

**FEDERAL REMEDIATION TECHNOLOGIES ROUNDTABLE MEETING**  
**Arlington, Virginia**  
**December 1, 2003**

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**ACTION ITEMS**

- ▶ All FRTR members are to update the list of points of contact for technology cost and performance case studies and provide to John Kingscott no later than January 30, 2004.
- ▶ All FRTR members are requested to provide names of points of contact for identifying and providing technical input/review for cost and performance case studies of long-term management and optimization projects and comments on the list of proposed projects distributed at the meeting to John Kingscott no later than January 30, 2004.
- ▶ All FRTR members are requested to name appropriate individual(s) from your agency to work on developing evaluation factors, ranking criteria, and presentation of data for a matrix showing most useful decision support tools and accompanying documentation and provide names to Dan Powell as soon as possible but no later than January 30, 2004. (\*\*Carolyn Perroni (EMS), EPA/TIP's contractor, will send out via e-mail a form with spaces for filling in all the names requested above to all FRTR participants shortly after the meeting. The completed form can be faxed to Dan Powell at 703-603-9135.)
- ▶ Deana Crumbling will provide all FRTR members with a list of members of the Triad Resource Center working group.
- ▶ Skip Chamberlain will provide FRTR members with a list of participants from various agencies that are working on a modeling MOU and could be integrated into future FRTR work on a decision support tools matrix.
- ▶ Naomie Smith will contact FRTR agency reps in February-March 2004 to obtain suggestions for speakers on DNAPL cleanup and subsurface bioremediation for the next FRTR meeting.

**WELCOME/OPENING REMARKS**

Walt Kovalick (U.S. EPA/OSTRI) welcomed the attendees and opened the meeting of the Federal Remediation Technologies Roundtable (FRTR) with self-introductions of the participants and an overview of the agenda. He reminded participants that a discussion of future meeting topics would take place later in the agenda, based on responses to the topic ballot that was e-mailed to everyone on the FRTR contact list. He indicated that an additional opportunity to fill out a ballot would be provided at the morning break.

**COST AND PERFORMANCE CASE STUDIES**

John Kingscott (EPA/TIP) updated Roundtable members on the status of the FRTR Technology Cost and Performance case study database and discussed proposals for expanding coverage (See Attachment A). He explained that additions to the database are generally made each spring. Volume 7 of the *Abstracts of Remediation Case Studies*, which contains information on the case studies added to the database in 2003, and a new fact sheet about the cost and performance case studies are available in hard copy and on the FRTR web site (<http://www.frtr.gov/publib.htm>). An updated CD-ROM containing all 342 cost and performance case studies in the FRTR database also is available on the FRTR web site. To spread the word about the availability of this information and generate interest in expanding the available data, Kingscott said that EPA/TIP is willing to provide hard copies of the case study abstract volumes, the fact sheet, and the CD-ROMs to member agencies for distribution at meetings, seminars, and other venues.

The cost and performance area on the FRTR web site (<http://www.frtr.gov/costperf.htm>) also includes a set of Site Characterization and Monitoring case studies, the expansion of which will be discussed during the Triad technical session at this meeting; and a compilation of Multi-Site Technology Assessment reports added in 2003.

Looking ahead to 2004, Kingscott said that FRTR may have to work harder to find data for case studies, because some of the agencies, e.g., DOE and AFCEE, will no longer be publishing as many reports that have served as primary source data for past case studies. As a result, it will be increasingly important to identify information early that might be reformatted into cost and performance case studies. Kingscott provided a list of agency points of contact (included in Attachment B) for identifying cost and performance case study data and asked all FRTR member agencies to update and/or add to the list by January 30, 2004. He also indicated that EPA/TIP will provide contractor support to format case studies.

Richard Mach (U.S. Navy) asked if the existing database of case studies is being reviewed periodically to ensure that outdated or obsolete case studies are culled. Kingscott indicated that no such review of the database has taken place to date. He said that FRTR may want to consider formulating some criteria for deleting case studies and, that done, EPA/TIP would undertake the necessary culling. Mach said that the Navy already has updated all its case studies and that he would make a copy of the updates available to replace Navy case studies in the FRTR database. In addition, he agreed to provide the criteria used to cull obsolete Navy case studies. In addition, he suggested that a number of UXO case studies prepared by SERDP might be added and agreed to contact Ann Andrews to discuss it.

Kovalick reminded everyone that EPA may need to solicit agency contributions in 2004 to support FRTR operations and asked participants to begin looking at funding possibilities in their agencies. This is usually done on a biennial basis.

### ***Long-Term Management and Optimization Case Studies***

Kingscott said that the timing seems appropriate for preparing case studies of long-term management and optimization projects since optimization is so much more prevalent in all federal remediation programs. He explained that the FRTR web site includes a section on Remediation Optimization, but it is fairly general and includes no case studies. Kathy Yager and Jean Balent (EPA/TIP) have undertaken an effort to revise and update the site. EPA/TIP has identified 74 projects with long-term management and optimization implications (See Attachment B). Kingscott asked all participants to review the recommended projects and get back to him as soon as possible but no later than January 30, 2004, so EPA/TIP can proceed to format the case studies approved for inclusion. He indicated that EPA/TIP will revise the form he mentioned in connection with updating points-of-contact for cost and performance reports, so that the same form can be used for providing points-of-contact for optimization case studies as well and send the form out shortly after the meeting. He said the goal is to have the revised optimization site and the new case studies available for the 2004 FRTR case study rollup and for demonstrating at the June 2004 Optimization conference in Dallas.

Kovalick asked for members' reactions and for suggestions about how to accomplish/who should be responsible for expanding the Remediation Optimization section of the FRTR web site to include these case studies and to determine what kind of pull-down menus and other search options should be available. Richard Mach offered to provide the search design recently developed for the updated Navy web site as a model that may be useful. David Morganwalp (USGS) suggested that any search capability should be based on a standard set of key words and that it would be very helpful if case studies included

information on how optimization was accomplished (e.g., whether it was result of a files review or an active project). Maj. Ida Widmann (USAF) asked if case study information is collected from private sector sources. Kingscott explained that, while some technical details may be obtained from consultants and vendors, all cases studies related to federal sites and a federal point-of-contact is required to approve case studies before they are included in the database. Kovalick explained that consultants are usually bound to confidentiality by private site owner clients; these owners have no incentives, and oftentimes many concerns, about revealing to EPA cost and performance data about site cleanup approaches. Also, such data gathering sometimes requires some modest extra expenditures vs. just cleaning the site. Thus, EPA is largely dependent on garnering such cost and performance data from publicly funded entities like federal facilities, municipalities, etc.

**STATUS UPDATE: ACCELERATING SITE CLOSEOUT, IMPROVING PERFORMANCE, AND REDUCING COSTS THROUGH OPTIMIZATION**

Richard Mach (NAVFAC) said a call for abstracts for the June 15-17, 2004, Optimization Conference in Dallas has been sent to about 20,000 recipients via mail and electronically through EPA's *TechDirect*. Individual agencies and services are doing additional electronic distributions. Mach reminded everyone that abstracts are due February 6, 2004 and that exhibit space is still available. Copies of the call for abstracts and other information about the conference is available at [www.clu-in.org/siteopt/siteopt.htm](http://www.clu-in.org/siteopt/siteopt.htm).

Mach said that there are commitments for about \$115,000 of the \$130,000 budgeted for the conference. He said this budget does not include state travel costs, which will be funds through a combinations of mechanisms, including the Interstate Technology Regulatory Council (ITRC), EPA, and, hopefully, DSMOA. He acknowledged that, even if the funds are available, state travel restrictions present a particular challenge and asked for suggestions from the members. Kovalick said that it is important to promote state attendance and suggested that agencies be prepared to provide letters and any other extra effort that may be required to overcome the hurdles.

**COST ESTIMATING WEB SITE**

Brian Skokan (DOE) presented an overview of the history and mission of the Environmental Cost Engineering Committee (EC<sup>2</sup>) and briefly described plans for a dedicated area on the FRTR web site for Environmental Cost Engineering information and tools (See Attachment C). EC<sup>2</sup> strives to provide agency leadership in promoting sound cost estimating practices and techniques by promoting advanced tools, sharing lessons learned, and providing training. The new area of the FRTR web site will include cost estimating contacts, tools, and projects and serve as a central location for gathering and exchanging interagency cost data and cost analysis case studies. This cooperative effort would make more cost estimating expertise available to FRTR and more data available to EC<sup>2</sup> for the further development of tools.

**COMMUNICATING THE AVAILABILITY AND APPLICABILITY OF DECISION SUPPORT TOOLS: A TECHNOLOGY MATRIX**

Dan Powell (EPA/TIP) reminded everyone that the FRTR meetings in December 2002 and June 2003 focused on Decision Support Tools (DSTs). Decision support is the process of combining experience, data, and problem-specific knowledge with the analysis and integration of information (e.g., cost and

risk variables) to enable decision-making. The tools typically provide output in terms of decision variables, such as cost or risk, or provide a direct comparison between alternative remedial strategies.

While DST systems can get managers to a “Yes” or “No” answer, Powell said, the key next step to getting people to use these systems is helping them understand why and how the answer was derived, how to apply tools to their particular problems, and the benefits of doing so. He reminded everyone of Terry Sullivan’s (DOE/BNL) suggestion at the June 2003 meeting that one method for accomplishing this next step would be to compile a “matrix,” targeted for project managers, that identifies, explains, rates free, public domain systems (See Attachment D). Powell passed out a sample “skeleton” of such a matrix (See Attachment E). EPA/TIP included 11 DSTs and 14 other systems that could be helpful but that do not get managers to a “Yes” or “No” answer.

Kovalick asked participants for comments. Bradley Call (USACE) said developing something to help managers use DSTs effectively would be a good idea. He cautioned, however, that is also is a very ambitious undertaking and would take significant time and effort. Other comments included:

- Tell those anticipating use of the matrix how to collect and format data to be needed for the DST to work properly.
- Explain what you can realistically expect to get out of each toll based on what data you put in.
- Focus on decisions managers will have to make, so people will know how to make a selection based on what decisions they need to support.

Powell suggested that FRTR members form a team for developing the matrix further. Skip Chamberlain (DOE) said that there already is an interagency group working on a modeling MOU, that includes work on DSTs, and suggested FRTR coordinate or combine efforts. Kovalick asked Chamberlain to provide a list of members of the existing group to EPA/TIP’s contractor who will forward it to all member agencies. He then asked each member agency to provide Dan Powell with the name(s) of those who should be included in the FRTR effort. He indicated that EPA/TIP will revise the form mentioned by John Kingscott in connection with points-of-contact for cost and performance and optimization case studies, so that the same form can be used for nominating participants for this DST matrix development group. The form will be sent out shortly after the meeting.

## **TECHNICAL FOCUS AREA—THE TRIAD APPROACH TO SITE CHARACTERIZATION**

### ***Why Triad?***

Dan Powell introduced the Triad session by acknowledging multi-agency efforts over the last few years to streamline sampling, analysis, and data management approaches that support site assessment, characterization, and cleanup. There is an increasing pull within federal and state agencies for reducing life-cycle costs while increasing confidence in the protectiveness of project decisions, influenced by the emphasis on brownfields redevelopment and beneficial site reuse. This has led EPA to develop the Triad approach as a way to codify these efforts into a comprehensive framework. As interest in the concept grows, there is momentum for moving forward in bigger steps. We need to ensure adequate support exists to prevent flawed applications of the approach. The Roundtable agencies need to work together to develop such a network of support.

Triad focuses on managing uncertainty. It synthesizes practitioner experience, successes, and lessons learned in a three-pronged approach that includes systematic project planning, dynamic work strategies,

and use of real-time measurement technologies (See Attachment F). The technical presentations during this meeting are aimed at:

- Ensuring a common understanding of Triad concepts and terms;
- Sharing experiences; and
- Identifying FRTR members' roles in advancing and supporting the use of Triad.

***The Uniform Federal Policy on Quality Assurance Project Plans (UFP-QAPP):  
A Product of the Intergovernmental Data Quality Task Force (IDQTF)***

Jim Woolford (U.S. EPA/FFRRO) briefly described the IDQTF and its work on the UFP-QAPP documents. In addition, he discussed how the UFP-QAPP effort complements the Triad approach (See Attachment G). The focus of the IDQTF, which is a consensus-based interagency partnership, is to comprehensively address a myriad of problems and issues related to the management of environmental data quality at Federal facilities. The UFP-QAPP is designed to fulfill the project-specific requirements of Part B of ANSI/ASCQ E4, to ensure that Federal departments and agencies will produce consistent quality assurance project plans (QAPPs) that reflect a systematic planning approach to collection and use of environmental data. As an initial step, the draft UFP-QAPP focuses on hazardous waste programs, but the intent is to investigate the application to other media areas as well. Currently, the draft UFP-QAPP, consisting of a manual, workbook, and a compendium of minimum QA/QC activities, is available for public comment at [http://www.epa.gov/swerffrr/documents/intergov\\_qual\\_task\\_force.htm](http://www.epa.gov/swerffrr/documents/intergov_qual_task_force.htm). The public comment period ends January 15, 2004; however, Woolford acknowledged that this would be a "soft" deadline for interagency review. In response to a questions, Woolford said that the IDQTF has tried to streamline the documents, but it remains to be seen whether these efforts have been successful.

The UFP-QAPP complements the Triad approach in several ways, Woolford said. Specifically, it emphasizes decision based systematic planning, supports the use of field analytical methods, and is consistent with requirements for dynamic work strategies. In addition, the data review process targets the quality requirements of the specific project. The data review process emphasizes field sampling as well as analytical data quality and data verification, validation, and usability assessment.

Woolford said that beta-version training in using the UFP-QAPP has begun in EPA regions. As the public and interagency review of the UFP-QAPP is completed and the documents are finalized, the IDQTF will design a strategy for introducing the products throughout the federal agencies, provide consistent training, and involve other stakeholders.

***Triad Overview—What It Is; What It Is Not***

Deana Crumbling (U.S. EPA/TIP) discussed the basics of the Triad approach, including the history of its development and how it works (See Attachment H). She emphasized that the concepts underlying Triad are not new; Triad brings together more than 25 years of experience with advances in science and technology to provide a way to improve confidence in project outcomes and save money over the life of a project. The Triad approach also involves use of standardized terminology and development of solid documentation, which improves the ability to communicate clearly about projects. Triad consists of three major components:

- **Systematic Project Planning**—The umbrella activity that considers ALL activities (not just data collection, although that is an important task of later stages of systematic planning) required for

achieving a successful project. This includes ensuring that involved parties reach consensus on clearly defined project goals and related regulatory and engineering decisions. Unknowns (i.e., uncertainties) that could lead to erroneous decisions must be identified, along with which decision errors are tolerable and which are not. Once cleanup goals have been defined, systematic planning is undertaken to chart a course for the project that is resource effective, as well as technically sound and defensible to reach these project-critical goals. A team of multidisciplinary, experienced technical staff works to translate the project's goals into realistic technical objectives. The conceptual site model (CSM) is the planning tool that organizes the information that already is known about the site; the CSM helps the team identify the additional information that must be obtained. The systematic planning process ties project goals to individual activities necessary to reach these goals by identifying data gaps in the CSM. The team then uses the CSM to direct the gathering of needed information, allowing the CSM to evolve and mature as work progresses at the site. Systematic planning also carefully considers scheduling, staffing, contracting, and budget constraints relevant to the project.

- **Dynamic Work Strategies**—An approach that relies on real-time data to reach decision points while work crews remain in the field. The logic for decision-making is identified and responsibilities, authority, and lines of communication are established. Dynamic work strategy implementation relies on and is driven by critical project decisions needed to reach closure. It uses a decision-tree and real-time uncertainty management practices to reach critical decision points in as few mobilizations as possible. Success of a dynamic approach depends on the presence of experienced staff in the field (or easily accessible for consultation through telecommunications) empowered to make decisions based on the decision logic and their capability to deal with new data and any unexpected issues, as they arise. Field staff maintain close communication with regulators or others overseeing the project during implementation of dynamic work plans.
- **Real-Time Measurement Technologies**—Includes the use of geophysics, rapid-turnaround from off-site laboratories, on-site analytical tools, rapid sampling platforms, and real-time management, processing, and display of data to permit real-time refinement of the CSM. On-site analytics (also called field analytical methods) are a broad category of analytical methods and equipment that can be applied at the sample collection site. They include methods that can be used outdoors with hand-held, portable equipment, as well as more rigorous methods that require the controlled environments of a mobile laboratory (transportable). During the planning process, the team identifies the type, rigor, and quantity of data needed to answer the questions raised by the CSM. Those decisions then guide the design sampling modifications and the selection of analytical tools. In many cases, a judicious mixing-and-matching of field and fixed laboratory methods are used to manage both the sampling and analytical uncertainties involved in generating data matching decision-making needs (termed “collaborative data sets”).

The development of accurate CSMs in the Triad approach provides a major advantage over past practices, because Triad expects the real world to be heterogeneous, Ms. Crumbling said. Triad addresses heterogeneity by using project-specific CSMs, a second-generation data quality model, and modern tools and work strategies. She provided participants with examples and graphic depictions of these major elements as well as a list of Internet resources, papers, and articles for additional information.

### ***Case Studies from Argonne National Lab***



Jack Ditmars (ANL) described Argonne National Laboratory's Adaptive Sampling and Analysis Program (ASAP), indicating that it shares Triad's emphasis on real-time decisions focus on systematic planning, dynamic work strategies, and real-time measurement systems (See Attachment I). ASAP is an expedited approach to collecting data in support of hazardous waste site characterization and remediation. ASAPs have been applied at a number of federal sites, and Mr. Ditmars briefly discussed projects at Joliet Army Ammunition Plant and Ashland 2, a FUSRAP site, to illustrate various aspects of the ASAPs and the savings realized. Overall, ANL's ASAPs have consistently yielded substantial cost savings compared to more traditional programs.

### ***Online Triad Resource Center***

Ditmars also indicated that ANL, in partnership with EPA, is developing a Triad Resource Center to be available on the Internet. The resource center will point users to information on how to use the Triad approach and include glossary and frequently asked questions areas. Ditmars asked anyone interested in reviewing and commenting on the site to contact him or Deana Crumbling to obtain access to the draft site. In response to a question, Crumbling agreed to provide to a list of current participants in the interagency group working of development of the Triad Resource Center. Ditmars encouraged FRTR members to contribute Triad case studies for inclusion on the site, suggesting that people contact him, Crumbling, or their representative on the interagency workgroup.

### ***Triad Case Studies from the U.S. Army Corps of Engineers***

Bradley Call (USACE Sacramento District) presented brief case studies of five sites at which the Corps has used the Triad approach. These included the Kauffman Minter Superfund Site, Moody Air Force Base, the McCormick and Baxter Superfund Site, the Fort Lewis East Gate Disposal Yard, and an East Palo Alto Brownfields site (See Attachment J). He said the Corps' experience at these sites has produced the following lessons:

- Proper systematic planning is the foundation to applying the Triad Approach correctly and receiving the most benefit.
- Triad application is independent of project size or complexity; however, there is a better return on investment from larger projects.
- Triad can ensure adequate data is available to support ongoing fieldwork, CSM development, and final project decisions while managing major sources of uncertainty—all of which result in reduced life-cycle costs.

In discussion following his presentation, Call indicated that the Corps has been working closely with EPA/TIP on the Triad campaign. Dan Powell indicated that the Corps, in fact, was using the concept long before the "Triad" title was coined.

With respect to the case studies presented, Call verified that different contractors had been used on the various projects, and contracts were a mix of cost plus fixed fee and fixed price. He said that these contractors understood and were willing to try the new approach. He also verified that, while there have been some issues with state regulators in these project, the Corps has been able to work through them with the states; it just takes a commitment of time. Ditmars suggested that putting collaborative data on a web site where state regulators can see it is one helpful tool.

In response to a question, call said the Corps is willing to share Scopes of Works (SOWs). Powell noted that EPA is in the process of preparing a procurement guide, under its Brownfields Technology Center, to help project managers construct SOWs for Triad projects. "Understanding Procurement for Innovative Sampling and Analytical Services for Waste Site Cleanup" is expected to be finalized early in 2004.

### ***Case Studies from the U.S. Navy***

Adrienne Saboya and Tim Shields (U.S. Navy/PWC San Diego) addressed the Navy's use of the Triad approach. Shields indicated that Triad supports the Navy's emphasis on promoting the use of innovative technologies, particularly the Site Characterization and Analysis Penetrometer System (SCAPS), and reducing site investigation and remediation costs (See Attachment K). He said that the Navy has used the elements of Triad to overcome some regulator reluctance about the use of SCAPS tools.

In case examples, he illustrated how the Navy used laser-induced fluorescence (LIF) in a dynamic work plan to delineate petroleum hydrocarbon contamination that had been missed in previous tests and how use of membrane interface probe (MIP) and direct sampling ion trap mass spectrometry (DSITMS) has been used to identify volatile organic compounds (VOCs) that might have been missed using old investigation methods and provide a better understanding of the nature and extent of a plume more quickly than would have been possible with old methods. He also said that the Navy has been able to show how using the real-time tools offered through SCAPS can identify contamination where no contamination had been found and to reduce the potential for cross contamination.

Shields said that the Navy plans to use the Triad approach, including use of on-site tools and real-time measurement, for an upcoming project to delineate a VOC plume and identify a trichloroethylene (TCE) source area. He indicated that the Navy's presentation of the approach to regulators was well received. Richard Mach emphasized that getting regulators on board is key for the services to use Triad broadly.

### ***Case Studies from the U.S. Air Force***

Jeff Cornell agreed with the previous speakers, saying that regulator acceptance is key to implementing the Triad approach at Air Force sites as well. He said that this front-end work has been difficult for the Air Force, but with their success in using the approach to build a hangar at McGuire AFB, they seem to have turned a corner. He said the Air Force is now looking for an installation-wide project. He said Triad may be most applicable at brownfields sites, but it could also be extremely helpful in addressing the new round of base realignment and closure (BRAC) sites if the barriers can be overcome.

Cornell introduced Bill David (Tri-Corders, Inc.) who presented brief case studies of the Air Force's experience using the Triad approach to locate a TCE source at Operational Unit 12 at Hill AFB in Utah and to locate a chlorinated solvent source and plume at McGuire AFB in New Jersey (See Attachment L). In both cases, the data quality objectives (DQO) process was used to plan the project, and the project was implemented by a core technical team. The projects resulted in the Air Force's being able to:

- Map the source area at the Hill AFB site, which they had been looking for a long time, in about two weeks, and
- Obtain all the data needed for remediation at the McGuire site in about 15 days, which enabled construction of the hangar to proceed.

***Triad in the States***

***New Jersey DEP and ITRC***

Brian Sogorka (New Jersey Department of Environmental Protection) explained that New Jersey has embraced the Triad approach for its brownfields programs as a way of managing heavy caseloads, improving project focus and communications, and eliminating excessive data needs (See Attachment M). He said that state has realized more than \$4 million in savings on 11 projects to date. New Jersey has issued a policy statement supporting and encouraging the use of Triad, published guidance explaining how to use Triad and verifying that it is consistent with New Jersey's technical rules, provided Triad training for its staff and consultants, and is discussing the possibility of establishing a pre-qualification program for Triad practitioners.

Sogorka, who has served as co-chair of the Interstate Technology Regulatory Council (ITRC), said that ITRC's Sampling, Characterization, and Monitoring (SCM) Team is finalizing an ITRC guidance document on Triad, to be published in January 2004. He said the SCM Team, which is led by NJDEP's Stuart Nagourney, will promote and help obtain multi-state acceptance for the Triad approach by identifying and developing ways to address regulatory barriers, highlighting Triad case studies, and assisting in the education and training of technical and regulatory communities. As future projects, the SCM Team plans to:

- Develop guidance on Triad work plan development;
- Examine sensor technologies applicable to environmental remediation;
- Research ways to present real-time data; and
- Work with European countries on improving site characterization and risk assessment through Network Oriented Risk Assessment by In Situ Screening of Contaminated Sites (NORISC), a technology development project under the 5th Framework Programme of the European Commission.

Further information about the SCM Team and ITRC guidance documents is available on the ITRC web site at [www.itrcweb.org](http://www.itrcweb.org).

***Path Forward for Triad Implementation***

Linda Fiedler (U.S. EPA/TIP) summed up the technical focus area discussion on the Triad approach by highlighting web-based and print resources, presentations and training opportunities, and technical assistance resources currently available and planned for 2004 as FRTR agencies jointly implement the concept (See Attachment N). Plans include holding a national Triad conference in mid-2004 and development of a Triad speakers bureau. She also stressed that, in order to carry the Triad campaign further, a Triad Support Network should be formalized and expanded. The network would be comprised of members from FRTR agencies, and their respective regions and laboratories as appropriate, who would meet periodically via conference call to exchange information and identify opportunities for getting the word out about Triad, conducting training, collecting and documenting case studies, and identify agency staff and others for Triad Expert training. Fiedler asked that anyone with ideas and comments on plans for joint implementation of Triad should contact her at 703-603-7194 or [fiedler.linda@epa.gov](mailto:fiedler.linda@epa.gov).

**NEXT MEETING AGENDA AND WRAP-UP**

Walt Kovalick reminded participants of the action items from this meeting:

***Federal Remediation Technologies Roundtable Meeting, Arlington, VA, December 1, 2003***

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- Update the list of points of contact for technology cost and performance case studies and provide to John Kingscott no later than January 30, 2004.
- Provide names of points of contact for identifying and providing technical input/review for cost and performance case studies of long-term management and optimization projects to John Kingscott no later than January 30, 2004.
- Name appropriate individual(s) from your agency to work on developing evaluation factors, ranking criteria, and presentation of data for a matrix showing most useful decision support tools and accompanying documentation and provide names to Dan Powell as soon as possible but no later than January 30, 2004.
- Deana Crumbling will provide all FRTR members with a list of members of the Triad Resource Center working group.
- Skip Chamberlain will provide FRTR members with a list of participants from various agencies that are working on a modeling MOU and could be integrated into future FRTR work on a decision support tools matrix.

Kovalick indicated that a form with spaces for filling in all the names requested will be sent to all FRTR participants shortly after the meeting. The completed form can be faxed to Dan Powell (fax number: 703-603-9135). He indicated that the lists from Crumbling would be e-mailed by the contractor as well.

Kovalick announced that, based on ballots cast before and during the meeting, the highest-rated topics for the next meeting are DNAPL cleanup and subsurface bioremediation. He said Naomie Smith (U.S. EPA/TIP) will contact member agencies for suggestions for speakers on these topics in February-March 2004 in preparation for the Spring FRTR meeting. He said date of the meeting will be determined after a review of other conferences planned in order to avoid conflicts and maximize travel dollars.

The meeting adjourned.