Highlights

Highlights of the FALL 2007 Technical Support Project Meeting

Held at the EPA's National Exposure Research Laboratory (NERL) in Las Vegas, the fall meeting of the Technical Support Project (TSP) featured research summaries from EPA's Technical Support Centers, case studies, and other technical issues, such as fractured rock, mass flux, and technical impracticability waivers. In addition, the co-chairs of each of the TSP's technical forums–Federal Facilities, Engineering, and Ground Water–presented updates of past, present, and future forum activities. Forum members also visited the world's largest in-situ bioremediation system for the treatment of perchlorate on a half-day field trip.

This newsletter highlights these meeting activities. For more information on individual presentations, please visit the TSP's webpage at www.epa.gov/tio/tsp/meetings.htm to download the slide presentations. Or contact one of the regional forum representatives listed at the end of the newsletter.

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NERL-Environmental Sciences Division (ESD) Research Summaries

Geophysics to Monitor Remediation: Dale Werkema (ESD) summarized how changes in geoelectrical signals can be used to monitor both passive and active remedial processes, such as the natural attenuation of petroleum hydrocarbons and surfactant-enhanced aquifer remediation (SEAR) of chlorinated solvents. In addition, the biomineralization of iron sulfide by sulfate-reducing bacteria during remediation of uranium (+4) can be monitored through changes in induced polarization response.

Vacuum Distillation: An EPA Method that Expands the Number of Volatiles that Can Be Analyzed, Especially in Difficult Matrices: Michael Hiatt (ESD) described SW-846 Method 8261, which applies a vacuum to remove volatile organic compounds (VOCs) from the sample matrix prior to analysis by gas chromatography/mass spectrometry. It improves the sensitivity of VOC analysis and facilitates analysis of additional matrices, such as milk, oil, and fish tissue. The method is available in several regional laboratories.

Thermal Multispectral Detection of Industrial Chemicals: David Williams (Office of Research and Development-RTP) summarized ESD's research on various thermal and infrared remote sensors that can be used to identify and quantify contaminants in emissions from industrial facilities as well as contaminated soil and ground water. Dave described several successful applications of these sensors, including a project in which an airborne hyperspectral imager was used to detect fugitive emissions and map plumes of benzene and ethylene glycol phenol ether.

GIS and Logistics Regression for Predicting Nutrients and Pesticides in Streams: Ann Pitchford (ESD) discussed ESD's efforts to develop models for predicting the presence of nutrients and pesticides above threshold values in small streams in the Mid-Atlantic Coastal Plain. The study involved both random and targeted sampling at 175 watersheds. The predictive models

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On-the-Spot Awards

Congratulations to this year's recipients of the TSP On-the-Spot Award: Rich Muza (Region 9, Federal Facilities Forum), Marcia Knadle (Region 10, Ground Water Forum), and Hilary Thornton (Region 3 Engineering Forum). This annual award is presented to individuals in appreciation of their outstanding support to the forums.

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developed for these watersheds were successfully applied to predict nutrients and pesticides in all watersheds in the region. Land use was found to be a significant factor in most of the models.

Environmental Geophysics: Methods, Applications, and Case Studies: Dale Werkema (ESD) described the principles, QA/QC requirements, and best practices for a number of geophysical methods (electrical, magnetic, seismic, and gravimetric) and their potential application to environmental investigations, such as the development of the conceptual site model (e.g., delineating preferential flow, mapping the bedrock surface, identifying sources, etc.) and monitoring remediation.

Additional Technical Sessions

Research on the Fate, Transport, and Remediation of Chlorinated Solvents in Fractured Sedimentary Rocks at the Former Naval Air Warfare Center (NAWC), West Trenton, NJ: Claire Tiedeman (U.S. Geological Survey [USGS]) described ongoing work at the NAWC to (1) find flow and transport paths in the fractured rock beneath the site (using cross-hole flow logging, aquifer testing, tracer testing, etc.); (2) monitor contamination, geochemistry, and microbiology (by evaluating contaminant distribution in the primary porosity of the rock matrix and monitoring the spatial distribution of contaminants, electron donors, and microbial community); and (3) evaluating remediation effectiveness of pump and treat, monitored natural attenuation, and enhanced biodegradation.

Access to Fractured Rock Technical Support from the U.S. Geological Survey: Kathy Davies (Region 3) explained that tech transfer from USGS on the topic of fractured rock is available to both CERCLA and RCRA staff in the regions through an interagency agreement (IAG). To access this support, which comprises training and research updates, contact John Quander (Technology Innovation and Field Services Division) at quander.john@epa.gov with a scope of work and funding commitment. Site-specific support may be obtained through other IAGs with USGS. Responses typically are returned in about two months.

Technical Impracticability (TI) Waivers: Matt Charsky and Dave Bartenfelder (Office of Superfund Remediation and Technology Innovation [OSRTI]) explained the regulatory basis behind TI decisions noting that the primary considerations for TI under CERCLA and RCRA are engineering feasibility and reliability. There have been 77 TI decisions made through 2006, the majority addressing ground-water remediation. Dense nonaqueous phase liquid (DNAPL) and fractured bedrock sites are the most likely to receive TI waivers, although the presence of DNAPL or fractured bedrock alone is not justification for TI. Headquarters is currently revising the 1993 TI guidance.

Sensors: A New Way to Collect Data for Environmental Decision-Making: Elizabeth Conroy (Interstate Technology Research Council [ITRC], New Jersey Schools Development Authority) reported that ITRC has formed a workgroup to produce guidance on the use of physical and chemical sensors, devices that collect environmental data from water or soil in situ, without the need to collect a discrete sample. Sensors offer real-time data availability, lower cost, and the ability to evaluate trends. Elizabeth described several sensors and their potential applications and asked the Ground Water Forum for feedback on what sensors the proposed guidance might include.

Mass Flux Seminar: Lynn Wood and Michael Brooks (GWERD) provided a seminar on contaminant mass flux– the mass of contaminant moving across a unit area per unit time. The seminar covered the measurement of mass flux for remedial design and performance assessment, field measurement techniques, flux-based remedial design and assessment tools, and a case study that used a flux-based assessment of

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historical data to evaluate remedial alternatives for a TCE plume. Lynn and Michael are seeking sites to use in a new project that will use site-measured characteristics to predict plume response based on changes in DNAPL source zone architecture. Among the several site criteria, the sites should have a relatively shallow, unconsolidated aquifer, available DNAPL source characterization data over time, and no major past remedial efforts.

Case Studies

Full-Scale Treatment of a DNAPL Source Zone Through Injection of Food-Grade Vegetable Oil: Henning Larsen (Oregon Department of Environmental Quality) summarized the use of food-grade vegetable oil to treat TCE-contaminated ground water at a site in Oregon. The vegetable oil served as an electron donor substrate for the reductive dechlorination of the TCE. The TCE NAPL also partitioned into the oil, further enhancing reductive dechlorination and reducing the amount of NAPL available to dissolve into ground water.

TI So Far, Anniston Army Depot (ANAD), Anniston, AL: Kay Wischkaemper (Region 4) described the TI zone determination process for a TCE plume at ANAD, a site underlain by weathered, fractured bedrock that may serve as a migration pathway for contamination toward the town water supply and private wells. EPA provided the Army with a number of TI zone criteria and concurred with its subsequent TI demonstration. However, concerned that the Army's TI zone comprised an area 1.5 miles downgradient of the 5-ppb TCE plume to the town water supply, EPA proposed additional remedy components to be considered in the feasibility study and alternative remedial strategy.

TI Decisions: The Good, The Bad, and The Ugly: Herb Levine (Region 9) compared three case studies with varying degrees of data collected to support decisions of TI.

Reprise NAPL delineation with TarGOST® at a Manufactured Gas Plant: Steve Mangion (Region 1 Superfund Technical Liaison) described the use of TarGOST®–a real-time, direct-push mounted, laser-induced fluorescence method–to determine the extent of mobile coal tar NAPL at a Superfund site in Vermont. The weight of a sand cap was suspected of causing the coal tar to surface in nearby Lake Champlain. The TarGOST® approach enabled investigators to narrow down the contaminated area so that a TI waiver was not necessary.

Federal Facilities Forum Update

The highlight of the Federal Facilities Forum's (FFF) business sessions was an opportunity to discuss current and future activities and priorities with John Reeder, Director of the Federal Facilities Restoration and Reuse Office (FFRRO). John described recent FFRRO activities and provided Headquarters' perspectives on regional and state issues brought forward by the FFF. Members briefed him on their recent accomplishments and plans for future projects.

John also discussed OSWER's cross-program measures (and associated logistics for data gathering) and updated FFF members on OSWER's progress in meeting construction-completion goals. Other notable topics that were discussed include the listing of federal facilities on the National Priorities List; recent enforcement activities at federal facilities; enforcement coordination between the Federal Facilities Enforcement Office (FFEO) and regional management; the FFRRO staff leads for target issues or FFRRO organizational changes; and integration of Military Munitions Response Program (MMRP) elements into federal facility agreements and their associated impacts on construction completions.

FFF members also met with contractors from Idaho National Laboratory to review their comments and compile edits on the *Explosives at Contaminated Sites Issue Paper*.

The FFF currently is working on a number of products, including both an issue paper and a three-day training course focusing on methods for investigating explosives-contaminated ranges. The training course is being prepared in collaboration with FFRRO. The FFF also has established a subcomittee to identify common post-Record of Decision issues and develop proposals for their resolution. Other

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Office Directors Meet with TSP Forums

In a joint business session of the three forums, Norm Niedergang (Director, Technology Innovation and Field Services Division [TIFSD]) and John Reeder (Director FFRRO) expressed appreciation to the membership on their work in technical outreach, document development, and document review activities. Headquarters' expectations for the forums include continued progress in these activities as well as assisting Headquarters in their efforts to develop metrics for measuring progress in the cleanup programs, prepare TI case studies, and review new guidance.

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activities include participation on the Open Burn/Open Detonation Workgroup. FFF members recently commented on a draft FFRRO fact sheet on 1,2,3-trichloropropane, the last of a six-part series on emerging contaminants.

The FFF would like to increase coordination and collaboration with FFRRO, especially on policy and guidance issues. Similarly, FFF members expressed an interest in increasing coordination with the Federal Facilities Leadership Council.

The FFF's near-term goal is to continue to identify technical and policy issues of national significance. The FFF plans to offer training at the spring 2008 NARPM meeting. Potential sessions include courses in designing MMRP sampling plans and in-situ bioremediation, and a course designed to introduce new RPMs to the challenges and issues associated with cleaning up federal facilities.

Engineering Forum Update

Since the TSP meeting in fall 2006, the Engineering Forum (EF) has drafted or reviewed several documents that recently were published. The EF issue paper *In-Situ and Ex-Situ Biodegradation Technologies for Remediation of Contaminated Sites*, which focuses on bioremediation technologies for treating contaminated media at hazardous waste sites, was published in October 2006 and is available at http://www.epa.gov/nrmrl/pubs/625r06015/625r06015.htm.

The information paper *Standard Guide for Collecting Treatment Process Design Data at a Contaminated Site* was published as an ASTM document (D7294-06) and can be purchased on ASTM's website (www.astm.org). This guide lists the physical and chemical processes data needed to evaluate, select, and design treatment processes for remediation of contaminated sites.

The engineering bulletin *Management and Treatment of Water from Hard Rock Mines*, which presents the "state of the science" regarding management and treatment of hard-rock mines, was published in December 2006 and is available at http://www.epa.gov/nrmrl/pubs/625r06014/625r06014.htm.

In the coming year, the EF, together with EPA's Office of Research and Development, hopes to publish engineering bulletins on a wide range of topics, including ex-situ treatment of oxygenated hydrocarbons and perchlorate in ground water, technology alternatives for the remediation of soil and sediment contaminated with PCBs, vapor intrusion mitigation approaches, and evapotranspiration covers. An engineering bulletin focusing on in-situ thermal treatment is being drafted and should be ready for publication in early 2009.

The EF also is preparing a resource guide that will serve as a clearinghouse for online remediation technologies databases and other information sources (expected publication early 2008). Other potential activities include drafting a paper that will synthesize and summarize lessons learned about a specific remedial technology (such as in-situ chemical oxidation [ISCO]), developing standard operating procedures for documenting and reporting operation and maintenance activities at remedial sites, and preparing either a cost-estimating tool or heavy equipment "picture book" aimed at assisting RPMs with selecting and identifying commonly used material-handling equipment.

During the meeting, the EF decided to prioritize activities and products relating to green remediation. Both EF members and OSRTI view green remediation and sustainability as emerging topics of great

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Transitions at the Technical Support Centers

Dave Burden, Acting Branch Chief of the Applied Research and Technical Support Branch (ARTSB) of the Ground Water and Ecosystems Restoration Division (GWERD) in Ada, OK, announced that the GWERD is being reorganized. The reorganization, expected to be final by June 2008, will reduce the number of GWERD branches from four to three. The technicians, scientists, and engineers of the Ground Water Technical Support Center (GWTSC) will be assigned to other branches. Although technical support remains part of GWERD's mission, obtaining technical support may be more difficult due to decreased funding and staff, and the distribution of tech-support staff among branches.

Brian Schumacher (NERL/Environmental Science Division) explained that requests for assistance to Technical Support Center for Monitoring and Characterization in Las Vegas will now be handled through the center's new Director, Felicia Barnett. Felicia is also Region 4's Superfund and Technology Liaison (STL). Regional staff requiring assistance from the TSC should contact their regional STL or Felicia (barnett.felicia@epa.gov).

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importance. The EF will review several documents and tools relating to green remediation in the coming year, and members may participate in an advisory group that will assist in developing an online energy calculator. EF members also expressed interest in strengthening collaboration with the ITRC.

Having successfully organized sessions at the 2007 conference of NARPM on engineering design considerations for vapor intrusion mitigation and nanotechnology challenges and implications for Superfund, the EF is busy planning additional training for the 2008 conference. Among the topics being considered are a panel session on permeable reactive zones and a session focusing on green remediation technologies.

Ground Water Forum Update

This past year, the Ground Water Forum (GWF) celebrated its 20th year of providing technical expertise and exchanging information related to ground-water remediation issues at Superfund and RCRA sites throughout the country. In the past two decades, the GWF has published over 30 issue papers, actively participated in nearly a dozen different workgroups and workshops, and offered training at both Regional offices and annual NARPM meetings, including five courses at the 2007 NARPM meeting in Baltimore.

Currently, the GWF is developing products covering a wide range of technical issues, including the following:

- *A Systematic Approach for Evaluation of Capture Zones at Pump and Treat Systems;*
- *Understanding the Uncertainties Associated with Ground-Water Cleanup Timeframe Calculations;*
- *Measurement of Field Parameters in Ground-Water Sampling;*
- *Assessment and Delineation of DNAPL at Hazardous Waste Sites;*
- *Evaluating Ground-Water/Surface Water Transition Zones in Ecological Risk Assessments;*
- *Site Characterization for Monitored Natural Attenuation;*
- *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities;* and
- *Subsurface Characterization for Vapor Intrusion*.

GWF members reviewed eight documents in the past year, including *Treatment Technologies for 1,4-Dioxane: Fundamentals and Field Applications*; *A Cost Comparison Framework for Use in Optimizing Ground Water Pump and Treat Systems*; *Optimization Strategies for Long-Term Ground Water Remedies*; and *ASTM D6771: Standard Practice for Low-Flow Purging and Sampling of Wells and Devices used for Ground-Water Quality Investigations*.

In the coming year, the GWF hopes to complete an issue paper on *Site Characterization for Monitored Natural Attenuation* and a fact sheet on *5 Year Reviews for Ground Water Remedies*. The GWF plans to offer three training courses at the 2008 NARPM conference on the topics of capture zone analysis, interpreting non-detect data correctly, and well biofouling.

GWF members will continue to collaborate with Headquarters on a number of ground-water-related issues, including technical impracticability waivers and ground-water remediation progress stories. The GWF also will continue to advise the Research Advisory Workgroup's Land Research Coordination Team and provide input on groundwater related tools, proposals, and documents to the Regions and Headquarters. Finally, the GWF plans to advocate for the finalization of the unified guidance on statistical analysis of ground-water monitoring data at RCRA facilities.

2008 NARPM Conference

In 2008, the TSP will again participate in the annual conference of the National Association of Remedial Project Managers (NARPM). This will mark the fourth year that the TSP attends NARPM. As in the past, the three forums plan to organize and offer a number of training sessions at the conference.

If you are interested in participating in TSP sessions at the spring 2008 or other or other meetings, please contact one of your regional forum representatives!

New GWF Co-Chair

Congratulations to Kay Wischkaemper (Region 4) who was elected as the new co-chair of the GWF replacing outgoing co-chair Glenn Bruck (Region 9). Kay begins her 2-year term in January 2008.

Field Trip to Perchlorate Treatment Facility

Todd Croft with the Nevada Division of Environmental Protection led TSP members on a field trip to the American Pacific Corporation's (AMPAC) in-situ bioremediation (ISB) perchlorate treatment area in Henderson, NV. AMPAC, through a

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