

**FEDERAL REMEDIATION TECHNOLOGIES ROUNDTABLE MEETING**  
**Arlington, Virginia**  
**May 27, 1998**

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**WRAP-UP**

**FEDERAL REMEDIATION TECHNOLOGIES ROUNDTABLE MEETING**  
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**INTRODUCTION/OPENING REMARKS**

Walt Kovalick, U.S. EPA/TIO, welcomed the attendees and opened the meeting of the Federal Remediation Technologies Roundtable by reviewing the agenda for the day and announcing the upcoming publication of a new round of cost and performance case studies that will bring the total number of case studies published to around 120. Dr. Kovalick announced the availability of the Field Sampling and Analysis Technologies Matrix and Reference Guide and a NATO emerging technology report on treatment walls. The Matrix and Reference Guide are available through the Roundtable Internet homepage ([www.frtr.gov](http://www.frtr.gov)). He also announced the upcoming release of twelve more technology verification reports by the Consortium for Site Characterization Technology.

A complete list of participants is attached to this summary.

**MANAGEMENT MEETING**

*Cost and Performance Case Studies and Subgroup Activities*

John Kingscott, U.S. EPA/TIO, reiterated that the cost and performance case study series is on the brink of a great leap forward with this summer's publication of the next round of case studies. The Cost and Performance Subgroup is currently evaluating and revising the cost and performance data reporting guidelines issued in 1995. Planned revisions include expanding the scope of the guidelines by adding classes of technologies (including containment approaches) and demonstration-scale reporting guidelines. The keyword system and cost elements will be evaluated and revised, as well as the electronic distribution strategy.

Mr. Kingscott said the existing cost reporting format will be revised and made simpler, with an emphasis on soil and groundwater remediation and a more effective unit-cost framework. He added that an interagency group also is revising the work breakdown structure (WBS) used in the Army Corps of Engineer's Historical Cost Analysis System (HCAS). The Corps and the Subgroup will coordinate these revisions to ensure compatibility of the cost and performance data reporting guidelines and HCAS.

The Roundtable website, operated voluntarily by Johnnie Shockley of the Corps of Engineers, is the source for electronic distribution of the cost and performance data case studies. Mr. Kingscott said the Subgroup is looking into ways it can assist Ms. Shockley by making the Roundtable homepage more of a gateway with links to pages operated by the member-agencies.

Mr. Kingscott reviewed the number of case studies released. In 1995, 37 case studies were released, and in 1997, 17 were released. In 1998, 81 case studies are expected to be released, including 57 from EPA, for a total of 135. Stephan Warren noted that DOE is having a hard time finding project managers who are willing to put up the money to pay for cost and performance reports. He noted that requiring two signatures (one each from DOE and EPA) on the reports has hampered efforts to get them issued. Also, much of the reporting has been *ex post facto*, which can be very expensive, since the data reporting was not included as a deliverable in contractor work plans. When cost and performance data reporting is written into work plans, then the reports are sure to get done. Bob

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Furlong agreed, noting that the Air Force reports issued in 1995 were written after-the-fact and were much more expensive than their more recent reports, which were included in work plans. Mr. Warren said DOE spends \$50,000 to \$70,000 to document cost and performance data when it has to go back and retrieve information. Mr. Furlong said the reports should become a normal cost of doing business, with overhead-type accounting. When done this way, the Air Force expects to spend \$10,000 to \$15,000 per report. Mr. Kingscott reminded the members that strict adherence to the cost and performance reporting guidelines is not necessary, and that the agencies are free to adapt them.

Mr. Kingscott said the subgroup expects to release the next round of case studies in seven volumes. The case studies consist of one page of cost information and a two-page abstract. Mr. Warren suggested that the case studies be placed on the Roundtable home page individually. Mr. Kingscott said the subgroup will plan an outreach event for the fall of 1998, and identified some of the conferences which they may attend, including the Air and Waste Management Association (AWMA) conference (November 4-6), the SERDP symposium (December), and the Tri-Services Technology Workshop (August 18-20). [The Roundtable itself will be represented at the AWMA conference.]

In closing, Mr. Kingscott reviewed the subgroup's next steps:

- Comments on the revised cost and performance data reporting guidelines are due by June 12, the final draft will be distributed in mid-July, and final comments will be due in mid-August.
- Electronic and hard copies of case studies should be delivered to EPA by August 28 for publication by the end of September
- An advisory board for the Roundtable website will be formed by June 30, with development of a searchable case study database to be completed by mid-October, and revision of the structure of the home page to be ongoing.
- The subgroup will plan outreach activities for the fall.

***Joint Roundtable Site Characterization Training Course***

Johnnie Shockley of the Corps of Engineers, Omaha Department, reviewed the Roundtable Site Characterization subgroup effort to develop joint training on field techniques for site sampling, analysis, and monitoring. She said training is needed since there are not many qualified users in the contractor community. Agencies have reported problems procuring qualified field sampling and analytical services. The member-agencies have developed a number of tools and products that may form the basis of the training course, including a manual issued by DoD, the Air Force's work with Tufts University, the Field Sampling and Analysis Technologies Matrix and Reference Guide issued by the Navy and EPA, the SCAPS work done by the Army Environmental Center, other Army work on field measurement of explosives, and other papers on innovative site characterization technologies. In addition, some agencies have offered training on some instruments. Ms. Shockley said the subgroup plans to take the existing products and training courses and combine them into a single course. The joint training course should be ready for delivery in FY1999, provided that the subgroup received adequate funding and participation from the member-agencies. The audience for the course will be remedial project managers, site assessment managers, and field contractors and their overseers. Other potential audiences are operation and maintenance contractors. The course will be open to all. Ms. Shockley closed by asking each member-agency to identify a point of contact and other resources to be committed to course development.

***Future Focus of Federal Remediation Technology Roundtable***

Dr. Kovalick opened a discussion on the future of the Roundtable by asking the members “what does the Roundtable do and what should it do?” Among the Roundtable activities identified were:

- technical information exchange, especially since the advent of including theme-based technical sessions on Roundtable meeting agendas
- joint projects, including the cost and performance data case studies, the Roundtable publications, the screening guides, and the site characterization training
- policy discussions subjects such as on performance-based contracting and RCRA best management practices (BMP) guidance
- Commerce Business Daily announcement coordination

Scott Edwards said DoD is very satisfied with its participation in the Roundtable, especially since the services that do the actual cleanup work within DoD (Air Force, Army, Navy) have been active Roundtable members. Mr. Edwards said the Roundtable has been especially valuable for in providing links to the private sector. Bob Furlong said he likes the technical session approach and noted that the issues of unexploded ordnance (UXO) detection and remediation at closed ranges and other sites are on the rise for the services. Dennis Teefy, Army Environmental Center, added that the Roundtable is a source of valuable information on the work being done by other agencies. On behalf of the Navy, Brian Harrison added that while UXO is a hot issue, the Navy is also moving on to developing installation closeout protocols that focus on determining the optimal maintenance and operation (M&O) regime in light of the budgets the Navy can expect in the coming years. He added that the Navy strongly supports the deployment of field techniques as discussed previously.

Stephen Warren noted that DOE had inherited some UXO sites at old Army Air Corps ranges at their Idaho and Nevada test sites. Jeff Marqusee added that UXO sites also are owned by the Interior Department and other federal agencies. Mr. Edwards said DoD is developing a contracting strategy for UXO cleanup that addresses technical issues and added that it is the main priority of the services. Mr. Warren agreed that the meeting format of updates followed by a technical session is valuable. He suggested future meetings focus on long-term stewardship, natural attenuation (especially with regard to the regulations), and lessons learned. He added that the Roundtable should consider ways to get more site representatives (RPMs, etc.) To attend the meetings, since the Roundtable needs to do a better job of communicating the knowledge from the meetings out to the front lines of cleanups. The goal for the member-agencies remains to get the right information into the hands of the right people.

James Jenkins said the Army has been able to save more money through cost avoidance than by fine-tuning technical approaches to sites. Cost avoidance has been achieved through a process of getting regulators to understand that environmental cleanup requirements that seek to achieve pristine conditions (i.e., cleaned up to beyond their natural state of contamination) are neither realistic nor required by law. In this process, the Army and other agencies regulated by EPA need a strong scientific base for loosening standards. Mr. Jenkins suggested that the Roundtable should focus on what is required under the law and where cost savings can be wrung out through cost avoidance. Ken Skahn, EPA/OERR, said the Superfund program has a workgroup working on the issues identified by Mr. Jenkins, and added that the program also needs performance monitoring protocols for containment systems to keep them from being treated as a “walk away” remedy.

Dr. Marqusee said the UXO issue is predominantly a concern of DoD, but if other agencies have enough interest in the subject, then the Roundtable could pick it up. As a rule, the Roundtable should stick to concentrating issues that are shared by the member-agencies. Dr. Kovalick noted that TIO served as a broker between a brownfield site in Hennepin County, Minnesota, and UXO specialists in the Navy (the brownfield site included a police firing range that had UXO contamination). Dr. Marqusee said he believed the top priority of the Roundtable is expediting the use of new technologies by lowering barriers. Mr. Warren added that incremental improvements in technologies do not add up to the reduction of barriers. The successes are breakthrough technologies that shift the approach to a site, rather than gradually improving it. Dr. Marqusee added that guidance on how to make site decisions is needed. This guidance should address the issue: “how do I make a decision?” rather than “what is the decision I should make?”

Dr. Kovalick said that EPA and the Air Force are on the verge of issuing a protocol on monitored natural attenuation that should clear up a lot of unanswered questions about what EPA thinks of the approach and what it will accept. He agreed that technological breakthroughs, rather than incremental improvements, are more likely to get into the field. He added that, from a project manager’s point of view, cost savings of at least an order of magnitude are usually required to get an innovative technology into the field. Treatment walls were cited to illustrate the point.

#### ***Update on Site Remediation Technology InfoBase***

Naomie Smith, EPA/TIO, gave an update on the Roundtable’s InfoBase document, which is in the final stages of revision before production. She distributed copies to each member-agency and asked that any comments or revisions be submitted to her by June 15, 1998. The document will then be printed and also placed on the Roundtable homepage.

### **TECHNICAL SESSION: BIOREMEDIATION OF CHLORINATED SOLVENTS IN GROUNDWATER**

#### ***Ground-Water Remediation Technologies Analysis Center—Status of Technology Applications***

Steve Othstein and Diane Roote of the Ground-Water Remediation Technologies Analysis Center (GWRTAC) provided an overview of GWRTAC’s activities and an update on bioremediation applications for treating chlorinated solvents in groundwater. GWRTAC serves as a clearinghouse for information on innovative groundwater technologies by monitoring technology developments, compiling information of demonstration and other projects, analyzing trends, and distributing information. GWRTAC also issues technology reports. Their customer base includes site owners, technology users, regulators, the research and development community, and technology investors. The Center is funded through a cooperative agreement with TIO and is operated jointly by the University of Pittsburgh and Concurrent Technology Corporation, a non-profit. GWRTAC is in the final year of its cooperative agreement.

GWRTAC issues four types of technology reports, including peer-reviewed evaluation reports, overviews, status reports, and information guides to resources. GWRTAC has issued an evaluation report on phytoremediation and drafted an overview of *in situ* bioremediation. GWRTAC maintains a database of approximately 500 technology case studies, including about 50 on *in situ* bioremediation (including bioremediation of chlorinated solvents), 30 on phytoremediation, 20 on natural attenuation,

and 10 on air sparging. Specific *in situ* bioremediation approaches that have received attention include aerobic cometabolism, methane injection, anaerobic processes, and reductive dechlorination.

***U.S. Army Corps of Engineers—Gaseous Nutrient Injection for TCE Cometabolism at a Former Ammunition Depot***

Greg Wallace of the U.S. Army Corps of Engineers, Kansas City District, described a gas nutrient injection project for enhanced treatment of TCE at a former naval ammunition depot near Hastings, Nebraska. The site covers 48,000 acres and includes six square miles of groundwater plumes. The plumes had been treated initially using horizontal and vertical air sparging and soil vacuum extraction. Nutrients were injected to enhance TCE cometabolism because adequate air for sparging was not getting to the far end of the horizontal well. Project results show that TCE concentrations are dipping steadily if not dramatically, indicating evidence of nutrient delivery and bioremediation of TCE.

***SERDP and ESTCP—Investments in Bioremediation of Chlorinated VOCs***

Dr. Jeff Marqusee, U.S. DoD, briefed the Roundtable on the investments into bioremediation of chlorinated VOCs made by the Strategic Environmental Research and Development Program (SERDP) and the Environmental Security Technology Certification Program (ESTCP). SERDP, which funds research, has invested in three projects. The first is a bioenhanced in-well vapor stripping technique that involves dual well recirculation. Stripping occurs in the upflow phase; aerobic cometabolism occurs in the downflow phase. The technique will be tested in a cell at Dover Air Force Base and field tested later in the summer. The second project will gather information on value added by site monitoring at Wurtsmith Air Force Base. The third is the Federal Integrated Biotreatment Research program's Flask to Field project. SERDP has also been involved in the development of a solvent extraction residual biotreatment process being led by the EPA laboratory in Ada, Oklahoma, and an electrokinetic project that uses an anaerobic bioreactive wall for *in situ* reductive bioremediation.

ESTCP, which demonstrates technologies, has invested in three areas. The first is a treatability test for *in situ* anaerobic dechlorination scheduled to be tested at five sites. A test protocol has been issued; Roundtable member-agencies may feel free to use the protocol and report back on the feasibility of the test. The second will demonstrate co-metabolic air sparging using propane at McClellan Air Force Base. The third is an examination of the science underlying phytoremediation.

In conclusion, Dr. Marqusee said the bioremediation of groundwater is a high priority for DoD's research and demonstration programs. He invited the members to visit programs' web sites ([www.serdp.gov](http://www.serdp.gov) and [www.estcp.org](http://www.estcp.org)) and added that the programs will sponsor a technical symposium and workshop on December 1-3, 1998, in Arlington, Virginia.

***RTDF—Accelerated Anaerobic Biodegradation/Bioaugmentation of Chlorinated VOCs at Dover Air Force Base***

Ed Lutz of DuPont briefed the Roundtable on a pilot project to demonstrate accelerated anaerobic biodegradation and bioaugmentation of chlorinated VOCs. The project is underway at Dover Air Force Base and is sponsored by the Remedial Technology Development Forum (RTDF), a partnership of private and governmental entities interested in the development and deployment of remedial technologies. Natural attenuation at the site resulted in only partial dehalogenation and led to the

implementation of this project. For this project, a culture of organisms from the Pinellas site was injected at Dover. Lactate was used as a substrate that was later augmented. This led to rapid, complete destruction. The pilot was not demonstrated at a source, but concentrations of VOCs were high. The test took place in a 40'x60' cell with three extraction and three injection wells. A manifold system was used to mix the injectant. Dechlorination commenced 90 days after injection. Mr. Lutz noted that the pilot used control areas on the sides of the cell, and that dechlorination had moved into those areas somehow.

Mick Mikula, the project manager at Dover, discussed next steps after the pilot. He noted that in 1995, EPA took a chance by including this project in the ROD for Dover, and today the targeted area is dechlorinated. The pilot will continue to operate and be expanded to the entire plume. There are two possible sources that are combining into one large plume. RTDF will be involved in the expanded project design, to be completed this year with implementation next spring. The project will also try a "homegrown" culture upgradient to see if it works. Dr. Kovalick noted that the project design and results should be peer-reviewed and reported. In response to a question, Mr. Mikula said the source area concentration of contaminants is about 22 ppm. Bob Furlong noted the IRP fact sheet included in the meeting materials on a cometabolic study by Perry McCarty at Edwards Air Force Base.

#### ***ITRD—Anaerobic Bioremediation of Chlorinated Solvents at DOE/Pinellas***

Mike Hightower of the Sandia National Laboratory gave a presentation on the ITRD's anaerobic bioremediation project to cleanup chlorinated solvents at the Pinellas site in Florida. The project has reviewed 20 technologies that will accelerate pump-and-treat at the site, and performed a number of treatability studies. The project has issued cost and performance reports, following the Roundtable guidelines, for pervaporation, *in situ* steam stripping, and *in situ* anaerobic bioremediation. The latter project has focused on nutrient addition to enhance dechlorination. Mr. Hightower reviewed the results for anaerobic bioremediation: nutrients were delivered to 80-100% of the monitoring points; lower concentrations dechlorinated more slowly; and there was up to 95% reduction within two months. Cost data was generated using the Corps' work breakdown structure. Final cost was about \$300,000.

Mr. Hightower made some final observations about the project:

- column studies are valuable for system design, followed by scale-up
- dechlorination did not stop at any point
- the process is more robust than expected
- delivery of nutrients is the key
- flow meter testing is important for system design
- underground injection control (UIC) regulations, which apply case-by-case in most states, may limit future application of the technology

#### **WRAP-UP**

Dr. Kovalick thanked everyone for attending and closed the meeting by suggesting that the next meeting be held around November 18 or December 9.

The meeting adjourned.

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FEDERAL REMEDIATION TECHNOLOGIES ROUNDTABLE  
May 27, 1998**

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