina-Springer with review comments concerning ground-water flow and transport modeling simulations at the site. The investigations were related to an assessment of the relative time frames associated with ground-water cleanup for natural attenuation and ground-water extraction remedial options. The March 1, 2000, comments discussed the evidence required to show that natural attenuation processes are occurring as well as the results and uncertainty of the modeling simulations. (99-R01-003) (A. Azadpour-Keeley(RSKERC)580-436-8890)

Technical Assistance to Region III: On December 14, 1999, the TSC provided RPM Ron Davis with comments concerning the design of a permeable reactive subsurface barrier (PRSB) at the Arrowhead Plating Site in Montross, VA. On February 28, 2000, Steven Acree and Dr. Robert Puls (RSKERC) provided Region 3 with a critique of responses to those comments. It was pointed out that concerns still exist with respect to the variability in contamination and hydrogeology that are not addressed in the Remedial Design Work Plan. Detailed comments were offered about the need to better define the vertical variations in hydraulic conductivity as well as contaminant concentrations at the proposed PRSB location. (98-R03-004) (S. Acree(RSKERC)580-436-8609)

Technical Assistance to Region VIII: In a continuing technical assistance effort at the Petrochem/Ekotek Superfund Site in Salt Lake City, UT, Steven Acree (RSKERC) provided RPM Russell Leclerc with review comments on a ground-water tracer study at the site. The February 28, 2000, comments suggested that, in general, the study provided information concerning ground-water flow directions, flow rates, and the magnitude of field-scale dispersion. However, the report attempted to draw other conclusions, such as vertical water movement, which were beyond the scope of the results. Issues discussed in detail were the vertical movement of ground water and its seasonal variation, and monitoring the effectiveness of natural attenuation processes. (93-R08-003) (S. Acree(RSKERC)580-436-8609)

Technical Assistance to Region IX: On February 29, 2000, Steven Acree (RSKERC) attended a meeting at the Nevada Department of Environmental Protection to discuss the status of improvements to the hydraulic extraction system and effectiveness monitoring at the Sparks Solvent/Fuel Site in Sparks, NV. Also attending the meeting were representatives of the State of Nevada, Washoe County District Health Department, and responsible parties. Proposed modifications include additional monitoring points at critical locations, and an improved analysis of hydraulic gradients and contaminant concentration trends. (94-R09-001) (S. Acree(RSKERC)580-436-8609)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Shen, Ying (National Research Council), and Candida West and Stephen R. Hutchins (RSKERC). "In Vitro Cytotoxicity of Aromatic Aerobic Biotransformation Products in Bluegill Sunfish BF-2 Cells." *Ecotoxicology and Environmental Safety* (45). 2000.

(S. Hutchins(RSKERC)580-436-8563)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of March 13, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: On March 2, 2000, Steven Acree and Drs. Eva Davis and Scott Huling (RSKERC) provided RPM Mike Nalipinski with review comments on four proposals for the mitigation of residual DNAPLs in fractured rock at Loring Air Force Base in Aroostock County, ME. The proposals involved pilot testing of steam injection technology and in situ chemical oxidation. It was suggested that, although both technologies offer the potential for the reduction of contaminant mass, the potential for uncontrolled migration in fractured rock is higher than in a porous media environment.

(98-R01-005)

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

Technical Assistance to Region IV: The Southern Solvents Inc. Site, in Tampa, FL, is a 100 ft by 185 ft parcel that was previously operated as a dry cleaning solvent storage and distribution center. On March 8, 2000, Dr. Scott Huling (RSKERC), and Dr. Bruce Pivetz and Rick Stransky (ManTech) provided RPM Kevin Misenheimer with review comments on a remedial design work plan for the site. In general, the overall conceptual and technical approaches of remedial activities were unclear. Detailed discussions were offered in a number of areas including treatability studies, aquifer characterizations, potential alternatives for treating more highly contaminated portions of the aquifer, and details of a monitoring system to assure that a rebound of contaminant concentrations does not occur.

(00-R04-005)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Blowes, D.W. (Univ. of Waterloo), R.W. Puls (RSKERC), and R.W. Gillham, C.J. Ptacek, T.A. Bennett, S.F. O'Hannesin, C.J. Hanton-Fong, and J.G. Bain (Univ. of Waterloo). "An In Situ Permeable Reactive Barrier for the Treatment of Hexavalent Chromium and Trichloroethylene in Ground Water: Volume 1 Design and Installation." EPA Report. EPA/600/R-99/095a.

(R. Puls(RSKERC)580-436-8543)

Blowes, D.W. (Univ. of Waterloo), R.W. Puls (RSKERC), R.W. Gillham, C.J. Ptacek, T.A. Bennett, J.G. Bain, C.J. Hanton-Fong (Univ. of Waterloo), and C.J. Paul (RSKERC). "An In Situ Permeable Reactive Barrier for the Treatment of Hexavalent Chromium and Trichloroethylene in Ground Water: Volume 2 Performance Monitoring." EPA Report. EPA/600/R-99/095b.

(R. Puls(RSKERC)580-436-8543)

Blowes, D.W. and K.U. Mayer (Univ. of Waterloo). "An In Situ Permeable Reactive Barrier for the Treatment of Hexavalent Chromium and Trichloroethylene in Ground Water: Volume 3 Multicomponent Reactive Transport Modeling." EPA Report. EPA/600/R-99/095c.

(R. Puls(RSKERC)580-436-8543)



HIGHLIGHTS

**National Risk Management Research Laboratory
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Status Report for the Week of March 27, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: On March 16, 2000, Dr. Ann Azadpour-Keeley (RSKERC) provided RPM Jennifer Chan with comments concerning an evaluation of the potential cosolvency effects between chlorinated solvents and coal tar constituents at the Dover Gas Light Site in Dover, DE. It was suggested that the presence of high concentrations of cosolvents may contribute to enhance dissolved concentrations of the tar and oil constituents and result in an increased mobilization of the dissolved compounds in the vicinity of the source. However, the cosolvency effects at downgradient wells may not be a likely scenario since the concentrations of chlorinated solvents are reducing while there is a significant increase in the concentration of coal tar constituents.

(99-R03-003)

(A. Azadpour-Keeley(RSKERC)580-436-8890)

Technical Assistance to Region III: On March 15, 2000, Region 3 requested technical assistance with respect to cost estimates of a pump-and-treat ground-water remediation system at the Dover Gas Light Superfund Site in Dover, DE. On March 21, 2000, Dr. Ann Azadpour-Keeley (RSKERC) informed RPM Jennifer Chan that RSKERC's area of expertise was in contaminant transport and transformation in ground-water and that she had made arrangements with Mr. David Reisman at the NRMRL Laboratory in Cincinnati, OH, to respond to her request because of their engineering capabilities.

(99-R03-003)

(A. Azadpour-Keeley(RSKERC)580-436-8890)

Technical Assistance to Region IX: In a continuing technical assistance effort at the Del Monte Superfund Site in Kunia, HI, Dr. Scott Huling (RSKERC) and Dr. Bruce Pivetz (ManTech) provided RPM Janet Rosati with review comments concerning the summary of a phytoremediation treatability study. The March 22, 2000, comments said that it appeared that soil in the treatment units is effectively responsible for removing contaminants from ground water which had been applied to the treatment systems. However, based on the lack of data in the report, it is unclear precisely what role phytoremediation had on contaminant loss. Specific comments were offered with respect to bench-scale and pilot-scale systems, air monitoring sampling results, and microbiological sampling.

(98-R09-001)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Bakker, Mark (Univ. of Minn.), Stephen R. Kraemer (RSKERC), Willem J. de Lange (Netherlands), and Otto D.L. Strack (Univ. of Minn.). "Analytic Element Modeling of Coastal Aquifers." EPA Report. EPA/600/R-99/110.

(S. Schmelling(RSKERC)580-436-8540)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of April 10, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: On April 4, 2000, Dr. Ann Azadpour-Keeley (RSKERC) and Dr. Hai Shen (Dynamac) provided RPM Carolyn Pina-Springer with a technical review of a document discussing natural attenuation at the Barkhamsted New Hartford Landfill in Barkhamsted, CT. Although some geochemical indicators suggest that natural attenuation processes might be taking place, these are not supported by monitoring data for contaminant reduction. It was pointed out that decisions to employ natural attenuation as a remedy or as a remedy component should be thoroughly and adequately supported with site-specific characterization data and analysis, and that a contingency plan should be developed in case MNA does not meet expectations. The possible use of a tracer study was discussed as well as the design of a monitoring plan that would result in statistically credible data.

(99-R01-003)

(A. Azadpour-Keeley(RSKERC)580-436-8890)

Technical Assistance to Region III: On April 3, 2000, Dr. Scott Huling (RSKERC) provided Senior Geologist Bruce Rundell with review comments of a document entitled "Technical Memorandum to the In-Situ Chemical Oxidation Treatability Study" which was prepared for the Berks Sand Pit Site in Longswamp Township, PA. In addition to general recommendations for the preparation of bench-, pilot-, and field-scale work plans, specific comments were offered with respect to test facilities and equipment, sampling, and laboratory analysis.

(00-R03-001)

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

Technical Assistance to Region IV: On March 29, 2000, Dr. Ann Azadpour-Keeley (RSKERC) provided Geologist Doug Yeskis with comments concerning a "Region 5 Framework for Monitored Natural Attenuation Decisions for Ground Water." It was pointed out that the authors of the document should be complemented for their valuable contribution to RPMs and others associated with the various approaches for the remediation of ground water. Some suggestions were offered with respect to the disciplines required to deal with natural attenuation processes, required frequency and duration of sampling, rate of biodegradation, and the relative contributions of total organic carbon and dissolved organic carbon.

(Misc.)

(A. Azadpour-Keeley(RSKERC)580-436-8890)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Huling, Scott G. (RSKERC), Robert G. Arnold (Univ. of AZ), Patrick K. Jones (RSKERC), and Raymond A. Sierka (Univ. of AZ). "Predicting Fenton-Driven Degradation Using Contaminant Analog." *Journal of Environmental Engineering*. April, 2000.

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



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of April 17, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region IV: In a continuing technical assistance effort at the GE/Shepherd Farm NPL Site in East Flat Rock, NC, Dr. Scott Huling (RSKERC) and Dr. Bruce Pivetz (ManTech) provided RPM Giezelle Bennett with comments concerning the final remedial design work plan for ground-water remediation at the site. The April 3, 2000, comments pointed out that, although many previous suggestions had been addressed and the document had been improved, there are still some areas of disagreement in that some suggestions have not been addressed and other issues will require careful attention and monitoring as the remedial action is implemented. General areas of concern include the treatment of metals in extracted ground water and head monitoring in wetlands. Specific areas of discussion included the QA/QC program, disposal of treated ground water, ROD-specific remediation goals, and ground-water modeling. (97-R04-001) (S. Huling(RSKERC)580-436-8610)

Technical Assistance to Region IV: Site characterization activities are being conducted at the Ashepoo Phosphate/Fertilizer Works Site in Charleston, SC, to evaluate the feasibility of installing a permeable reactive barrier (PRB) for the treatment of arsenic and lead in ground water. Direct push ground-water sampling and continuous split spoon sampling were conducted to determine the vertical and lateral distribution of contaminants as well as the vertical lithologic profile. Efforts were made to identify a layer of lower hydraulic conductivity into which the PRB could be keyed. On April 5, 2000, Dr. Ralph Ludwig (RSKERC) visited the site to ensure that appropriate data were being collected and appropriate means of data collection were being utilized. (99-R04-001) (R. Ludwig(RSKERC)580-436-8603)

Technical Assistance to Region IX: On March 28, 2000, Steven Acree (RSKERC) attended a meeting in Santa Ana, CA, to assist in the evaluation of LNAPL remediation alternatives at the Del Amo Superfund Site in Torrance, CA. The meeting focused on issues such as the interpretation of data available from a hydraulic extraction test, the potential benefits of partial LNAPL removal, and the applicability of removal technologies. Also attending the meeting were representatives from Region 9, State of California, and responsible parties. (94-R09-006) (S. Acree(RSKERC)580-436-8609)

Technical Assistance to Region IX: During April 3-7, 2000, Dr. David Jewett (RSKERC) presented a talk entitled "The Herman Pit and Its Influence on Water-Rock Interactions at the Sulphur Bank Mercury Mine Superfund Site, Clearlake, CA" at the NRMRL sponsored Mining-Impacted Pit Lakes Workshop in Reno, NV. During the meeting, he also discussed issues pertaining to activities at the site with representatives from Region 9, Corps of Engineers, and consultants. Following the workshop, Dr. Jewett attended a technical meeting in Sacramento, CA, to review a water quality work plan and to discuss issues related to soil/sediment and wetland investigations at the Sulphur Bank Site. (97-R09-006) (D. Jewett(RSKERC)580-436-8560)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Hantush, Mohamed M. (RSKERC), M. Rashidul Islam (ManTech), and Miguel A. Marino (UC Davis). "Models for Leaching Pesticides in Soils and Groundwater." Journal of Hydrology Amsterdam, The Netherlands. 227 (2000). (M. Hantush(RSKERC)580-436-8531)

Faulkner, B.R. (RSKERC) and J.C. Guitjens (Univ. of NV/Reno). "Field-Scale Observations of Arsenic and Boron in Soil Irrigated with Drainwater." Journal of Irrigation and Drainage Engineering. May/June 2000. (B. Faulkner(RSKERC)580-436-8530)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of May 01, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region II: In response to a March 3, 2000, request from RPM Joe Gowers, Dr. Ann Azadpour-Keeley (RSKERC) and Dr. Jin-Song Chen (Dynamac) commented on the remediation of lead and cadmium in ground water at the NL Industries Superfund Site in Pedricktown, NJ. The April 19, 2000, review comments focused on an evaluation of the potential of using stabilizing agents to enhance the natural attenuation of these inorganic compounds. It was suggested that further studies be conducted including site geochemical reactions involving lead and cadmium, and other inorganics such as arsenic which exist at the site, in a raised pH ground-water environment. Other comments concerned fate and transport modeling, pump-and-treat performance, and plume migration.

(98-R02-008)

(A. Azadpour-Keeley(RSKERC)580-436-8890)

Technical Assistance to Region III: In a continuing technical assistance effort at the Dover Gas Light Site in Dover, DE, Dr. Ann Azadpour-Keeley (RSKERC), and Rick Stransky and Dr. Bruce Pivitz (ManTech) provided RPM Jennifer Chan with an evaluation of a proposed Focused Feasibility Study (FFS). The April 21, 2000, comments discussed the problems associated with commingling coal tar and solvent plumes. In addition to commenting on the presence and significance of NAPLs in a pump-and-treat system, and providing detailed descriptions of remedial alternatives, it was suggested that the FFS should have an emphasis on site characterization to ensure that the solvent plume and coal tar plume are adequately addressed.

(99-R03-003)

(A. Azadpour-Keeley(RSKERC)580-436-8890)

Technical Assistance to Region IX: On April 14, 2000, Dr. David Jewett (RSKERC) provided RPM Ellen Manges with comments on a geological materials work plan for the Sulphur Bank Mercury Mine Superfund Site in Clearlake Oaks, CA. A major concern with the document was the lack of a concise description of how the investigation is going to be conducted. Although it included sufficient background information and site description, relatively little detail was provided on how the data were going to be obtained. Editorial comments were also suggested.

(97-R09-006)

(D. Jewett(RSKERC)580-436-8560)



HIGHLIGHTS

**National Risk Management Research Laboratory
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Status Report for the Week of May 8, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: On December 14, 1999, Steven Acree and Dr. Robert Puls (RSKERC) provided RPM Ron Davis with comments concerning the design of a permeable reactive subsurface barrier at the Arrowhead Plating Site in Montross, VA. On February 28, 2000, a critique of the PRP response to those comments was provided to the Region. In an additional communication dated April 26, 2000, it was pointed out that the revised work plan adequately addressed the earlier technical concerns.

(98-R03-004)

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

Technical Assistance to Region III: In a continuing technical assistance effort at the Lord Shope Landfill Site in Girard Township, PA, Dr. Mary Gonsoulin (RSKERC), and Drs. Daniel Pope and Hai Shen (Dynamac) provided RPM Dave Turner with review comments on an enhanced natural attenuation pilot test. Specifically, the comments focused on the adequacy of the proposed introduction of lactic acid, benzoic acid, and ammonium phosphate into the aquifer to assist in the dechlorination of vinyl chloride. Although the concept appears to be workable, apprehensions were expressed concerning the population of microorganisms, biofouling, and difficulty in determining the pathway taken by the injected fluids. It was suggested that the design of the pilot system should incorporate these issues to improve the chances of success.

(98-R03-010)

(M. Gonsoulin(RSKERC)580-436-8616)

Technical Assistance to Region IV: On May 1, 2000, Dr. Scott Huling (RSKERC), and Dr. Bruce Pivetz and Rick Stransky (ManTech) provided Environmental Scientist William O'Steen with review comments on a document entitled, "Evaluation of Monitored Natural Attenuation at the Potter's Pits Site, Sandy Creek, North Carolina." Although there is some evidence that natural attenuation processes, especially biodegradation, are occurring at the site, the available data and analysis of that data do not conclusively indicate that MNA will be effective in meeting remedial goals in a reasonable time frame. It was suggested that additional field work be carried out to better define site characteristics with respect to the contaminants and to collect appropriate MNA data. It was also suggested that a contingency remedy be considered if MNA fails to meet remedial goals.

(00-R04-007)

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



HIGHLIGHTS

**National Risk Management Research Laboratory
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Status Report for the Week of May 29, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: During May 15-17, 2000, Dr. David Jewett (RSKERC) and Dr. Elise Striz (ManTech) met with representatives of the Massachusetts Department of Environmental Protection (MADEP) and their contractor to discuss a conceptual model and the results of preliminary mathematical modeling at the Microwave Development Laboratory in Wellesley, MA. The presentation focused on concerns with the contractor's model, revisions to the site conceptual model, and alternative ground-water flow modeling scenarios developed by the SPRD Center for Subsurface Modeling Support (CSMoS). Following the meeting, a tour of the site was made along with visits to adjacent impacted land and well field.

(99-R01-002)

(D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region III: On May 9, 2000, Dr. Scott Huling (RSKERC) provided Senior Geologist Bruce Rundell with a review of a statement of work for an in-situ chemical oxidation treatability study at the Berks Sand Pit Site in Longswamp Township, PA. In general, it appeared that the statement of work was focused on Fenton oxidation rather than chemical oxidation. Consequently, vendors are unlikely to submit proposals regarding permanganate reactions. Since different forms of oxidation may also provide a viable means by which to remediate target contaminants at this site, it may be appropriate to revise the scope of the work to include other forms of oxidation.

(00-R03-001)

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

Technical Assistance to Region VI: On May 9, 2000, Dr. David Jewett (RSKERC) and Dr. Jerome Cruz (ManTech) provided Gene Keeper (Region 6 RCRA Enforcement Division) with comments concerning the "Environmental Data Evaluation Report: Refinery Surge Pond" at the CITGO Manufacturing Complex in Lake Charles, LA. In general, the report presented a comprehensive review of environmental data collected in the vicinity of the Surge Pond at the CITGO facility, however, the data sets themselves are inconsistent and contradictory. For example, water level measurements were collected at random intervals and water quality data are composed of a changing set of chemical parameters for a varying number of monitoring wells over an apparently random sampling interval. As a result, uncertainty in the data and data collection process undermines the reliability of the final interpretations. It was suggested that a consistent water level and water quality monitoring plan for both surface and ground water be carried out with a regular interval over a suitable time period.

(98RC06-001)

(D. Jewett(RSKERC)580-436-8560)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Chattopadhyay, Sandip (ManTech) and Samuel J. Traina (Ohio St. Univ.). "Sorptive Characteristics of Acridine-Surfactant-Phyllosilicate Systems." *Jour. of Colloid and Interface Science*. 225 (2000).

(S. Mravik(RSKERC)580-436-8553)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
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Status Report for the Week of June 5, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region VI: On May 31, 2000, Dr. Scott Huling (RSKERC), Dr. Bruce Pivetz and Rick Stransky (ManTech), and Dr. Kelly Hurt (Dynamac) provided RPM Ernest Franke with technical review comments on a number of documents concerning the Industrial Transformers/Sol Lynn Site in Houston, TX, including the supplemental RI/FS, amended work plan, and data evaluation report. Although the work plan appeared to include the required tasks and descriptions, detailed comments were offered in a number of areas including monitoring. The data evaluation provided a concise summary of the available information as well as interpretation and a discussion of data gaps. In addition to technical comments a number of editorial suggestions were also provided.

(99-R06-002)

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

Technical Assistance to Region IV: On May 18, 2000, Dr. Mary Gonsoulin (RSKERC) and Drs. Kelly Hurt and Daniel Pope (Dynamac) provided RPM Jon Bornholm with comments concerning monitored natural attenuation (MNA) at the Aberdeen Pesticides Superfund Dump Site in Aberdeen, NC. It was pointed out that the use of MNA for the restoration of contaminated ground water requires a high degree of site characterization including a 3-dimensional characterization of the contaminant plume as well as contaminant fate and transport processes. It was suggested that the current monitoring well network is sufficient to only partially provide this information. A list of seven steps was provided which should lead to data sufficient for: an initial assessment of the potential of MNA to contribute significantly to remedial activities; the determination of additional characterization needs; and, an initial design of the performance monitoring system if MNA is judged to have remediation potential at the site.

(99-R04-004)

(M. Gonsoulin(RSKERC)580-436-8616)

Technical Assistance to Region IX: On May 31, 2000, Dr. Eva Davis (RSKERC) provided RPM Travis Cain with comments concerning the use of aggressive thermal remediation technologies such as Six Phase Heating (SPH) to recover NAPLs from the subsurface at the Brown and Bryant Superfund Site in Arvin, CA. It was pointed out that SPH uses electrical current to heat the ground and vapor extraction to recover contaminants. The technology has been used successfully to remediate chlorinated solvents such as PCE and TCE from both above and below the water table. Steam injection may be capable of extracting all of the site contaminants more readily because they are recovered in the liquid, aqueous, and vapor phases; however, the viability of this technology is dependent upon the lithology of the site. A treatability study to determine the rate of volatilization of the contaminants would give greater confidence that remediation goals can be achieved cost effectively by SPH or another thermal technology.

(99-R09-003)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Ford, Robert G. (RSKERC), and Andreas C. Scheinost, Kirk G. Scheckel, and Donald L. Sparks (Univ. of DE). "The Link between Clay Mineral Weathering and the Stabilization of Ni Surface Precipitates." Environmental Science & Technology. Vol. 33, No.28, 1999.

(R. Ford(RSKERC)580-436-8872)

Peak, Derek (Univ. of DE), Robert G. Ford (RSKERC), and Donald L. Sparks (Univ. of DE). "An In Situ ATR-FTIR Investigation of Sulfate Bonding Mechanisms on Geothite." Journal of Colloid and Interface Science (218). 1999.

(R. Ford(RSKERC)580-436-8872)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of June 12, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: During a May 16, 2000, meeting RSKERC presented a conceptual model and a preliminary computer model for ground-water flow at the Microwave Development Laboratories Site in Needham, MA. The presentation, based on existing information, illustrated the impact of subsurface geology and ground-water/surface water interactions on ground-water flow patterns. On June 2, 2000, Dr. David Jewett (RSKERC), and Drs. Elise Striz and Jerome Cruz (ManTech) provided the Massachusetts Department of Environmental Protection (MADEP) with a list of tasks which are required to provide an accurate ground-water flow and solute transport model for the site. The work is being conducted by the SPRD's Center for Subsurface Modeling Support (CSMoS).

(99-R01-002)

(D. Jewett(RSKERC)580-436-8560)

Technical Assistance to Region II: On June 7, 2000, Dr. Mary Gonsoulin (RSKERC) provided RPM Lisa Wong with comments concerning potential remedial technologies, evaluation of evidence of natural attenuation, and scope of work for monitoring natural attenuation at the Solvent Savers Site in Lincklaen, NY. Several factors were suggested for determining whether monitored natural attenuation is an appropriate remedy for soil and ground water. In addition, the installation of transects was discussed as well as monitoring well sampling frequencies and the need for continuously updating water elevation maps.

(00-R02-001)

(M. Gonsoulin(RSKERC)580-436-8616)

Technical Assistance to OERR/ORIA: CSMoS is conducting an evaluation of vadose zone models to support the Office of Emergency and Remedial Response/Office of Radiation and Indoor Air Soils Screening Guidance (SSG) for Radionuclides. The first step in the work, which is being conducted by Dr. David Jewett (RSKERC) and Drs. Jin-Song Chen, Sam Lee, and Zhixun Lin (Dynamac), was a literature search focused on sites currently contaminated with radionuclides and sites slated for possible future radionuclide waste disposal activities. The search identified 21 potential sites which were reduced to four based on an assessment of available site characterization data. The Las Cruces Trench Site in Las Cruces, NM, was proposed as the best option for model testing due to extensive physical and chemical soil testing along with chloride, bromide, and tritium tracer tests. On June 5, 2000, a site-selection memorandum was submitted to OERR/ORIA for review and concurrence of the selection of the Las Cruces Site for model testing.

(Misc.)

(D. Jewett(RSKERC)580-436-8560)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Beck, Frank P. (RSKERC), Patrick J. Clark (NRMRL, Cincinnati), and Robert Puls (RSKERC). "Location and Characterization of Subsurface Anomalies Using a Soil Conductivity Probe." Ground Water Monitoring and Remediation. Vol. 20, No. 2. Spring 2000.

(F. Beck(RSKERC)580-436-8554)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of June 26, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: In a continuing technical assistance effort at the Dover Gas Light Site in Dover, DE, Dr. Ann Azadpour-Keeley (RSKERC), and Dr. Bruce Pivetz and Rick Stransky (ManTech) provided RPM Jennifer Chan with review comments on the “Analysis of Natural Attenuation Plan” for the site. It was the opinion of the reviewers that the plan is one of the better and more balanced presentations that have been received by RSKERC in terms of the evidence provided for moving forward with a NA study. The plan, with some modifications, describes a study that can be expected to identify whether or not MNA can be successful at meeting cleanup goals. Some questions remain in regard to how the ROD is interpreted and the relative importance of cleanup of the BTEX and PAHs versus the importance of cleaning up a commingling solvent plume.
(99-R03-003) (A. Azadpour-Keeley(RSKERC)580-436-8890)

Technical Assistance to Region IV: On June 13, 2000, Dr. Scott Huling (RSKERC), and Dr. Bruce Pivetz and Rick Stransky (ManTech) provided RPM Kevin Misenheimer with review comments concerning a draft bench-scale treatability study work plan for the Southern Solvents Site in Tampa, FL. In general, the work plan lacks sufficient detail regarding the rationale for the proposed methods and procedures. Detailed comments were provided with respect to the remedial design including sampling locations, slurry permanganate test, and soil oxidant demand test.
(00-R04-005) (S. Huling(RSKERC)580-436-8610)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Hantush, Mohamed M. (RSKERC) and Jerome Cruz (ManTech). “Hydrogeologic Foundations in Support of Ecosystem Restoration: Base-Flow Loadings of Nitrate in Mid-Atlantic Agricultural Watersheds.” EPA Report. EPA/600/R-99/104.

(M. Hantush(580-436-8531))



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
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Status Report for the Week of July 10, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: On June 28, 2000, Dr. Ann Azadpour-Keeley (RSKERC) and Rick Stransky (ManTech) participated in a conference call concerning the Dover Gas Light Site in Dover, DE. Also participating in the conference were RPM Jennifer Chan, Regional hydrologist, State of Delaware representatives, and PRPs. The discussion followed June 16, 2000, RSKERC review comments on a proposed natural attenuation plan for the site. Items discussed were necessary modifications to the plan to adequately characterize the commingling portion of a PCE plume with the plume of manufactured gas plant constituents, and the frequency of monitoring. Also discussed were the use of tracers to determine ground-water flow rates, and guidelines to determine if natural attenuation is a viable remedial alternative for this site.

(99-R03-003)

(A. Azadpour-Keeley(RSKERC)580-436-8890)

Technical Assistance to Region III: On June 28, 2000, Dr. Ralph Ludwig (RSKERC) provided Project Manager Hilary Livingston with review comments on the RCRA Facility Investigation Final Report for the OSRAM Sylvania Products Site in Wellsboro, PA. The primary concern is that a limited temporal and spatial database was used to make strong conclusions regarding the behavior of the contaminated ground-water plume. It was suggested that additional data be collected using direct push or equivalent technology so that the conclusions can be made more defensible. Detailed comments were offered in a number of areas including the calculation of vertical gradients, the collection of ORP data, and the need to evaluate the ground-water modeling study.

(00RC03-001)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Bedient, Philip B. and Anthony W. Holder (Rice Univ.), Carl G. Enfield (NRMRL, Cinn.), and A. Lynn Wood (RSKERC). "Enhanced Remediation Demonstration at Hill AFB." Chapter in ACS Publication entitled "Field Testing of Innovative Subsurface Remediation Technologies." 1998.

(L. Wood(RSKERC)580-436-8552)

Haitjema, H.M. (Indiana Univ.), V.A. Kelson (South FL Water Management Dist.), and K.H. Luther (Valparaiso Univ.). "Analytic Element Modeling of Ground-Water Flow and High Performance Computing." EPA Research Brief. EPA/600/S-00/001.

(S. Schmelling(RSKERC)580-436-8540)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of July 24, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region II: On July 12, 2000, Dr. Scott Huling (RSKERC) and Rick Stransky (ManTech) provided RPM John DeMurley with review comments concerning a draft feasibility study addendum for the Fort Dix Military Reservation in Wrightstown, NJ. The study briefly described the results of additional sampling at the site in support of a limited action remedial alternative for ground water. The purpose of the review was to assess the adequacy of the study to determine the potential effectiveness of monitored natural attenuation (MNA) for the remediation of ground water. Although the information contained in the study is an excellent starting point, it is too brief and generalized, and includes only limited information with respect to the evaluation of MNA. It was recommended that a more thorough evaluation be conducted which includes a cleanup time estimate and a demonstration that the plume is stable.

(99-R02-001)

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

Technical Assistance to Region IX: During July 8-16, 2000, Dr. Eva Davis (RSKERC) participated in a cone penetrometer/laser induced fluorescence (CPT/LIF) exploration being conducted from a barge at the McCormick and Baxter Superfund Site in Stockton, CA. A CPT/LIF exploration conducted at the site during 1999 showed that considerable creosote contamination existed along Old Mormon Slough which forms the northern boundary of the site. In order to proceed with an evaluation of thermal remediation technologies for the site, it was necessary to determine if nonaqueous phase creosote contamination also exists under the slough. In order to obtain this information, the Tulsa District Army Corps of Engineers Site Characterization and Analysis Penetration System (SCAPS) rig was operated from a barge on the slough. This was the first time that direct push site characterization technology was deployed over water, and it proved to be highly successful. Depths of the pushes into the sediments were up to 70 feet, allowing the investigation of zones where contamination was most likely to exist. Contamination was located with the LIF in several off shore locations, and its presence was confirmed with soil samples.

(93-R09-004)

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

Technical Assistance to Region IX: On July 18, 2000, Dominic DiGiulio (RSKERC) provided Superfund Technical Support Team Leader Harold Ball with an evaluation of a bioventing option at the Del Amo Superfund Site in Torrance, CA. The technologies of soil venting, soil vacuum extraction, and bioventing were discussed in detail along with the problems of using oxygen consumption to estimate biodegradation rates and the indicators required to demonstrate microbial activity. Also discussed were the long-term problems resulting from the majority of the contaminant mass being contained within waste pits.

(00-R09-003)

(D. DiGiulio(RSKERC)580-436-8605)

MTBE WORKSHOP

During June 19-21, 2000, Drs. Randall Ross, Steve Schmelling, and John Wilson (RSKERC) participated in an ORD Scientist-to-Scientist MTBE Workshop at the Argonne National Laboratory in Chicago, IL. Dr. Ross gave a presentation on "State-of-the-Art Field Techniques for Site Characterization" and Dr. Wilson gave a presentation on the "Rate and Extent of MTBE Degradation in Oxygenated Ground Water" and discussed "Policy/Regulatory/Technical Background Transformation."

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Harada, Morihiro (Meijo Univ., Japan), Mohamed M. Hantush (RSKERC), and Miguel A. Marino (Univ. of California, Davis). "Hydraulic Analysis on Stream-Aquifer Interaction by Storage Function Models." Groundwater Updates. Springer-Verlag Tokyo. January, 2000.

(M. Hantush(RSKERC)580-436-8531)

Huling, Scott G. (RSKERC), Robert G. Arnold (Univ. of AZ), and Dennis Fine (ManTech). "Contaminant Adsorption and Oxidation via Fenton Reaction." Journal of Environmental Engineering. July, 2000.

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



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
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Status Report for the Week of July 31, 2000**

COOPERATIVE RESEARCH

A Facilities and Land Use Agreement between EPA and a private company was entered into in September 1999 to allow the use of the RSKERC Mechanical Integrity Testing Facility to conduct research into the use of bentonite as a plugging agent for abandoned wells.

The research included evaluating the ability of bentonite plugs to resist high pressures and its long-term effectiveness in preventing fluid migration into and from plugged wells. The research was conducted in three phases using one of the existing research wells at the Mechanical Integrity Testing Facility as a receptor for the test vessel containing the bentonite plug.

In Phase I, a test vessel was designed, constructed, and installed in the well and tested to 500 psi with both water and air pressure. In Phase II, the long-term aspect of the effectiveness of bentonite as a plugging agent was addressed. A pressure of 1,000 psi was placed on the test vessel and monitored over a nine-month period. Phase III included a two-week test of the bentonite while exposed to 1,500 psi, destruction of the test vessel, and recovery of the bentonite to determine the water content, homogeneity, bond strength, and permeability.

The results of the tests during each phase of the project have shown that bentonite is very effective in containing pressures up to 1,500 psi while exposed to air, water, and brine. Because of the success of this research, a company received authority to plug 3,000 abandoned shallow wells in California. The company projects that the plugging process using bentonite will be much more effective for protecting the environment than conventional plugging measures and will save 30-70 percent of the cost of conventional plugging methods.

This is an excellent example of industry working with EPA at an existing research facility to develop state-of-the-art methods for protecting the environment using more cost effective technologies.

(J. Jones(RSKERC)580-436-8593)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of August 7, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region II: In a continuing technical assistance effort at the Liberty Industrial Finishing Superfund Site in Farmington, NY, Steven Acree (RSKERC) provided RPM Lorenzo Thantu with review comments concerning a compliance monitoring network and ground-water monitoring plan. In general, the July 28, 2000, comments pointed out that the proposed plan addressed many of the previous concerns regarding monitoring locations. It was suggested, however, that additional monitoring points be placed directly downgradient of the circulation cells to better determine the contaminant concentrations in ground water released from the cells. Suggestions were also offered with respect to the sampling frequency.

(98-R02-003)

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

Technical Assistance to Region II: On August 1, 2000, Dr. Scott Huling (RSKERC) provided RPM Mary Anne Rosa with a review of amendments to the design work plan at the Leaman Tank Lines Superfund Site in Bridgeport, NJ. The amendments resulted from June 13 and June 19, 2000, conference calls involving Region II, RSKERC, and consultants. Comments were made with regard to water and soil sampling procedures, capture of volatiles, and the difference in H₂O₂ requirements between laboratory and field investigations.

(00-R02-002)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

1. McCray, John E., Kenneth D. Bryan, R. Brent Cain, Gwynn R. Johnson, William J. Blanford, and Mark L. Brusseau (Univ. of AZ). "Field Test of Cyclodextrin for Enhanced In-Situ Flushing of Multiple-Component Immiscible Organic Liquid Contamination: Comparison to Water Flushing."
2. Gierke, John S., Christopher L. Wojcik, and Neil J. Hutzler (MI Tech. Univ.). "Field Test of Air Sparging Coupled with Soil Vapor Extraction."
3. Blanford, William J. (Univ. of AZ), E.J. Klingel (IEG Tech.), Gwynn R. Johnson and R. Brent Cain (Univ. of AZ), Carl Enfield (EPA Cin.), and Mark L. Brusseau (Univ. of AZ). "Performance Assessment of In-Well Aeration for the Remediation of an Aquifer Contaminated by a Multicomponent Liquid."
4. Knox, Robert C. (Univ. of OK), Bor Jier Shau (ManTech), and David A. Sabatini and Jeffrey H. Harwell (Univ. of OK). "Field Demonstration Studies of Surfactant-Enhanced Solubilization and Mobilization at Hill Air Force Base, Utah."

Book Chapters. ACS Symposium Series 725, Innovative Subsurface Remediation, Field Testing of Physical, Chemical, and Characterization Technologies, 1999. American Chemical Society, Washington, DC.

(L. Wood(RSKERC)580-436-8552)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of August 14, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: On August 4, 2000, Dr. Scott Huling (RSKERC) provided Senior Geologist Bruce Rundell with review comments concerning proposals for oxidation studies at the Berks Sand Pit Site in Longswamp Township, PA. At the current time ground water is being remediated by a standard pump-and-treat system. A treatability study suggested that the best option for enhancing the remedial time frames may be the injection of Fenton's Reagent. The work plan for bench and pilot scale studies, as well as the treatability study, were found to be general in scope and lacked details. It was recommended that they be revised to more accurately describe their specific objectives, how the studies can be used to make decisions, and to provide details on procedures used in the studies. A number of detailed comments and recommendations were offered with respect to both the bench and pilot scale studies and the treatability study.

(00-R03-001)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Ross, Randall R. (RSKERC) and Baxter E. Vieux (Univ. of OK). "A Probabilistic Method for Estimating Monitoring Point Density for Contaminant System Leak Detection." *Ground Water* 38(4). July-August, 2000.

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

Ludwig, Ralph (RSKERC), David Blowes (Univ. of Waterloo), and Keith Mountjoy and Rick McGregor (Conor Pacific Environ. Tech.). "Treatment of Heavy Metals Using an Organic Sulfate Reducing PRB." *Proceedings, The Second International Conference on Remediation of Chlorinated and Recalcitrant Compounds*. May 2000. Monterey, CA.

(J. Jones(RSKERC)580-436-8593)

Chattopadhyay, Sandip (ManTech) and Robert W. Puls (RSKERC). "Forces Dictating Interactions Between Viruses and Soil." *Chemosphere* 41(2000).

(R. Puls(RSKERC)580-436-8543)

Annable, M.D., P.S.C. Rao, R.K. Sillan, and Dongping Dai (Univ. of FL), and A.L. Wood and C.G. Enfield (RSKERC). "Evaluation of In Situ Cosolvent Flushing Dynamics Using a Network of Spatially Distributed Multilevel Samplers." *Water Resources Research* 34(9). September 1998.

(L. Wood(RSKERC)580-436-8552)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of August 28, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region IX: On August 23, 2000, Drs. Scott Huling and Randall Ross (RSKERC), and Dr. Bruce Pivetz (ManTech) provided RPM Janet Rosati with review comments on a summary phytoremediation treatability study at the Del Monte Superfund Site in Kunia, HA. Based on the results of the study, it appears that phytoremediation is an acceptable technology for the treatment of pesticides EDB, DBCP, and 1,2-DCP. Since the length of time the system was evaluated is much shorter than the length of time the system will be operated in the field, it was suggested that a backup technology, such as carbon adsorption, be considered. Other issues which were discussed included the effect of the treatment process on the underlying perched aquifer, steady-state sampling, field crop sampling, and plant metabolism studies.

(98-R09-001)

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

Technical Assistance to the Technology Innovation Office: On August 16, 2000, Dr. Scott Huling (RSKERC) provided Daniel Powell (TIO) with a review of a draft DNAPL training module. Overall, the proposed outline and reference material represent a good foundation upon which to base a training module which will help the reader develop an understanding of DNAPL fate and transport, and site characterization. Detailed comments were offered concerning the types of DNAPLs and their properties, basic concepts of their migration, DNAPL dissolution, non-invasive and invasive information gathering, and NAPL modeling.

(Misc.)

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

RESEARCH IN PROGRESS

The Bedrock Bioremediation Center (BBC) at the University of New Hampshire has been conducting research to improve an understanding of in-situ bioremediation in bedrock aquifers contaminated by organic chemicals. In the first year of the study the BBC evaluated the sources and extent of microbial contamination of bedrock core samples obtained from drilling, identified the microbial community responsible for the degradation of TCE and its daughter products, characterized the geology and hydrology of the test site, and developed laboratory microcosms that can be used to document in-situ biodegradation.

(M. Gonsoulin(RSKERC)580-436-8616)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of September 11, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: On September 6, 2000, Dr. Ralph Ludwig (RSKERC) provided RPM Bernice Pasquini review comments concerning the use of filtered ground-water data at the Buckingham County Landfill in VA. It was suggested that the use of 1 m cellulose acetate filters would be suitable for representing mobile-phase heavy metal concentrations in the aquifer. The opinion was based on a comparison of filtered and unfiltered sampling data. It was pointed out that the low dissolved iron content will not be an issue in terms of precipitation. It was recommended that one unfiltered sample be collected per each ten filtered samples to provide verification that they continue to yield similar results.

(00-R03-003)

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

Technical Assistance to Region IV: On September 7, 2000, Dr. Mary Gonsoulin (RSKERC) and Dr. Kelly Hurt (Dynamac) provided RPM Jon Bornholm with a critique of a report about the reduction of contaminants in ground water at the Aberdeen Pesticides Superfund Dump Site in Aberdeen, NC. In general, inadequate data were produced to demonstrate the effectiveness of source removal operations and to ensure that the lateral spacing and vertical screen locations of monitoring wells are appropriate for demonstrating decreasing contaminant trends. Discussed in detail were the statistical approach used in describing ground-water data and the effect of using different monitoring wells in developing statistical conclusions. Comments were also offered with respect to the sampling effort required to demonstrate that the contaminant flow path is consistent with the flow path assumed in the contaminant reduction calculations. It was concluded that degradation appears to be occurring but at a rate much lower than presented in the report.

(99-R04-004)

(M. Gonsoulin(RSKERC)580-436-8616)

Technical Assistance to the Navy: Dr. Randall Ross (RSKERC), and Drs. Kenny Banks and Kelly Hurt (Dynamac) provided Mark Kramm (Port Hueneme, CA) with comments on a draft report comparing the performance of direct-push wells versus drilled wells. In general, the approach should be adequate for accomplishing project goals. Issues discussed included possible interferences caused by the sampling order of well types, statistical methods used in analyzing the data, and sampling techniques.

(Misc.)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Weesner, Brent (ConsuTec, Inc.), Steve Acree (RSKERC), Todd McAlary (Beak International, Inc.), and Joseph J. Salvo (General Electric Corp.). "Design and Operation of a Horizontal Well, In Situ Bioremediation System." Symposium Paper. The First International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, CA, May 18-21, 1998.

(J. Jones(RSKERC)580-436-8593)

Lin, Zhixun (NRC) and Robert W. Puls (RSKERC). "Effect of Impurities Associated with Aluminosilicates on Arsenic Sorption and Oxidation." Hydrological Science & Technology Special Issue, 4th USA/CIS Joint Conference on Hydrology and Hydrogeology, San Francisco, CA, November 1999.

(C. Paul(RSKERC)580-436-8556)

Huling, Scott G. (RSKERC), Patrick K. Jones (ECU), Robert G. Arnold and Raymond A. Sierka (Univ. of AZ), and Dennis Fine (ManTech). "Contaminant Adsorption and Oxidation via Fenton Reaction." Journal of Environmental Engineering. July 2000.

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



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of September 25, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: On September 15, 2000, Steven Acree and Dr. Robert Puls (RSKERC) provided RPM Ron Davis with comments concerning a preliminary remedial design at the Arrowhead Plating Site in Montross, VA. Issues of concern were the location of a permeable reactive barrier (PRB) with respect to significant contaminant sources, PRB thickness, effectiveness of monitored natural attenuation (MNA), quality assurance monitoring, and the location of long-term monitoring wells.

(98-R03-004)

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

Technical Assistance to Region IV: In a continuing technical assistance effort at the Aberdeen Pesticide Superfund Dump Site in Aberdeen, NC, Dr. Mary Gonsoulin (RSKERC) and Dr. Kelly Hurt (Dynamac) provided RPM Jon Bornholm with comments on a two-year review report for the site. The September 11, 2000, comments stated that, in general, the data did not provide supporting evidence to conclude that natural attenuation is capable of protecting ground-water receptors. It was suggested, however, that significant source removal activities may decrease the concentration of contaminants to a level that is controllable by natural attenuation. It was further suggested that the plume be monitored for a longer period in order to determine the effect of source removal activities.

(99-R04-004)

(M. Gonsoulin(RSKERC)580-436-8616)

Technical Assistance to Region IX: On August 23, 2000, Drs. Scott Huling and Randall Ross (RSKERC), and Dr. Bruce Pivetz (ManTech) provided RPM Janet Rosati with comments on a summary phytoremediation treatability study for the Del Monte Superfund Site in Kunia, HA. Subsequently, a response to those comments was prepared by Del Monte. On September 14, 2000, a critique of that response was provided to Region IX. Issues discussed included loading rate nomenclature, bench-scale soil sampling, hydrogeological analysis of the perched ground water, plant metabolism study, and mass balance calculations.

(98-R09-001)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Boeckenhauer, Rachel K., Dennis D. Cox, Katherine B. Ensor, Philip B. Bedient, and Anthony W. Holder (Rice Univ.). "Statistical Estimation and Visualization of Ground-Water Contamination Data." EPA Report. EPA/600/R-00/034.

(M. Gonsoulin(RSKERC)580-436-8616)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of October 2, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region II: On September 25, 2000, Dr. Ann Azadpour-Keeley (RSKERC) and Dr. Kelly Hurt (Dynamac) provided RPM Rick Robinson with review comments on a work plan report concerning an accelerated biological treatment system for the Caldwell Trucking Company Superfund Site in Fairfield, NJ. The parties involved in the development of the plan were congratulated for the professional effort extended to ensure that the research yields beneficial results that can be accurately monitored. It was also noted that the plan recognized that controlling and removing source materials is the key to shortening the remedial time frame and minimizing costs associated with the site. Specific comments addressed the need for a pilot study, the injection of microbes to degrade TCE, location of injection and monitoring wells, and the injection of nutrients. (00-R02-003) (A. Azadpour-Keeley(RSKERC)580-436-8890)

Technical Assistance to Region IX: On September 14, 2000, Dr. David Jewett (RSKERC) attended a technical review meeting in Rancho Cordova, CA, to discuss the results of hydrogeological and geochemical investigations at the Sulphur Bank Mercury Mine Superfund Site in Clearlake Oaks, CA. Also discussed was the format for presenting the results to the public. Others attending the meeting included representatives from Region 9, NRMRL-Cincinnati, U.S. Army Corps of Engineers, and consultants. (97-R09-006) (D. Jewett(RSKERC)580-436-8650)

Technical Assistance to Region IX: In a continuing technical assistance effort at the Sulphur Bank Mercury Mine Superfund Site in Clearlake Oaks, CA, Dr. David Jewett (RSKERC) provided RPM Ellen Manges with comments concerning a rock sampling work plan. The September 26, 2000, review stated that questions expressed in a review of a previous draft had been addressed. The only major comment was relative to the number of samples to be collected. It was suggested that the number be sufficient to provide the statistical confidence needed for tolerable limits on errors. (97-R09-006) (D. Jewett(RSKERC)580-436-8560)

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Cho, Jong Soo, John T. Wilson, and Frank P. Beck (RSKERC). "Measuring Vertical Profiles of Hydraulic Conductivity with In Situ Direct-Push Methods." Journal of Environmental Engineering, Vol. 126, No. 8, August 2000.

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



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of October 9, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region IV: On September 27, 2000, Dr. Ralph Ludwig (RSKERC) attended a meeting in Charleston, SC, to participate in subsurface investigations concerning the installation of a permeable reactive barrier (PRB) at the Columbia Nitrogen Site. The site is a former phosphate fertilizer manufacturing facility which is extensively contaminated with arsenic and lead. The impacted ground water is discharging into a sensitive tidal marsh. Current plans are to install a PRB that will remove arsenic and lead from the ground water thereby avoiding further impacts to the tidal marsh. Subsurface investigations at the site are currently focusing on assessing the lithology at the proposed location of the PRB to determine the most appropriate design.

(00-R04-003)

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

Technical Assistance to Region IV: On September 28, 2000, Dr. Randall Ross (RSKERC) and Drs. Kenny Banks, Kelly Hurt, Jin-Song Chen, and Sam Lee (Dynamac) provided RPM Tim Woolheater with a technical review of a long-term monitoring program at the Cape Canaveral Air Station and Patrick Air Force Base in Cape Canaveral, FL. One of the major questions underlying the review was whether the available data sets were adequate or appropriate for statistical analysis. It was suggested that the frequency of ground-water sampling events has been erratic, inconsistent, and of insufficient duration to allow the application of appropriate statistical methods. In addition to a discussion on applicable statistical methods to determine when to terminate monitoring programs, case histories of post-remediation long-term monitoring at six sites were provided.

(00-R04-006)

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

Technical Assistance to Region IX: On October 2, 2000, Dr. Scott Huling (RSKERC), and Dr. Bruce Pivetz and Rick Stransky (ManTech) provided Region 9 with review comments on a chemical oxidation treatability studies work plan at the Hunters Point Shipyard in San Francisco, CA. There are several technical obstacles that may limit the feasibility of chemical oxidation and a carefully controlled site-specific study is required for their evaluation. It was suggested that bench-scale testing could provide the information to determine whether pilot-scale and field-scale testing has a reasonable chance of success. A number of detailed scientific comments were offered to assure that the appropriate methods and procedures were in place to acquire the scientific data to investigate the feasibility of the process.

(00-R09-004)

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

RESEARCH IN PROGRESS

Push probe technology is being developed for real-time assays for subsurface contamination of fuel hydrocarbons and chlorinated solvents. Down-hole probe sensors by Geoprobe Systems and Dakota Technologies have been tested at several spill sites on Offutt Air Force Base, NE. The Geoprobe sensor is a polymer membrane interfaced with an above ground gas chromatograph. The Dakota sensor operates as a laser induced fluorescence detector. Adjacent vertical profile cores were collected for total petroleum hydrocarbons (TPH) analyses which has become an acceptable regulatory benchmark used to measure petroleum product contamination. Initial measurements have demonstrated that the two sensors' response magnitude relates well with TPH. Further field and laboratory measurements are being made to quantify the sensors' response. The objective of the study is to develop and refine rapid, low cost assay technology for spill site characterization and remediation monitoring.

(D. Kampbell(RSKERC)580-436-8564)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of October 23, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region VII: In a continuing technical assistance effort at the General Motors Site in Sioux City, IA, Steven Acree (RSKERC) and Barbara Wilson (Dynamac) provided RPM Nancy J. Swyers with comments concerning a butane biostimulation pilot study work plan. The plan discussed the implementation of a field study using butane as a primary substrate for the cometabolism of 1,1,1-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethene, vinyl chloride, and *cis*-1,2-dichloroethene in ground water. In general, the proposed approach appeared to be well planned. It was suggested that the cometabolism of chlorinated solvents with butane should be feasible if adequate concentrations of butane and oxygen could be provided in the ground water. Some concerns were expressed about the anaerobic nature of the source area and the potential presence of NAPLs. It was pointed out that the addition of oxygen to a highly anaerobic zone could increase the potential for the precipitation of inorganic compounds that would reduce aquifer permeability or affect well performance. Detailed comments were offered with respect to the butane injection rate, the location of monitoring wells, and the parameters measured during the study.

(98-R07-002)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Blowes, David W., Carol J. Ptacek, Shawn G. Benner, Che W.T. McRae, and Timothy A. Bennett (Univ. of Waterloo), and Robert W. Puls (RSKERC). "Treatment of Inorganic Contaminants Using Permeable Reactive Barriers." *Journal of Contaminant Hydrology*, Vol. 45, Nos. 1-2. September, 2000.

(R. Puls(RSKERC)580-436-8543)

FY 2000 RSKERC ACTIVITIES

During FY00, there were 85 Superfund **Technical Assistance** activities at 46 sites and 8 RCRA activities at 5 sites. There were 18 Superfund and 2 RCRA requests for assistance entered into the Technical Support Center tracking system during FY99. Of these, 11 Superfund and 2 RCRA were at new locations. One Brownfield Site in Des Moines, IA, was added to the review system. Nine **Miscellaneous Technical Assistance** activities have been provided to the Office of Radiation and Indoor Air, Office of Science Policy, Office of Emergency and Remedial Response, US Navy, TIO, and Regions. These involved plume stability studies, permeable reactive barriers, biotic intrusion barriers, inorganic hydrogen cyanide, natural attenuation, vadose zone models, DNAPL training, and monitoring well construction. Three **Technology Transfer Activities** have been given on subjects including the natural attenuation of ground-water contamination and MTBE. The Center for Subsurface Modeling Support (**CSMoS**) has distributed about 13,161 models. In addition, about 700 technical assistance responses have been provided to telephone and E-Mail requests. The Subsurface Remediation Information Center (**SRIC**) has provided 6,614 RSKERC publications in response to 483 requests to all levels of government, private consultants, industry, educational institutions, and foreign countries. There were forty-nine **Publications** in scientific journals, and EPA Research reports, briefing documents, and issue papers.

(J. Jones(RSKERC)580-436-8593)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of October 30, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region III: In a continuing technical assistance effort at the Arrowhead Plating Site in Montross, VA, Steven Acree (RSKERC) and Dr. Kenneth Banks (Dynamac) provided RPM Ron Davis with review comments on a report of the evaluation of a ground-water flow divide and surface water quality. The October 20, 2000, comments expressed concerns with respect to the comparisons used to determine the lack of impact to surface water adjacent to the site. A brief observation of the data indicated that the results from the tolerance limit calculations for most of the constituents analyzed would exhibit substantially lower tolerance if background ground-water data were not used. Detailed suggestions were offered with respect to the statistical analysis of the data.
(98-R03-004) (S. Acree(RSKERC)580-436-8609)

Technical Assistance to Region VI: On October 20, 2000, Dr. Scott Huling (RSKERC), Dr. Bruce Pivetz and Rick Stransky (ManTech), and Dr. Kelly Hurt (Dynamac) provided RPM Ernest Franke with technical review comments on an RI/FS field sampling plan for the Industrial Transformer/Sol Lynn Superfund Site in Houston, TX. In general, the plan met many of the requirements outlined in previous meetings, phone conversations, and written comments. General comments were offered with respect to the content of the Field Sampling Plan while specific comments were provided in a number of areas including sampling procedures and required parameters, cone penetrometer testing, and monitoring well installation.
(99-R06-002) (S. Huling(RSKERC) 580-436-8610)

Technical Assistance to Region IX: On October 20, 2000, Steven Acree (RSKERC), and Drs. Elise Striz and Mingyu Wang (ManTech) provided Hydrologist Greg Lovato with review comments on a conceptual flow and transport model report at the Charnoch and Arcadia RCRA Sites in Santa Monica, CA. Overall, the report demonstrates a concerted effort to collect and evaluate all available data from the site to reduce uncertainty. Using the conceptual model, a numerical model was developed to simulate ground-water flow and perform pathline analyses. The MODFLOW and MODPATH models, which were selected to perform the simulations, are appropriate for this three-dimensional flow problem. Concerns regarding the simulation included water balance analysis, vertical discretization in the model, and the selection of steady state calibration data.
(97RC09-001) (S. Acree(RSKERC)580-436-8609)



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of November 13, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region V: On November 3, 2000, Dr. John Wilson (RSKERC), and Dr. Elise Striz and Jerome Cruz (ManTech) provided RPM Kyle Rogers with comments on the prospects for the natural attenuation of chlorinated solvents and aromatic petroleum hydrocarbons in ground water at the Thermo Chem Site in Muskegon, MI. The evaluation was based on: (1) sampling and analysis of ground water by RSKERC through an agreement with the PRP, (2) data in the RI/FS, and (3) a ground-water flow modeling report prepared by the RSKERC Center for Subsurface Modeling Support (CSMoS). It was concluded that the plume of contamination in the floodplain was confined by a combination of natural biological degradation and the transfer of contaminants to surface water bodies. It was also stated that if the pump-and-treat system successfully prevents the transfer of contaminants into the floodplain, the combination of natural flushing and natural biodegradation will reduce the concentrations of contaminants below MCLs. It was estimated that the time required to restore the ground water is six years from the inception of pump-and-treat.

(98-R05-003)

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

Technical Assistance to Region IX: On October 2, 2000, the TSC provided Region IX with technical review comments on a draft chemical oxidation treatability studies work plan for the Hunter's Point Naval Shipyard in San Francisco, CA. On November 7, 2000, Dr. Scott Huling (RSKERC), and Dr. Bruce Pivetz and Rick Stransky (ManTech) commented on a U.S. Navy/IT Corp. response to that review as well as the "Final Chemical Oxidation Treatability Studies Work Plan" for the site. As discussed in previous correspondence, it was pointed out that the optimal concentrations of Fe(II) and H₂O₂ determined from laboratory batch reactor tests will have little correlation with concentrations applied in the field. Other discussions included the usefulness of microbial enumerations, geochemical characteristics affecting chemical oxidation, and proposed field monitoring parameters for the Fenton system.

(00-R09-004)

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

Technical Assistance to the Office of International Activities: Between June and August 2000, 378 people in the Pervomaisk region of southern Ukraine became ill. Two primary symptoms of the illness were a rash and central nervous system toxicity which included headache, fatigue, and weakness. At the request of the Ukrainian government through the U.S. Department of State, a team from EPA and the Centers for Disease Control and Prevention was assembled to aid in an investigation. Stephen Acree (RSKERC) served as a hydrologist on this team along with a physician, epidemiologist, expert in laboratory technology, and an expert in environmental monitoring. The objectives of the team were to evaluate data and site conditions to determine the steps and additional studies needed to identify potential causes of the outbreak and address the problem. The team traveled to the affected region September 16-24, 2000, with the support of the U.S. Agency for International Development. Concerning the cause of the outbreak, the available evidence is most consistent with exposure to undetermined chemicals and the most likely exposure pathway appeared to be the inhalation of airborne toxins. A number of recommendations were provided to define the cause of the outbreak, identify any reoccurrence, and reduce the threat of future outbreaks.

(Misc.)

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



HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of November 20, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region IV: On November 2, 2000, Steven Acree (RSKERC) and Dr. Daniel Pope (Dynamac) provided RPM Galo Jackson with technical review comments on a natural attenuation evaluation report for the Sydney Mine NPL Site in Brandon, FL. It was suggested that significant enhancements to the existing monitoring system must be made to effectively evaluate plume migration and contaminant reduction if monitored natural attenuation is selected as a component of an amended ROD remedy. The history of plume development is not well known, so the effects of natural attenuation, changes in the source term, and hydrologic variations are difficult to separate. As a result of these confounding effects, it will be necessary to increase monitoring to reduce uncertainty in long-term evaluations.

(96-R04-003)

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

Technical Assistance to Region IX: Following an October 24, 2000, site visit at the Del Monte (Oahu Plantation) Superfund Site in Kunia, HI, Drs. Scott Huling and Randall Ross (RSKERC), and Dr. Bruce Pivetz (ManTech) provided RPM Janet Rosati with comments regarding a phytoremediation treatability study at the site. Issues discussed in detail were contaminant volatilization and transpiration, the operation of land treatment units, and the difficulties involved in attempting a mass balance using Br and Cl data. The use of hydrolysis at a high pH to treat soil contaminated with endosulfan was also discussed.

(98-R09-001)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

Ford, Robert G. (RSKERC) and Donald L. Sparks (Univ. of DE). "The Nature of Zn Precipitates Formed in the Presence of Pyrophyllite." *Environmental Science & Technology*, Vol. 34, No. 12, 2000.

(R. Ford(RSKERC)580-436-8872)

Scheckel, Kirk G. and Andreas C. Scheinost (Univ. of DE), Robert G. Ford (RSKERC), and Donald L Sparks (Univ. of DE). "Stability of Layered Ni Hydroxide Surface Precipitates - A Dissolution Kinetics Study." *Geochimica et Cosmochimica Acta*, Vol. 64, No. 16, 2000.

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HIGHLIGHTS

**National Risk Management Research Laboratory
Subsurface Protection & Remediation Division
Robert S. Kerr Environmental Research Center
Status Report for the Week of December 11, 2000**

TECHNICAL ASSISTANCE

Technical Assistance to Region I: On December 6, 2000, in response to a request from RPM Mike Nalipinski, Steven Acree (RSKERC) coordinated the review of proposals received in response to a September 6, 2000, Request for Proposals (RFP) from Loring Air Force Base located in Aroostock County in Northeastern Maine. Three proposals for pilot testing of thermal treatment technologies were reviewed by Dr. Eva Davis (RSKERC), and four proposals for in-situ chemical oxidation were reviewed by Dr. Scott G. Huling (RSKERC).

(00-R01-002)

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Technical Assistance to Region IX: On December 1, 2000, Dr. Scott Huling (RSKERC), and Dr. Bruce Pivetz and Rick Stransky (ManTech) provided RPM Janet Rosati with detailed comments resulting from the review of a number of reports from the Frontier Fertilizer Site in Davis, CA. Based on the review, a preliminary assessment regarding the presence of DNAPLs at the site was presented. Overall, the results were inconclusive whether DNAPLs were present. It appeared that a limited release of a pesticide DNAPL may have occurred, but a definite estimate of the volume and extent of contamination is not currently possible. Additional site characterization activities were recommended with a highly focused scope of investigation. It was also recommended that a detailed work plan for the additional site characterization efforts be prepared which incorporates the comments and recommendations provided in the review.

(01-R09-001)

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

SCIENTIFIC AND TECHNICAL PUBLICATIONS

DiGiulio, Dominic C. (RSKERC) and Varadhan Ravi (Johns Hopkins Univ.). "Steady-State Field-Scale Gas Permeability Estimation and Pore-Gas Velocity Calculation in a Domain Open to the Atmosphere." Remediation/Autumn 2000.

(D. DiGiulio(RSKERC)580-436-8605)

Kovacs, David (ManTech) and D.H. Kampbell (RSKERC). "Improved Method for the Storage of Ground Water Samples Containing Volatile Organic Analytes." Archives of Environmental Contamination and Toxicology. 36, 1999.

(R. Cosby(RSKERC)580-436-8512)

Liang, Liyuan, Nic Korte, and Baohua Gu (Oak Ridge Natl. Lab.), Robert Puls (RSKERC), and Charles Reeter (US Navy). "Geochemical and Microbial Reactions Affecting the Long-Term Performance of In-Situ 'Iron Barriers.'" Advances in Environmental Research 4, 2000.

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

Rifai, Hanadi S. (Univ. of Houston), Charles J. Newell (Groundwater Services, Inc.), James R. Gonzales (Brooks AFB), and John T. Wilson (RSKERC). "Modeling Natural Attenuation of Fuels with BIOPLUME III." Journal of Environmental Engineering, Vol. 126, Issue 5. May 2000.

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