FEDERAL REMEDIATION TECHNOLOGIES ROUNDTABLE MEETING
Arlington, Virginia
December 9, 1998

TABLE OF CONTENTS

FEDERAL REMEDIATION TECHNOLOGIES ROUNDTABLE MEETING
Arlington, Virginia
December 9, 1998

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 noting the publication of several documents bearing the Roundtable's imprimatur, including the first editions of *Site Remediation Technology InfoBase: A Guide to Federal Programs, Information Resources, and Publications on Contaminated Site Cleanup Technologies* and *Field Sampling and Analysis Technologies Matrix and Reference Guide*. Dr. Kovalick noted also the upcoming meeting on ground water remediation technologies sponsored by the Ground Water Remediation Technology Analysis Center (GWRTAC). William Crawford, Army Corps of Engineers, mentioned that the Corps is planning to convene a workshop on operation and maintenance (O&M) at landfill sites.

A list of attendees is attached to this summary.

MANAGEMENT ISSUES

Update on Roundtable Operations

Dr. Kovalick noted an EPA flyer (included in the meeting materials) on protecting against system failures related to the Year 2000 (Y2K) bug. He stressed that problems may extend beyond personal computers and other servers to analytical operations and other site clean up functions, such as pump-and-treat systems and monitors. The member agencies should have Y2K plans in place or in the works.

Dr. Kovalick reviewed the financial contributions of the member agencies to joint Roundtable projects for the years 1996-1998. The projects include Roundtable operations and the development of search engines for use with the Roundtable's online products, both financed by the Air Force and EPA, and the Field Sampling and Analysis Technologies Matrix, financed by the Corps of Engineers, the Navy, and EPA. Dr. Kovalick asked that other member agencies find ways to contribute to Roundtable projects in the future.

ONGOING ROUNDTABLE PROJECTS

Follow Up on Cost and Performance Case Studies/Searchable Home Page

John Kingscott, EPA Technology Innovation Office, gave an update on the progress of the cost and performance data subgroup, including the development of an online searchable database of the cost and performance case studies and the revised guidelines for reporting cost and performance data. Several members of the subgroup attended a recent conference on compliance at federal facilities where they led a panel discussion and demonstrated the searchable database.

The revised cost and performance data reporting guidelines issued by the subgroup will recommend format changes for reporting cost data, including the use of a summary sheet for cost data. The format for reporting performance data remains unchanged. Mr. Kingscott noted that about 140 cost and performance case studies have been issued; most will require revision to conform with the new cost

reporting format. He added that the case studies include a significant number of pump-and-treat and incineration technologies. Dr. Kovalick noted that pump-and-treat systems are included to benchmark cost and performance data showing improvements achieved for traditional approaches for the benefit of engineering consultants and others.

The cost and performance subgroup still needs to appoint a website advisory group and continues to seek assistance and guidance from the member/agencies on how to present and distribute cost and performance data electronically over the Internet. So far, EPA is the only agency that has "signed up" to serve on the advisory group, which is to cover both content and technical procedures for the cost and performance website. Dr. Kovalick asked that each member/agency participate in the advisory group. Mr. Kingscott is the contact.

Scott Edwards (DoD) asked whether there was any indication that project managers and others were using Roundtable products such as the cost and performance case studies and whether the products were at least getting delivered to their intended audiences. He noted that commercial vendors have emerged that are selling case study systems that include re-packaged Roundtable case studies.

Mr. Edwards also asked for a breakdown of which agencies were contributing cost and performance data case studies. Of the 86 new studies, five came from the Air Force, three from the Navy, six from DOE, eleven from the Corps of Engineers, and the remainder from EPA. Johnnie Shockley added that she expects the number from the Corps to increase because regulators are now linking the reports to remedial action completion reports. Tom Anderson (DOE) added that the DOE Greenbook series of 60 or so project reports are based on the cost and performance reporting guidelines. DOE also has issued new guidelines on quantifying methodologies. Mike Goldstein (EPA) noted that the Superfund program has developed a guide on estimating costs for remedial projects.

Johnnie Shockley concluded by giving an online demonstration of the searchable cost and performance case study database. The database can be found on the Roundtable home page (www.frtr.gov).

Action Item:

- The Roundtable should collect and maintain contact information for federal remedial project managers and others such as technology advocates who should be receiving Roundtable products. Contact information is to include postal and electronic mail addresses.

Status Report on ESTCP Case Studies

Jeff Marqusee, DoD, updated the Roundtable on the status of case studies to be issued by the Environmental Security Technology Certification Program (ESTCP) in the Spring of 1999. He noted that ESTCP case studies cover full-scale demonstrations of new technologies rather than implementation of technologies as part of a remedy. For this reason, the studies skew some cost figures, especially operation and maintenance costs since the timeframes are shorter. The subjects of ESTCP case studies include characterization, monitoring, compliance, cleanup, pollution prevention, and unexploded ordnance (UXO) technologies. Ongoing cleanup technology demonstrations include techniques for DNAPL removal. A new ESTCP project will examine decades-scale performance of reactive walls.

Dr. Marqusee also updated the Roundtable on new research projects and other DoD activities. Several projects have been initiated by the Strategic Environmental Research and Development Program (SERDP), including basic research on the functions of reactive walls. DoD also held a workshop on environmentally acceptable endpoints (EAE's) for chlorinated organics, explosives, and metals. FY2000 projects will include work on bioavailability for stabilization of metals in soils and DNAPL source removal. Under the latter, SERDP will study enhanced source removal in a control cell at Dover Air Force Base, and ESTCP will participate in a surfactant-enhanced DNAPL removal project. Dr. Marqusee added that the State of Delaware received a special award for finding a way to permit a "release" in the test cells at Dover. At Dover, a release occurs only if contaminant is found outside the second pile wall.

Joint Site Characterization Training Course

Dan Powell, U.S. EPA TIO, said the training course on site characterization technologies under development by a number of Roundtable member-agencies will focus on project planning to take the highest advantage of new technologies. The course will combine training on technologies offered by the CERCLA Education Center with training on processes such as expedited site characterization, performance-based management, development of data quality objectives, and case study exercises.

The joint characterization training course is under review. Review of the course by the Roundtable site characterization subgroup will be sought, and the course will be subject to a pilot delivery in 1999. Mr. Powell sought support from the Roundtable member-agencies, including financial support, review of the course, and technical and logistical support, including course instructors.

OTHER BUSINESS

Work Breakdown Structure

Bob Furlong, U.S. Air Force/CEVR, spoke on behalf of the interagency Environmental Cost Engineering Committee. He gave a brief description of the Committee's structure and efforts and said one of his goals at this meeting was to gauge the Roundtable's interest in the Committee's work. The Committee is composed of engineers engaged in the development of perimetric cost engineering systems such as RACER, Tank RACER, and HCAS. The mission of the committee is to take the lead on improving engineering cost management practices by federal agencies. Mr. Furlong observed that these tools are more useful in some areas, such as decommissioning and decontamination, than others, such as unexploded ordnance. One area of particular interest is the development of hierarchical cost element structures that focus on project life cycle phases, including enhancement of the Corps of Engineers' work breakdown structure.

Mr. Furlong sought Roundtable endorsement and buy-in into the Committee's work such as publication of work breakdown structures. He noted that the Committee members represented several Roundtable agencies and the Committee's work products met the informal Roundtable standard of contributions from at least three Roundtable agencies. He acknowledged that most Roundtable products had their origins in Roundtable discussions, but this endorsement fit in with similar Roundtable standardization projects. Rob Smith, NAVFAC, agreed, noting that the Committee offers a backbone of cost definitions similar to other types of engineering standards.

Action Item:

- The Roundtable agreed to look into forming a subgroup on environmental cost engineering. A meeting will be convened on the subject, organized by the Environmental Cost Engineering Committee, and Roundtable interest will be gauged by the participation of member-agencies.

Optimization of Groundwater Monitoring Systems

Kathy Yager, EPA/TIO, described a conference planned for June 1999 on optimization of groundwater monitoring systems which will focus on innovative methods of improving long-term groundwater monitoring, long-term operation and maintenance of pump-and-treat, soil vapor extraction, and permeable reactive barrier systems. The conference will cover sampling, analysis, and data assessment, and data presentation in assessing and improving system performance. Conference proceedings will be issued as a state-of-the-practice document that will identify opportunities for cost savings, performance improvements, and future research topics. Conference planning has been shared by the Air Force, EPA, DOE, the Corps of Engineers, and the Navy. Funding has been provided by the Air Force and EPA. Ms. Yager identified additional funding needs (adding up to approximately $70,000) and asked the other Roundtable member-agencies to consider covering these areas.

Future Roundtable Agendas

Dr. Kovalick sought input from the attendees on technical subjects for future Roundtable meetings. Paul Beam, DOE, suggested putting performance measurements for environmental technology development on the agenda. A recent Government Accounting Office (GAO) report questioned DOE's policies and procedures for setting and meeting site cleanup goals. In particular, the report found that DOE does not use metrics or other performance measurements in accounting for its site projects and other budget items in its cleanup program to ensure that budget dollars are directed toward the most serious problems or where they can be used most effectively. The reports findings extend to a number of environmental technology development programs, including ESTCP and EPA's SITE program, which do not have performance measurements in place to ensure that budgets are used effectively.

Mr. Edwards agreed that the subject was important and suggested that DOE could take the lead and chair the meeting if performance measurements was placed on the agenda. Mr. Edwards added that groundwater monitoring is DoD's top priority. Marvin Unger (ThermoReTec) asked whether the members placed a priority on environmentally acceptable endpoints and risk-based regulatory schemes for cleanups. In response, it was agreed that while the subject is important, it is more closely associated with policy rather than technologies. Skip Chamberlain (DOE) suggested placing both performance measurements and groundwater monitoring on the agenda: the former as a business and management issue; the latter as a technical issue. One drawback would be the timing. The next Roundtable meeting will take place before the groundwater monitoring optimization conference. Another technical subject, such as innovations in containment systems and containment monitoring, may be substituted. A field trip to Dover Air Force Base to visit the test cell complex was also suggested.

TECHNICAL SESSION: DNAPL SOURCE TREATMENT

State of Florida—Co-Solvent Flushing for DNAPL Removal Using Partitioning Interwell Tracer Tests for DNAPL Detection

Kevin Warner, Levine Fricke Recon, gave a presentation on the use of co-solvent flushing to enhance DNAPL removal at a dry cleaner site in Florida. The project used ethanol as a co-solvent and partitioning interwell tracer (PIT) tests to detect DNAPL. Co-solvent flushing was used because it increases mass flux by several orders of magnitude. Pilot project objectives included enhanced dissolution, hydraulic containment, DNAPL treatment, cost savings, and regulatory acceptance. PIT tests were done before and after the co-solvent flushes using non-partitioning and partitioning tracers.

The pilot achieved enhanced dissolution and DNAPL recovery. Forty-one liters of DNAPL were recovered, with 10 to 20 liters left behind because the project ran out of ethanol, though re-use of the co-solvent is a practical solution. The treatment system employed (MPP) was effective, and hydraulic containment was achieved. The entire project, from mobilization through completion, took place in July and August 1998. Mr. Warner said they now plan to design a mobile injection/extraction system that re-uses recovered co-solvent.

NASA—Side by Side Comparison of Source Destruction or Removal Technologies

Jacqueline Quinn, NASA, described a side by side comparison test of three types of source destruction or removal technologies NASA underway at Pad 34 at Cape Canaveral. The three technologies categories were thermal (steam injection and electrical resistance), *in situ* chemical oxidation (permanganate and Fenton's reaction) and surfactant flushing. A pre-demonstration performance assessment using PIT tests is scheduled for February 1999. Construction and operation of the comparison test is scheduled to run from Spring 1999 to Spring 2000, with a post-demonstration performance assessment to be completed by the end of 2000. The project is directed by a core management team composed of NASA, the Air Force, DOE, and EPA.

U.S. Army Corps of Engineers—Experiences in DNAPL Treatment Technologies

William Crawford described several DNAPL treatment projects undertaken by the U.S. Army Corps of Engineers. The first, at Fort Richardson, near the Eagle River in Alaska, used a six-phase thermal heating array, including soil vacuum extraction, an air stripper, and a thermal oxidizer to treat groundwater. The project required diesel-powered generators brought in by truck to provide electricity, hence the cost was driven up to $390 per cubic yard. Mr. Crawford said the cost would have been in the neighborhood of $30 to $85 per cubic yard had the site not been so remote. The project met cleanup criteria, though Mr. Crawford pointed out that the use of diesel generators had a separate impact on air quality. A cost and performance report for the project will be issued.

The project provided the Corps with several lessons learned:

1) there are limits to the size of the array that can be employed;
2) preferential flow pathways reduce efficiency;
3) optimized long-term performance data is needed;
4) induced soil voltages can lead to stray currents that affect site safety and the performance of nearby electric equipment.

The other project described by Mr. Crawford, at Port Moller, Alaska, used an on-site *ex-situ* thermal desorption unit to treat 9500 cubic yards of soil contaminated with gasoline, diesel, and residual range organics. The desorption unit treated 70 tons per hour using a direct fired rotary kiln, an oxidizer, and a baghouse. The project operated from June to August 1995 and met cleanup criteria. As with the above project, mobilization/demobilization costs drove costs up, this time to $350 per cubic yard. The site location allowed only a three month window for completing the project, leading the Corps to issue an innovative contract that combined the site inspection with the treatment phase.

Field Applications of DNAPL Destruction by Oxidation

Rich Steimle, U.S. EPA/TIO, briefed the Roundtable on trends in the use of *in situ* oxidation technologies that treat DNAPL using oxidants without flushing or otherwise mobilizing contaminants. The technology seems best suited for treating BTEX using strong oxidants such as hydrogen peroxide and ozone. Other oxidants demonstrated include dissolved oxygen and potassium permanganate. Mr. Steimle described a number of *in situ* oxidation demonstrations and applications, including cost and performance data. The key to improved performance is the development of better injection methods and research on media interaction and treatment trains. Dr. Marqusee added that ESTCP and SERDP plan to issue a state-of-the-process document.

Mr. Steimle listed the advantages and disadvantages of the technology. On the pro side, the technology destroys NAPL, offering a permanent solution. Energy requirements are low and cleanups are rapid. On the con side, the technology uses hazardous chemicals and volatilizes contaminants. Other subsurface biomass is destroyed in the process, and high concentrations of contaminants require adding high amounts of oxidizing agent. Incomplete oxidation or formation of intermediate contaminants is possible.

DOE—Thermal Treatment Options

John Kingscott spoke on behalf of DOE on a dynamic underground stripping pilot project for treating fuels undertaken jointly by DOE/Lawrence Livermore National Laboratory (LLNL). The technology involves steam injection and recovery with electro-conductive tomography employed for real-time monitoring. Steam injection is employed because it decreases viscosity, increases solubility, allows distillation of vapor, and results in some *in situ* oxidation. The technology has been applied at the Visalia Pole Yard, a wood treater site in southern California, and is being considered at two other NPL sites. The technology is one of the three techniques subject to the side by side comparison at Cape Canaveral described above. LLNL has licensed two vendors to sell the technology.

The Visalia Pole Yard project has been recovering on average ten pounds of creosote per week since 1997 and achieving pumping rates at 130% of expected efficiency. The timetable for remediating the site has been reduced from centuries to months, though there is more contaminant at the site than was first believed. Costs have been averaging $60 per cubic yard. A community advisory group has overseen the project. EPA and DOE are in process of forming a national task force for the technology.

WRAP-UP

Dr. Kovalick thanked everyone for attending and reviewed the action items identified during the meeting.

- An RPM contact list is to be developed.
- Member-agency support of the joint site characterization training course is to be clarified.
- Member-agency support of the groundwater monitoring optimization conference is to be clarified.

- A new Roundtable subgroup on environmental cost engineering may be formed depending on member-agency interest and participation in the upcoming Environmental Cost Engineering Committee meeting.
- A field trip to the Dover Air Force Base test cell complex may be planned.
- The next general Roundtable meeting, to be held in May 1999, will be chaired by DOE and will cover performance measurements as a business issue and containment systems, including monitoring, as a technical issue.

The meeting adjourned.

ATTENDEES
FEDERAL REMEDIATION TECHNOLOGIES ROUNDTABLE
December 9, 1998

Name	Agency/Organization	Telephone
Maria Bayon	NASA	202-358-1092
Paul Beam	DOE/EM-50	301-903-8133
Phillip Berrill	LABAT	703-506-1400
Mike Boeck	EMS, Inc.	301-589-5318
Skip Chamberlain	DOE/EM-50	301-903-7248
Scott Edwards	DoD	703-697-5372
Marty Faile	Air Force/AFCEE	210-536-4342
Bob Furlong	Air Force/CEVR	703-697-3581
Brian Gieselman	Tetra Tech EM Inc.	703-287-8898
Mike Goldstein	EPA/OERR	703-603-9045
Brian Harrison	Navy/NAVFAC	703-325-0039
Wally Hise	Radian International	
Joe Hoagland	TVA	205-386-2108
Jim Jenkins	Bregman & Co./Army Environmental Program	703-693-0644
John Kingscott	EPA/TIO	703-603-7189
Gayle Kline	Tetra Tech EM Inc.	703-287-8865
Walter Kovalick, Jr.	EPA/TIO	703-603-9910
Donna Kuroda	Army Corps of Engineers	202-761-4335
Jeff Marqusee	DoD/SERDP/ESTCP	703-696-2120
Mary McCune	DOE/EM-40	301-903-8152
Terry Messenger	ESTCP	703-412-7408
Debbie Newberry	CSI	703-514-2142
Phil Palmer	DuPont	302-892-7456
Dan Powell	EPA/TIO	703-603-7196
Jackie Quinn	NASA	407-867-4265
Diane Roote	GWRTAC	412-826-6809
Jeff Sacre	GWRTAC	915-845-3195
Johnnie Shockley	Army Corps of Engineers	402-697-2558
Naomie Smith	EPA/TIO	703-603-7186
Rob Smith	Navy/NAVFAC	202-685-9317
Karl Stoeckle	DOE/FETC	304-285-4119
Dennis Teefy	Army/Army Environmental Center	410-612-6860
Marvin Unger	ThermoReTec	610-992-9950
Catherine Vogel	SERDP/ESTCP	703-696-2118
Kevin Warner	Levine Fricke Recon	
Richard Weisman	Tetra Tech EM Inc.	703-287-8897