FEDERAL REMEDIATION TECHNOLOGIES ROUNDTABLE MEETING

Arlington, Virginia
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ACTION ITEMS

- ► Douglas Dahle will send a copy of *Assessing the Potential for Renewable Energy Development on DOE Legacy Management Lands* to John Kingscott for posting on the FRTR Web site when the report becomes available.
- ► Comments on the draft 2009 FRTR fact sheet should be sent to John Kingscott or Marti Otto by July 4.
- ► The Air Force will take the lead in coordinating the Fall 2009 Roundtable meeting agenda with John Kingscott and Marti Otto.

WELCOME/INTRODUCTIONS

Jeff Heimerman, Deputy Director of the Technology Innovation and Field Services Division (TIFSD) in the U.S. Environmental Protection Agency's (EPA) Office of Superfund Remediation and Technology Innovation (OSRTI), welcomed the attendees to the 38th meeting of the Federal Remediation Technologies Roundtable (FRTR). He observed that many advances have been made in the area of data management across government agencies, and one of the key benefits of membership in a multi-agency organization such as FRTR is that each agency has the ability to leverage off the advances made by other agencies.

Attendees introduced themselves. Heimerman announced that a representative from each member agency present would be asked to cast a ballot to select a topic for the technical session at the Fall 2009 roundtable, with the results to be announced at the end of the meeting.

FRTR ADMINISTRATIVE AND BUSINESS ISSUES

John Kingscott (EPA/OSRTI) announced the 2009 meeting on the Environmental Implications and Applications of Nanotechnology (June 9-11) at the University of Massachusetts at Amherst (http://es.epa.gov/ncer/events/calendar/2009/jun09/agenda.html). TIFSD has developed an agreement with the University of Massachusetts at Amherst to support five national conferences. The focus of the first conference, which was held in 2008, was Triad investigations. Green remediation will be the focus of the 2010 conference. Topics for the conferences to be held in 2011 and 2012 are still open, and TIFSD welcomes participation by other agencies interested in co-sponsoring the meeting and selecting a conference topic. Kingscott also drew attention to a new report, *Ecological Revitalization: Turning Contaminated Properties into Community Assets* (www.clu-in.org/s.focus/c/pub/i/1597/), which identifies 100 sites where revitalization has taken place. Appendix A lists each site with a description of the type of cleanup, the revitalization/reuse component(s), problems and solutions, as well as a point of contact.

Robert Sadorra, Naval Facilities Engineering Command (NAVFAC), said that the Navy is emphasizing the need for comprehensive use across the organization of the Naval Installation Restoration Information Solution (NIRIS). NIRIS is a central system for maintaining all environmental remediation site data (including geographic information system data), documents, and records.

Erica Becvar, U.S. Air Force Center for Engineering and the Environment (AFCEE), offered several updates on green remediation issues, beginning with AFCEE's May 1 release of the Sustainable Remediation Tool. The Tool is designed to aid environmental professionals in incorporating sustainability concepts into the remediation decision-making process. The Tool should be available in the near future for free download through the AFCEE Web site (www.afcee.af.mil/), or Becvar can provide a copy in response to an email request. The next AFCEE Technology Transfer Workshop will be held the week of April 4, 2010, in San Antonio, Texas. The meeting, which is free to all state and federal employees, will have five concurrent sessions, including tracks on sustainable remediation and the Military Munitions Response Program. AFCEE has received several responses to its recent Broad Agency Announcement that are relevant to green remediation: one proposal to add more metrics and modules to the Sustainable Remediation Tool and incorporate the Tool into the Remedial Action Cost Engineering and Requirements (RACER) software, and another proposal to evaluate the incorporation of alternative energy sources with existing remediation systems. Finally, the Sustainable Remediation Forum (SURF) will be publishing a white paper on sustainable remediation in the June 2009 issue of Remediation Journal [Note: The paper and summary are available in full text on the SURF Web site: www.sustainableremediation.org/library/issue-papers/].

Jake Phillip, U.S. Nuclear Regulatory Commission (NRC), described the chief issues currently of interest to NRC's Office of Research—remediation of uranium-contaminated groundwater and soil, leaching of uranium and thorium from slags, and long-term performance of engineered covers constructed to isolate wastes, particularly in humid environments.

Rick Newill, Department of the Interior, said that his agency is interested in program and project management systems primarily associated with cataloging and assessing liabilities (including cost tracking to support cost recovery) related to hazardous waste sites located on lands managed by the Department of the Interior.

Beth Moore, U.S. Department of Energy (DOE), said that DOE recently has been focusing on in situ bioremediation of metals and radionuclides in the subsurface. An Interstate Technology & Regulatory Council (ITRC) team is working with EPA's Office of Research and Development on case studies of intrinsic attenuation of metals and radionuclides, and they are actively seeking additional studies. Moore also reported that Carlos Pachon (EPA/TIFSD) coordinated the first conference call on May 8 for the green remediation/sustainability subgroup formed at the Fall 2008 FRTR meeting. The subgroup members had reviewed AFCEE's Sustainable Remediation Tool prior to the call, and they concluded that the development of more modules for the Tool merited group support and possibly funding. The group now is focused on determining which new products are needed and how to encourage their development. Moore suggested that the expertise of DOE's National Renewable Energy Laboratory (NREL), which works with industry and organizations to transfer renewable energy and energy efficiency technologies into the marketplace, could be valuable in bringing the Sustainable Remediation Tool into widespread use.

Ann Marie Hoffman of EPA's Federal Facilities Restoration and Reuse Office reported that green remediation/sustainability subgroup calls probably will take place monthly and encouraged

anyone interested in participating to contact her, John Kingscott, Jeff Heimerman, or Marti Otto (EPA/TIFSD) for information on the next conference call.

Jeff Heimerman noted the formation of a new verification center—the Materials Management and Remediation (MMR) Center—within EPA's Environmental Technology Verification Program. The MMR Center (www.epa.gov/etv/center-mmr.html) verifies the performance of materials management technologies, including those developed for recycling, beneficial use of waste materials, recovery of useful components of waste, and treatment to minimize disposal requirements (e.g., containment, volume, cost), as well as technologies to remediate contaminated land and ground water, such as that found at Superfund sites. Established in late 2008, the MMR Center is operated in cooperation with Battelle. The new center partly fills the gap left by the retirement of the Superfund Innovative Technology Evaluation Program.

David Carillo, U.S. Air Force, remarked that the green remediation effort will need to pull together expertise from diverse sources and coordinate input on air emissions and energy development with the application of remediation technologies.

Douglas Dahle (NREL) said environmental remediation sites could be a key opportunity for net-zero installation of energy systems because green remediation is a nice fit with renewable energy. His office recently completed an assessment of the potential for renewable energy development on DOE legacy management lands, which includes uranium mining sites. When the report becomes available, Dahle will send a copy to John Kingscott for posting on the FRTR Web site. [Note: *Assessing the Potential for Renewable Energy Development on DOE Legacy Management Lands* is available at http://www.frtr.gov/pdf/Dahle_et_al._2008.pdf]

Mike Adam (EPA/TIFSD) pointed out the availability of several publications issued by the Triad Resource Center (www.triadcentral.org/). The first publication is directly relevant to the meeting topic:

- *Management and Interpretation of Data under a Triad Approach—Technology Bulletin*. EPA 542-F-07-001, May 2007 (www.triadcentral.org/ref/ref/documents/epa542f07001.pdf)
- *Triad Issue Paper: Using Geophysical Tools to Develop the Conceptual Site Model*. EPA 542-F-08-007, December 2008 (www.triadcentral.org/tech/documents/Geophysics-Issue-Paper.pdf)
- *Demonstrations of Method Applicability under a Triad Approach for Site Assessment and Cleanup—Technology Bulletin*. EPA 542-F-08-006, August 2008 (www.clu-in.org/download/char/demonstrations_of_methods_applicability.pdf)

John Kingscott explained the new approach taken in developing the annual FRTR fact sheet. The new format for the 2009 fact sheet incorporates information from the last Roundtable meeting by highlighting the approaches to green remediation followed by member agencies. This change is intended to illustrate the Roundtable members' common interests and cooperative efforts, in addition to the benefits that can be obtained by sharing information. The new format continues to identify new case studies and reports added to the FRTR databases. The most recent additions are five remediation case studies, 11 site characterization and monitoring case studies, five

technology assessment reports, and two long-term monitoring and optimization case studies. Comments on the draft fact sheet should be sent to Kingscott or Marti Otto by July 4.

Kingscott also reviewed the ballot of potential topics for the Fall 2009 FRTR meeting and asked the voters to return them after the lunch break.

DATA MANAGEMENT

Jeff Heimerman provided a brief overview of the agenda and noted that people unable to attend the meeting would be able to monitor the presentations via the Internet.

EPA OSWER Data Management: Current Efforts and Issues

Jean Balent (EPA/TIFSD) described how data management at the site level historically has been decentralized within EPA's cleanup programs (Attachment A). While programmatic information such as project management, funding, and congressional standards are reported nationally and stored in systems such as the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS), site-specific data management is delegated to the regions. Those making the decisions at the site are faced with the challenge of collecting, managing, reviewing, analyzing, and storing this information. As a result, site data are dispersed widely across the agency in different locations ranging from EPA systems to contractor databases, in varying physical formats (e.g., hard copy, scanned reports, electronic packages), and in a wide range of reporting formats.

In recent years, newer tools and approaches leading to more centralized information management have been explored. EPA's Office of Solid Waste and Emergency Response (OSWER) is developing the Superfund Enterprise Management System (SEMS), which is designed to integrate three primary Superfund data collection, reporting, and tracking systems: CERCLIS, the Superfund Document Management System (SDMS), and the Institutional Controls Tracking System (ICTS). The system eventually could incorporate analytical data from the Contract Laboratory Program (CLP) and the removal program. The integration of these systems is complicated by issues of data format, data validation, and data storage method.

EPA's Office of Emergency Management (OEM) is building the Emergency Management Community on the EPA Portal. The Emergency Management Community will encompass the WebEOC (emergency operations center), provide removal site data from/with Scribe/Scribe.net, and possibly include site data from other programs (Superfund, Brownfields, RCRA). Although currently under construction, portions of the site may be operational in 2009. Issues in the development of the site involve coordinating efforts and data formats between the Environmental Response Team (ERT) and OEM.

EPA's regional offices have adopted a wide variety of data management solutions. Five regions have EarthSoft's EQuIS (Environmental Quality Information System) software licenses, and all are at varying stages of deploying it. The goal for some regions is to use the system to manage all data from all programs. Other regions are using and exploring STOrage and RETrieval/Water Quality Exchange (STORET/WQX) and/or Scribe/Scribe.net for the same purpose. Contractor

databases are widely used in many regions. These databases vary in data format based on the individual needs of each region, with wide differences in data management support.

Balent discussed several efforts at EPA regional and headquarters offices for data collection and management. She also highlighted some of the pivotal issues EPA faces in developing a comprehensive data management strategy. Foremost is the increasing demand for readily accessible data while the volume of data continues to grow. EPA's Superfund offices need access to better methods and resources to store, access, interpret, analyze, visualize, and assure quality of environmental data consistently. Balent described several potential data management scenarios: (1) a centralized national repository owned and managed by headquarters, (2) a coherent system of regional repositories with access for other parties, or (3) a standarded data format to be used across all programs. Each scenario would require resolution of difficult and complex issues:

- In what format would data be stored and exchanged?
- How and in what kind of repository/surroundings/equipment would the data be stored?
- Which applications (tools) could be agreed upon that all would use to review, analyze, and understand the data?
- And finally, who would control and be responsible for the data?

EPA headquarters and regions will continue to engage in dialogue to resolve its data management issues. TIFSD's next steps in developing a comprehensive data management system will involve identifying those who are "doing it better," documenting their successes, and working with these data "champions" to support an information-exchange network. An E-data workgroup will share information on these approaches, tools, and contacts with other regions and offices and continually look for new areas to improve.

Question: Are there plans for information outreach to the regional offices, or are programs already in place to teach project managers how to manage their data or to help them understand the data management issues?

Answer: Some regions have training in place for the regional project managers (RPMs), some do not. Headquarters is trying to convey the benefit of having compatible data management tools and systems in place.

Question: What is the timeframe for completion of SEMS?

Answer: SEMS is part of the initiative to roll the Superfund information now available in several different systems into one streamlined system, essentially a new and improved CERCLIS. Steve Wyman (OSRTI) is the contact for detailed information on SEMS.

Question: Does EPA have restrictions on information technology (IT) development with respect to project size or funding?

Answer: We have a division with responsibility for major IT investments. This entity looks at the need and considers allocation of resources. IT security requirements also impose significant restrictions. Selection and use of software, however, can vary region by region and program by program.

Collaborative Technology: Guidance for Federal Agencies

Beth Moore explained that collaborative technology, also known as groupware or workgroup support systems, is software designed to help people involved in a common task achieve their goals (Attachment B). Common examples include wikis, blogs, social networks, and social voting. Government agencies are using collaborative technology to flatten their respective organizational structures and facilitate communication with offices and programs to solve challenges related to organizational culture; policy and governance; and science, engineering, and technology.

The Collaboration Project Web site (www.collaborationproject.org) is hosted by the National Academy of Public Administration (the National Academy). The site was established by a forum of leaders to share ideas, examples, and the benefits of collaborative technology to solve complex challenges within government. The Collaboration Project allows staff to contribute and share content with colleagues and the public. The National Academy encourages the user community to add ideas, challenges, and opportunities to help each other implement collaborative technology successfully.

The National Academy has taken on, as part of its mission, a requirement to provide guidance to federal agencies on the following question: *When, and in what circumstances, should agencies use collaborative technology to solve organizational challenges?*

The Executive StEPPs Team comprises nine federal employees who, working with the National Academy, identified and analyzed case studies in an effort to document instances where agencies use collaborative technology to solve organizational challenges. The Team surveyed collaborative technology projects across the federal, state, local, international, nonprofit, and private sectors to build a viable database from which to derive common traits and best practices. Two mechanisms were used: Team member-facilitated interviews and Web surveys. The interview and survey questions addressed the following four elements of each collaborative technology case study:

1. The business challenge, or need, the organization must solve.
2. The decision and approach taken to solve the challenge using collaborative technology.
3. The results achieved by the organization.
4. The lessons learned by the organization.

Using the results and lessons learned from the case studies, the Team summarizes findings in the federal guidance report regarding effective use of collaborative technology to solve agency challenges related to organizational culture; policy and governance; and science, engineering, and technology. For science, engineering, and technology applications, collaborative technologies offer the following benefits, based on case study examples:

- Optimize technical transfer, support, and education to connect experts and provide solutions to those in need.
- Promote the formation of self-initiated groups around similar data or projects to undertake analysis and solve challenges.
- Catalyze innovation and process improvement (for example, public peer review and input).

- Improve internal and external communication, as well as better delivery of services for stakeholders and clients.

Other general recommendations are provided to improve the business case for collaborative technology use in government:

- Officially obtain senior leadership backing.
- Find a champion, ideally outside of the information technology group.
- Define a clear vision of direction and purpose.
- Be realistic about how collaborative technology fits into the organization.
- Utilize sound management practices for collaborative technology projects.
- Plan for and dedicate adequate financial resources and staff (e.g., may require a full-time webmaster).
- Classify criteria for success and failure.
- Measure return on investment.
- Create adequate, but not excessive, security.
- Design the collaborative technology sites to be simple to use.
- Integrate project use and maintenance into regular employee workload.
- Include incentives to keep the audience engaged.
- Account for the culture of the stakeholders in the use of collaborative technologies.

Moore recommended a report prepared by the National Academy's Executive StEPPs team: *More than Just a Slick Website: The Use of Collaborative Technology to Solve Organizational Challenges in Federal Agencies*. The report, which contains numerous examples of the use of collaborative technologies by federal agencies, should be available later in 2009.

Question: Are most of the case studies in the report examples of internal or external application of collaborative technology?
Answer: Most of the applications were deployed externally, but internal deployment may be underreported and underestimated.

Naval Installation Restoration Information Solution (NIRIS)

Robert Sadorra and Josh Fortenberry (NAVFAC), presented an update on the Navy's use of NIRIS (Attachment C). NIRIS is the Navy's corporate solution for managing environmental data sets. The NAVFAC Environmental Business Line deployed the NIRIS Web-based centralized geographic information system (GIS) database to support the multi-million dollar Environmental Restoration Program (ERP). NIRIS is being implemented across all NAVFAC offices and will be used by the Navy and its contractors to manage, evaluate, and visualize data, documents, and records for Navy and Marine Corps sites. NIRIS manages all ERP analytical and spatial data, which includes the Munitions Response and Installation Restoration Program (the Navy's Superfund/CERCLA program) data, ensuring institutional memory is preserved, land use controls are maintained, and remedial actions are effective. A Web-based tutorial on the development and functions of NIRIS is available on line (www.ert2.org/NIRIS/tool.aspx).

Question: What is the size of the Navy's universe of cleanup sites?
Answer: The total number of sites is around 4,000, and work is being performed at about 1,800 of them.

Question: How many sites have data in the NIRIS system so far?
Answer: The use of NIRIS for new projects was required early on, but one of the biggest challenges has been the conversion of historical records from formerly used data management systems. NIRIS has been online a little less than a year, and incorporating existing data is an ongoing process. Training is being emphasized.
Question: Did the Navy have to struggle with combining historical data with new data?
Answer: Yes. Data cleanup took much longer than expected as information was transferred from paper and different electronic record formats. Some offices are still struggling with it. In some instances, decisions had to be made on a site by site basis as to whether conversion of very old records was warranted.
Question: Was it possible to capture data by scanner or was it necessary to do it by hand?
Answer: Administrative records can be scanned, but numerical site data often must be captured manually.
Question: Is NIRIS replacing the NORM database?
Answer: No, NORM is still the financial and program management information system. NIRIS is intended to maintain technical, chemical, analytical, and spatial data. The goal is eventually to make NIRIS and NORM inter-operable, so that the site inventory within NORM correlates with the information in NIRIS.
Question: Will the information used in Navy reports to Congress come from NORM or NIRIS?
Answer: Most of the requirements will be extracted from NORM. NIRIS will supply elements such as acreage, which allows the Navy to correlate parcel size with environmental liabilities through the use of spatial tools.

Recommendations on Long-Term Information Management

Mindy Vanderford (GSI Environmental, Inc.) drew on an example of ancient petroglyphs to illustrate how information could be preserved successfully over the long term, even as the links to the information (the metadata) that allowed others to use it were lost (Attachment D). Redundancy is of key importance to long-term preservation of information. Genetic information, for example, has been preserved while being expanded and modified over 3 billion years. Planning for long-term data management must address the following issues:

- *Prioritization/Relevance*: Prioritization calls for supplying the right amount of information at the right time. Information overload can be described more accurately as filter failure.
- *Curation/Archiving*: Physical data warehoused in boxes can be totally destroyed by fire or flood. Information systems also are stuck with a particular ontology for classifying the information. To retrieve information from a system, a user must understand its ontology to enable knowledge sharing and reuse, but the system must be supported for the information to remain accessible. Even in the last 10 years, digital data were developed and stored in formats that rapidly became obsolete. Ultimately, digital formats have to be fast, cheap, and easy to use to ensure that they will be socially maintained.
- *Quality*: Deterioration is the perennial enemy of all data. Metadata (information about data such as input parameters, assumptions, and other minutia) must be supported. The need to maintain data quality is an enormous challenge.
- *Access*: Access is a key issue. Data in a physical format are difficult to disseminate, analyze, and retrieve. Access to digital information can be undermined by absence of

standardization and the commercial need to protect ownership of a product. The demand for faster access is a constant.

- *Integration*: Integration allows individual data sets to be combined to achieve a larger vision, for example by integrating information sets at the site scale to investigate basin- or region-wide interactions. Integration is dependent on linkages and exploding ontologies.
- *Communication*: Data are to information what wood components are to a house. For information to be communicated, the data must be processed, integrated, visualized, packaged, and disseminated.

In February of 2009, DOE's Office of Environmental Management (DOE EM) convened an Information Management Forum (IM Forum) to provide suggestions for the development and implementation of efficient information management systems for long-term environmental monitoring data across the DOE complex. The IM Forum identified the major challenges presented by current environmental information management practices at DOE, and proposed investment sectors to address these challenges.

- Environmental data historically have been maintained in physical format, which is costly to store, access, manipulate, and communicate, and is restricted by the requirement to categorize the information. The transition to digital data management presents new challenges for long-term information management. DOE faces unique issues in environmental information management due to the time scale over which information must be maintained and the size and diversity of data sources. Additionally, the DOE complex is composed of multiple semi-autonomous laboratories with diverse data management practices.
- The IM Forum recommended three strategies to address the challenges identified. First, DOE should build on existing digital information infrastructures created both within DOE and in other governmental agencies (e.g., NIH, NASA, NOAA). Second, DOE should develop data and software standards for implementation across the complex, and contractor standards for data delivery. Finally, the IM Forum recommended the development of a distributed data search engine with comprehensive coverage of both DOE complex and Web-based environmental information resources (Semantic Web). While storage of digital data is relatively easy, preservation of digital data is difficult. The proposed cyber-infrastructure would contribute to preservation of digital information through data linking, redundancy, and degeneracy, while leveraging a large number of users to provide social stability to information resources.

Question: Are there any thoughts on moving forward with the recommended system?
Answer: The IM Forum made its recommendations, but the security-conscious element in DOE's culture may be a barrier to implementation of data sharing—security tends to trump transparency. The recommendations were incorporated into a paper that likely will be posted when it has been approved.

Examples of Air Force Data Management and Information Systems: GTS and EDITT

Phillip Hunter (AFCEE/TDV) provided an overview of two AFCEE products: the Geostatistical Temporal-Spatial (GTS) optimization software, and the Environmental Decision Information Tracking Tool (EDITT). (Attachment E). The Air Force has loaded environmental data into a

central database (ERPIMS) for almost 25 years. This database, the largest of its kind in the world, consists of about 60 million analytical records gathered from 165 installations, 6,500 sites, 58,000 wells, and 95,000 boreholes. Since the early years when data were simply archived, other systems have been developed that either capitalize on these data for specialized applications, or have been created as complementary systems that store other types of data that serve new applications. The evolution and synergy of these systems has vastly expanded the knowledge base necessary for smart environmental decision-making where issues of sustainability and green technology factor into stewardship of the environment.

AFCEE developed a temporal and spatial algorithm for optimizing long-term monitoring (LTM) networks using geostatistical methods. This algorithm, known as GTS, can be used for cost-effective management of both passive sampling networks and those that monitor performance or effectiveness of remedial systems. Use of GTS typically can achieve LTM cost savings of 25 to 50 percent per site, or as much as $1M per installation with cumulative savings. GTS is a free, public-domain, LTM-optimization software application that identifies essential sampling locations and reduces redundancy in sampling frequency. GTS uses a detailed algorithm and a novel combination of state-of-the-art statistical techniques woven into a user interface that guides an operator through a complex series of analyses. Several user defaults allow a mid-level environmental professional to perform the analysis, or a more detailed path allows a geostatistician to control the analysis in a more sophisticated way. The software, manual, and algorithm can be downloaded from AFCEE's Long-Term Monitoring Programs page (www.afcee.af.mil/resources/restoration/rpo/ltm/index.asp).

EDITT (www.afcee.af.mil/resources/restoration/rpo/editttool/index.asp) is the Air Force system that provides a standardized approach to collecting the inventory of existing remediation and LTM programs. The system stores both O&M and life-cycle remedial system costs and assists in prioritization of systems in terms of optimization potential. EDITT includes the systems inventory and performance tracking tools that were part of the earlier RIPS tool. EDITT also provides new tools, including a decision-document tracker that considers legal drivers across individual installations and sites. The installation RPM has access to the password-protected EDITT system for all of the systems and LTM programs at his installation. Information can be viewed and/or updated at any time.

Question: What kind of challenges did the Air Force face in developing a centralized environmental management system? What was done to prevent the system from becoming a bottleneck to progress? Slow response can cause an active system to degenerate into an archival system.

Answer: It is important to have policies that specify how to manage the data. It also is important to develop the right tools for interrogating the data systems—tools for decision analysis are critical. Cost/benefit analysis can prove the value of the system as it operates over a period of time, which the GTS system has demonstrated. Data management costs for the Air Force are relatively low, about 0.5 percent of the overall budget for its environmental program.

Question: Has the hurdle of getting the data into ERPIMS been overcome?

Answer: Yes, the Air Force has a good handle on that.

EPA DATA MANAGEMENT INITIATIVES

SCRIBE: Environmental Data Management

John Gilbert of EPA's Environmental Response Team (ERT) gave an account of ERT's development and use of Scribe, a software tool created to assist in the process of managing environmental data (Attachment F). Scribe is a back-end Microsoft Access database that can capture a variety of data, including sampling, observational, and monitoring field data for soil, water, air, and biota. The basic system is easy to use for those with no knowledge of Access, but users experienced with Access can customize the tool when needed. For example, custom data views can be added to the database for site-specific queries. They are accessible with one click via the user interface. Customizations in a previous Scribe project, such as layouts, queries, and import scripts, can be brought forward into new projects. Custom templates can be developed based on site type that will automatically incorporate layouts, import scripts, queries and picklist values.

Scribe can import electronic data including analytical lab results in electronic data deliverable (EDD) format and sampling location data such as global positioning system (GPS). A flexible user interface allows the data to be managed, queried, and viewed. When Scribe is integrated with a software extension called Scriblets, it can be used to capture and import sampling and monitoring data that are collected on handheld portable data assistants (PDAs) during field work. Scribe outputs include labels for collected samples, chain-of-custody generation, and analytical lab result data reports. Electronic data also can be exported for user services, such as GIS tools and spreadsheets, thus allowing sampling data to be analyzed and incorporated into reports and deliverables.

The project team enters known information (lab analyses, locations, media) into Scribe at the beginning of the project. This information is transferred to Scriblets-loaded PDAs, which enables data to be entered quickly and with fewer transcription errors. Scriblets also allows the user to set up a sample number mask, and most data (such as container, medium, and sampler) will carry over from sample to sample.

Scribe.NET provides a method of storing and sharing Scribe projects. Using Scribe.NET, Scribe projects (e.g., multiple projects for the same site) can be shared between Scribe desktop clients and/or enterprise Oracle/SQL database clients. Scribe projects are "published" from the Scribe desktop client, and other desktop/enterprise users "subscribe" to the published projects. Users can subscribe to individual or multiple projects. Regional or global subscriptions can also be created for sharing entire sets of published projects.

Scribe is a known data format that the Removal program is required to use. As sites transition to from removal to remedial activity, the availability of the complete Scribe data package, in addition to hard copy reports and the site file, allows personnel to build on what was done instead of starting from scratch. Scribe also produces data deliverables that are consistent and uniform, allowing EPA to implement systems to combine Scribe data from many sites for other uses.

Question: Is Scribe freeware?
Answer: Yes. Scribe and Scribe.NET are available on the Web (www.epaosc.org/Scribe; www.epaosc.org/scribe_net), and ERT staff welcome requests for information on the use of these tools.
Question: Have you perceived any resistance on the part of field staff to adapting to a new system? Do you have any problems training people to use the system?
Answer: Our training process is to grind them down with results. Lectures don't work as well as putting results in someone's hands. Once you show people what it can do, ease of use and the flexibility and potential for cooperation and collaboration sell the system.

Region 10 – Sharing Analytical Data

Sue McCarthy (U.S. EPA Region 10) explained that Region 10's resources are limited compared to other EPA regions, so the region tends to leverage headquarter expertise and products (Attachment G). Data sharing in a common format is essential. Daily work involves incorporating analytical data into frequently used tools like GIS and spreadsheets. The analytical data can originate from external systems, such as contractor databases, CLP and other laboratories, WQX, STORET, and projects using Scribe. If data can be mapped to a simple common format or schema, data from different sources can be combined for analysis.

WQX (www.epa.gov/storet/wqx.html) is a framework that facilitates the storage and retrieval of environmental monitoring data by using standard data sharing templates (schemas) that specify data elements and data structure. Developed by EPA's Office of Water, WQX uses Extensible Markup Language (XML) and a defined set of data elements (the WQX schema) to allow states, tribes, and other organizations to submit data from their own database to EPA's STORET Warehouse. The standardized data formats specify the data elements and data structure required for submission of data to EPA. The WQX schema is an implementation of the Environmental Sampling, Analysis, and Results (ESAR) data standard, which was developed by states and EPA.

The WQX schema provides for complete reporting of water quality monitoring, from field measurements and observations to samples and subsamples. The major components of the WQX schema follow the ESAR data standard closely, and many of the data elements in WQX share the same names and definitions as the data elements in ESAR. The WQX schema accommodates the sharing of physical, chemical, fish tissue results, biological, and habitat data. WQX is technically state of the art, a well-designed, standardized, non-proprietary system. It provides a data repository that can house historical and current site data. It allows users to leverage CLP information because a subset of CLP data can be housed in WQX and used for data analysis. The data are accessible, and even site stakeholders have access to the data site. With data download available via the Internet, WQX makes it easier for states, tribes, and others to submit and share water quality monitoring data. It was used by the Puget Sound Partnership due to its ability to facilitate secondary use of Superfund data. WQX is also developing a variety of analytic tools to support water quality-related decision making.

McCarthy suggests that OSWER and other data providers would benefit from leveraging the expertise of the Office of Water. Emergency response data could be standardized by exploring a Scribe/WQX schema crosswalk and developing a WQX version of Scribe with custom lists and

views. A similar treatment of Superfund data is suggested by investigating Superfund electronic data deliverable/WQX schema similarities, testing a pilot flow of data from CLP to WQX, and developing a WQX version of Forms 2 Lite.

Question: What time scale did your slide show?
Answer: It spanned a period of six years.

Electronic Data Capture in Region 4

Fred Sloan (U.S. EPA Region 4) described an environmental data archival system Region 4 has implemented for all programs using the Region 4 Science and Ecosystem Support Division (SESD) laboratory and CLP (Attachment H).

The legacy data collection and reporting system was inadequate to the needs of the end users of the data. The new system routinely captures data for Superfund, RCRA, Water, and Air programs into an Oracle-based system purchased from EarthSoft (EQuIS). The analytical data are provided to EQuIS via Region 4's Laboratory Information Management System (Element by Promium), while the necessary field data are provided by field project leaders from EPA, the states, and EPA contractors responsible for sample collection. By developing methods for the SESD lab and CLP systems to communicate, Region 4 can now routinely capture all EPA-led investigations using these resources. This system is successful because it can provide feedback to all data providers in a timely fashion on the status of their data. At the present time, EQuIS is collecting data only from samples run through the CLP system, but Region 4 is working on being able to accept data from potentially responsible parties.

Sampling information (Station ID, Sample ID, date, time, analyses, media) is provided to Element via FORMS (.xml file export). This information is compared to EQuIS to determine what data elements might be missing (most commonly sample coordinates). If any required data are missing (or if errors are found), an automated email is sent to the responsible party requesting the data or a correction. Emails are sent each Monday until the corrections/missing data are provided. At this point, the analytical data can be loaded to EQuIS.

Missing data (such as Location EDD) are attached to the requesting email in the Region 4 EDD format and sent to SESD. These Location EDD files can be created from a partially completed attachment in the requesting email, or can be created from FORMS using a Region 4 utility. If errors are found, the responsible party can correct them in the email and send it back to SESD.

EQuIS is a very powerful tool for analyzing and presenting environmental data. This system forms the basis for a major upgrade in how Region 4 stores and processes environmental data. As with any database, EQuIS requires a support system to deliver high-quality data.

Comment: When the Navy was looking for a data management system, EQuIS was given serious consideration. NIRIS and EQuIS are very similar, and EQuIS is a powerful solution, but it didn't quite fit the standard being developed by the Office of the Secretary of Defense or the Navy's particular requirements for accommodating munitions response data.

Comment: Because of the way organizations use different values to characterize sample components, sampling results for a site taken by two parties using different systems could look like two different versions of the same site. In the absence of standardization, there is a great need for middleware that will translate the differences and allow diverse data sets to be entered into the same system.

Web 2.0 @ EPA

Rick Martin of EPA's Office of Environmental Information discussed the Agency's use of social media available in the universe of Web 2.0, the second generation of web development and design (Attachment I). Web 2.0 social media facilitate communication, information sharing, interoperability, and collaboration on the World Wide Web. The availability of these media has led to the development and evolution of web-based communities, hosted services, and web applications. Examples include social-networking sites, video-sharing sites, wikis, blogs, Twitter, RSS news feeds, and folksonomies.

EPA offices want to explore opportunities to be innovative and more efficient and meet their audiences' needs more effectively. The creative use of social media can improve EPA's effectiveness in a variety of areas by:

- Enabling geographically dispersed teams to work together effectively.
- Helping EPA share knowledge within the agency and with partners.
- Attracting and retaining employees.
- Allowing the Agency to communicate with the public in new ways.
- Enabling public discussion of important environmental issues.
- Expanding traditional participation in EPA's regulatory development process.
- Increasing transparency with the public.

EPA's one public-facing blog is Greenversations (blog.epa.gov/blog/), but it has 22 other blogs and 47 wikis through Intranet/Extranet channels. EPA launched its YouTube channel in early March (www.youtube.com/usepagov). EPA's Facebook page has current blog entries and events, such as Earth Day, and it links back to the EPA Web site. It is not new content, just a new method of delivery.

In 2007, The Governor of Washington State appointed former EPA Administrator Bill Ruckleshouse to head up the Puget Sound Initiative, which was tasked with developing a comprehensive plan for cleaning up and protecting the Puget Sound ecosystem. At the 2007 Environmental Information Symposium, EPA kicked off the 2-Day Puget Sound Information Challenge (pugetsound.epageo.org/index.php5?title=Main_Page) using Web 2.0 technologies. The Challenge wiki garnered more than 18,000 page views, 175 entries with everything from documents to decision support systems. The willingness of people to contribute everything from documents to decision support systems illustrated the benefits of using Web 2.0 collaboration tools.

Watershed Central is designed to assist users with development and implementation of effective watershed management programs. The site contains guidance, tools, case studies, and data sets to assist users in sharing information, analyzing data, and identifying opportunities to initiate or strengthen watershed management efforts. Watershed Central offers a wiki application

(www.epa.gov/owow/watershed/watershedcentral/wiki.html) for information sharing and collaboration. Information in the wiki that is deemed appropriate is moved over to the Watershed Central pages on EPA's web site.

EPA is developing strategies and policies regarding the external use of social media. The enterprise collaboration strategy is aimed at addressing social media infrastructure needs. The strategy will assess options and provide recommendations for technologies EPA can support and use. The Social Media Policy Workgroup is developing a policy for the Agency that will specify the use of social media be linked to the agency's mission. The policy will contain procedures and additional guidance on specific technologies or issues. The Workgroup is drafting a memo and interim guidance from CIO and Office of Public Affairs about representing EPA online in an official capacity. The policy does not apply to personal use while at work. The guidance stipulates the following restrictions:

- Online representation needs the supervisor's approval and should be within job responsibilities or expertise.
- Record of the activity must be maintained, and the activity should be transparent.
- The communication will convey facts, not opinion.
- The public needs to be clear that any edits or corrections made by EPA are based on facts with appropriate supporting citations.

Question: Do all staff across EPA have agency permission to use the social media—for example, can everyone Twitter?

Answer: On a personal basis, of course; however, the person who twitters or tweets externally as an employee of EPA will have the authority to do so, guidance to follow, and will need to exercise as much care under as much management involvement and oversight as would be appropriate for an official memo. But within the agency, for collaborative agency use, those restrictions will not apply.

Comment: Mechanisms to help the public participate in rulemaking have evolved in the last decade. Regulations.gov, the public face of the Federal E-Government eRulemaking Program, facilitates public participation in the federal regulatory process by improving the public's ability to find, view, and comment on federal regulatory actions. The user-friendly interface is revolutionizing the way the government writes rules, solicits comments, and involves the public in its decision-making by moving from paper-based processes to electronic ones.

MEETING WRAP-UP/NEXT MEETING AGENDA

Balloting for the next FRTR meeting topic indicated vapor intrusion as the topic of greatest interest to member agencies. The Air Force will take the lead in developing the agenda and coordinating the Fall 2009 FRTR meeting with John Kingscott and Marti Otto.

Jeff Heimerman asked if the meeting attendees saw any potential for cross-agency sharing of source codes and design elements for environmental data management systems developed for essentially the same purposes.

Robert Sadorra responded that all the components that comprise NIRIS are commercially available. The only unique part of the system is the data model that centralizes the data and captures the elements that are of particular interest to the Navy.

Phillip Hunter said that the Air Force borrowed elements from the Army's system (which was already Web enabled), including software for interrogating the system. The valid values, conventions, and quality checks are available in a data dictionary in a model that is open to anyone with an interest. During the process of developing a database, it is important not to try to do too much at one time, or to "capture the world"; it is too easy for the enterprise to spin out of control. Tools that are easy to use are key. Configuration management has to be tight, and it is important to have quality controls on the data being entered. Flexibility in data structure will allow for modification when new types or formats of data must be captured.

Erica Becvar added that none of the Air Force's environmental data systems have resulted from proprietary development—those types of systems, their coding, and the models are freely available. She emphasized that ensuring the quality of the data entered into the system is of major importance. Data sets from 2008 are still being entered into the databases because data verification is a time-intensive process.

Beth Moore supported the idea of cross-agency system sharing, aiming for one best system as a desirable goal using components that are in the public domain. She cautioned that DOE experience has demonstrated the importance of budgeting to maintain and support public domain software; unsupported, it falls out of usability.

David Carillo pointed out that even the best system planning can be affected by factors beyond agency control. For example, as his office replaces old desktop computers with new ones using a different operating system, there is evidence that the new operating system can affect user ability to access or coordinate with applications that tie into other systems (e.g., RACER).

The next meeting will be scheduled in November or December. Heimerman thanked everyone for attending, and the meeting was adjourned.

ATTACHMENTS

A. EPA OSWER Data Management: Current Efforts and Issues
B. Collaborative Technology: Guidance for Federal Agencies
C. Naval Installation Restoration Information Solution (NIRIS)
D. Recommendations on Long-Term Information Management
E. Examples of Air Force Data Management and Information Systems: GTS and EDITT
F. SCRIBE: Environmental Data Management
G. Region 10 – Sharing Analytical Data
H. Electronic Data Capture in Region 4
I. Web 2.0 @ EPA

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