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# INTEGRATION OF INNOVATIVE EXPEDITED SITE CHARACTERIZATION TECHNIQUES

### TECHNOLOGY NEED

Because technology gaps exist, even within the context of Expedited Site Characterization (ESC) the scope of this project will involve the use of both state-of-the-practice technologies (SOPT) as well as innovative characterization technologies (IT). By fielding ITs at actual sites, nontechnical as well as technical barriers can be simultaneously identified. Of prime importance is an opportunity to involve regulators in the evaluation and fielding of these technologies as well as the ESC method itself. Side-by-side comparison of ITs with SOPT technologies, documented standard operating procedures, and confirmatory off-site analysis are some of the criteria for encouraging regulatory acceptance of ESC and any ITs.

### TECHNOLOGY DESCRIPTION

This project promotes the adoption of ESC and its associated technologies, so that the costs and time associated with the U.S. Department of Energy's (DOE) site characterization program can be dramatically reduced.

The ESC methodology incorporates on-site decision-making technologies that permit site characterizations to be completed in one continuous phase. It has demonstrated that the characterization phase can be streamlined, without compromising data quality. Using both on-site analytical and multiple hydrogeologic technologies, the need to send nearly all samples off-site and the need to perform massive subsurface sampling in the absence of local hydrogeologic information is removed. By providing on-site decision-making capability, ESC can significantly reduce the probability of having to return to the site to fill data gaps. As a result, the current multiphase time sequence of data acquisition - consisting of sampling, analyzing, planning and sampling and so forth, that typically takes years - becomes compressed into a single real-time phase, requiring only months to complete. Because each new piece of information is dictated by analysis of all past data, its information content is maximized. The result is not only quicker but better site characterizations.

### BENEFITS

The benefits of this project can be divided into two categories: the ESC methodology development and the demonstration of the innovative ESC analytical and geotechnical technologies. ESC has already demonstrated at two sites in FY94, the importance of early and continuous involvement of the regulators, and the utility of an on-site mobile command center to enhance the ESC process.

In FY95, at the D-Area Oil Seepage Basin (DOSB) site in Savannah River it was shown that a different management strategy can be used to execute ESC. Instead of permanent project personnel as the source of ESC management staff, task management responsibilities (e.g., analytical, geophysical, regulatory documentation, and field services) were out-sourced to both private sector consultants and components of the DOE site management team in a manner consistent with the principles of ESC and the standard operating procedures of the environmental services marketplace. Ames ESC project personnel maintained the responsibility of overall program and project management. The benefits consisted of improved ability to transfer this methodology to the private sector, and proactive involvement of the environmental remediation site team. This management mode makes the ESC methodology easier to bring to other DOE entities. As support for this contention we note that DOE at SRS has committed to performing all characterizations using ESC methodology with the Ames ESC as consultants to their EM-40 site managers starting February 1996.

## **COLLABORATION/TECHNOLOGY TRANSFER**

The adoption of ESC and its technologies requires not only field demonstrations, but widespread dissemination of the ESC story. In FY94 and FY95, conducted tours for stakeholders at the selected sites served as the vehicle for ESC promotion.

These tours were vital in transferring an understanding of the ESC methodology, but they were nonetheless limited to those stakeholders who are able to attend (500 thus far, for three demonstrations). To build the “critical mass” of those who are aware of and understand the ESC methodology and are able to effect its adoption, the production of a variety of ESC high-impact information packages targeting environmental contractors, site managers, technology providers and regulatory communities were accomplished in FY95.

The ESC commercialization plan for these ESC information products has been implemented, including a large world wide web site that has been constructed at: <http://www.etd.ameslab.gov/technologies/projects/esc/index.html>.

## **ACCOMPLISHMENTS**

- ESC has been accepted by DOE EM-40 for adoption at all sites at SRS, and the Ames ESC team has been contracted to provide guidance on ESC principles and practices.
- DOSB on the SRS.
- Site Specific Contaminants (SSCs) were determined during the first Phase in June, along with ground penetrating radar (GPR) and EM geophysical measurements. Innovative groundwater sampling using Geoprobe samplers without filtering was tested and confirmed to yield representative samples.

- U.S. EPA methods using gas chromatography (GC), inductively-coupled plasma (ICP) and Graphite Furnace Atomic Absorption (GFAA)-based instrumentation, plus direct push probes were fielded during the second phase held during August/September 1995 at DOSB. Eight SSC plumes were tracked in groundwater and data for baseline risk assessments and feasibility studies were obtained.
- There was acceptance of ESC at the DOSB site at SRS from the regulators from U.S. EPA Region IV and South Carolina Department of Health and Environmental Control, in particular the practice of early, proactive regulator involvement.
- Over 180 stakeholders participated in the stakeholder program at SRS DOSB site that included ESC presentations, panel discussions, technical overviews and exhibits, and on-site tours for a closeup view of the technologies in action.
- An ESC demonstration at an oil refinery in Czechowice, Poland is being planned for spring of 1996 as part of a joint DOE/Polish project.
- Nearly all ESC technologies for each of the four demonstrations were contracted from an international suite of private sector vendors, with some participation from university and DOE entities.

### TTP INFORMATION

Integration of Innovative Expedited Site Characterization Techniques technology development activities are funded under the following technical task plan (TTP):

TTP No. CH13C221 "Integration of Innovative Expedited Site Characterization Techniques"

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### BIBLIOGRAPHY OF KEY PUBLICATIONS

None available at this time.