WEB-BASED

Information technologies have increased collaboration among members of the environmental project team and the value of the information assets at Tooele Army Depot.



By Suzan Hughes and Maryellen Mackenzie

he environmental industry has long sought innovative technologies that allow it to deliver additional value to its customers under ever-increasing budgetary pressures. Historically, the innovations have centered on remediation, sampling and design activities. Innovations in information management have been viewed largely as unable to provide the return on investment necessary to make a technology economically viable. That is not the reality, however. The management of project data has the potential for enormous cost and schedule impacts, both positive and negative.

The investigation of new information technologies can be challenging, because the concept of "data management" is rather abstract in nature. Although the value of "information management" is not easily quantified, it can be optimized based on the fact that value increases with utility and decreases with cost. In a practical sense, project managers can maximize the utility of information and minimize its cost to the project through collaboration.

value $\propto \frac{\text{usefulness}}{\cos t}$

Value Equation: The *value* of information technology increases with its *usefulness* and decreases with *cost*.



The Army Corps of Engineers (USACE) Sacramento District, has for several years used Internet-based technologies that enable real-time collaboration among members of the project team. These technologies allow unprecedented use of technical data, electronic documents and geospatial data associated with environmental activities, and can be accessed from any computer using only a Web browser. This system has resulted in a cost-effective solution to the problem of sharing information across organizational, disciplinary and geographic boundaries.

Tooele Army Depot

At Utah's Tooele Army Depot, established in 1942 as a major ammunition storage and equipment maintenance facility, volatile organic compounds have been released into the environment and into the groundwater from an industrial waste lagoon. In 1982, a "pump and treat" system was installed to purify the impacted groundwater. The system has operated continuously since 1994.

Investigations have continued, as another source was identified through groundwater monitoring in 1994. In 1998, a RCRA Phase I Facility Investigation (RFI) was initiated to identify whether other sources of groundwater

> contamination were present. That has been completed and a Phase II RFI is in progress. The many and lengthy investigations involved multiple contractors and volumes of information.

Web-Based Information Management

To access and use existing data for decision-making, the Army opted for a single repository from which data generators, data users and decision-makers could obtain the information they need. The goal was to take advantage of collaboration to increase utility, and thus increase the value of the information collected in support of the project. To permit multiple organizations and people to share a single data set successfully, a Web-based service was designed to meet these requirements: • Facility Control of Data: The system has tools that allow the "database owner" to designate all permissions and data access rules. At Tooele Army Depot (AD), this responsibility was shared between the base environmental officer and the USACE project manager.



Web-Based Information Repository houses all technical data, electronic documents and geospatial data associated with environmental activities performed at Tooele Army Depot.

• All Members Share One Data Set: The permissions-based system implemented by the Tooele AD team was the first in the environmental industry to allow multiple organizations to share a single live data set. Similar in concept to a local area network, but able to be deployed within an Internet browser to any authenticated team member, the enterprise-level application used for the project solved the problem of multiple data sets and decentralized information access.

• User-Friendly for All Disciplines: The collaborative system provides geologists, chemists, surveyors, project managers and team members in other disciplines, few of whom are skilled in database programming, the information they need in straightforward way. They select from a variety of Internet tools that allows them to work comfortably with the database and the data in ways appropriate to their disciplines.

• Security Concerns: The data system meets the security needs of the project and those of accessibility. The basic system operates with the same level of encryption and firewall protection used for banking transactions. Backups of the data set are maintained, and transaction logs record database activities. All formal security policies of the USACE and the facility have been met or exceeded.

• *Traceability of Inputs and Modifications:* In addition to security, legal defensibility concerns exist regarding the modification of data. The system here is the first to allow individual data generators (laboratories, field personnel, project managers) to directly load their own data into final system tables. During loading, unaltered copies of the files are stored on the central server and on the client's local machine. This is done to maintain the legal defensibility of the information in the central repository.

Successes

This Web-based system has increased substantially the utility of data.

• The Agency for Toxic Substances and Disease Registry used the database to craft its Public Health Assessment and answer questions of local citizens regarding the risks posed by the many sites here.

• By accessing real-time groundwater and contaminant charts and reports, regulators and the Army now make more informed decisions as to the nature of groundwater plumes here.

• The electronic document library houses many of the depot's critical documents—those that lay out work requirements of the work, how the work was performed and the conclusions reached—all of which are retrieved using a simple search interface.

• The documentation behind the database and its data allows the Army to substantiate its work convincingly.

• Data entry is easier; data generators use task-specific submission forms and loading tools.

• People who had never used a database are some of the most forceful advocates of this system.

Today, nearly 200 system users in more than 20 varied organizations use Tooele Army Depot's information repository daily to complete complex, data intensive tasks, performing an average of 1,500 database transactions every day.

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Outsourcing to Enhance Collaboration

In addition to the cost savings and quick implementation that can be achieved through outsourcing data management, it is frequently the most efficient way to allow multiple organizations to share a single data set. Data centers specializing in the maintenance of large amounts of information are well suited to provide secure and controlled data access. A community of database users develops quickly, and the sharing of information allows all projects to benefit from invested resources.

Other benefits of using a service provider include having the latest technology, with the cost of maintaining it borne by the provider, not in-house IT budgets and personnel resources. Standard programming features enable application turn-ups in 30 days or less. Users choose whether to staff the project out of their own offices, with training and technical support as needed, or offload the whole thing to the provider. For these reasons, it makes sense to include the option of outsourcing data management when evaluating technology needs.