

EPA's Superfund technical support project*

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Abstract

Remediation of hazardous waste sites, especially the subsurface component, is a relatively new, extremely complex, interdisciplinary science. Success is determined more by experience than by hardware. The Technical Support Project of the U.S. Environmental Protection Agency (EPA) has been very successful in minimizing the time between development of the science and application of that scientific knowledge to decision making in the field. The Technical Support Project not only transfers knowledge from research to the field but acts as a critical feedback mechanism for focusing research efforts on the highest priority and most productive areas. Requests for technical support to the Superfund program have increased dramatically through the years as Regional staff have become more familiar with the system and how to access the program. In 1991, EPA's Office of Solid Waste started an effort to extend the Technical Support Project to the RCRA corrective action program. RCRA corrective action may affect almost 4000 facilities and, although administrative efforts may differ, technical questions will be very similar to those addressed by Superfund.

Background

In early 1987, there were several studies conducted by Congress and EPA's Office of Solid Waste and Emergency Response (OSWER) that indicated a number of problems with Superfund site remediation decision making. Regional staff, Regional Project Managers (RPMs) and On-Scene Coordinators (OSCs) who were responsible for selecting and/or approving remediation programs were overloaded and had a high turnover rate. Most had a relatively narrow technical background at a time when managing the cleanup of Superfund sites required state-of-science knowledge of a number of disciplines, in a complex environmental field where the science was (and is) developing rapidly. There was a great deal of inconsistency within and between Regions con-

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cerning site remediation. The OSCs and RPMs needed a source of technical expertise to help resolve technical problems and to evaluate the advice of their contractors.

Also in 1987, there was an *ad hoc* group of Regional ground-water specialists that began a series of meetings to share their experiences in Superfund remediation and investigate methods of obtaining technical support. These meetings led to a formal group called the "Ground Water Forum" which now includes representatives from all ten EPA Regional Offices. EPA's Office of Solid Waste and Emergency Response (OSWER) was exploring ways to make EPA's Office of Research and Development (ORD) scientific expertise more readily available to provide assistance. To this end, OSWER and ORD established the Technical Support Project which provided funding to four ORD laboratories to establish technology support centers. The Centers and specialty areas are:

- Robert S. Kerr Environmental Research Laboratory (RSKERL), Ada, Oklahoma (Ground Water Fate and Transport)
- Environmental Monitoring and Support Laboratory (EMSL), Las Vegas, Nevada (Monitoring and Site Characterization)
- Risk Reduction Engineering Laboratory (RREL), Cincinnati, Ohio (Engineering and Treatment)
- Environmental Research Laboratory (ERL), Athens, Georgia (Exposure and Ecorisk Assessment)

The objectives of the Technology Support Centers are to:

- Provide technical support and assistance to Regional staff;
- Improve communications among Regions and ORD laboratories;
- Ensure coordination and consistency in the application of remedial technologies; and,
- Furnish technology workshops and state-of-the-science information for RPMs and OSCs.

Since the establishment of the original four Technology Support Centers, two additional centers have been added to the Technical Support Project. The Environmental Criteria and Assessment Office (ECAO) Laboratory at Cincinnati provides chemical-specific health information and reviews site-specific Superfund risk assessments. The Emergency Response Team in Edison, New Jersey, provides assistance on health and safety and emergency response, remedial and removal program clean-up technologies.

With establishment of the Technical Support Project, a Regional Engineering Forum analogous to the Ground Water Forum was established and both groups provide points of contact between the Centers and the Regional staff.

Centers' mission

The Centers provide technical support in response to formal written Regional requests, in addition to responding to hundreds of telephone inquiries.

The types of assistance provided range from the review of contractor work plans and reports to the development and evaluation of treatability studies and remedial alternatives. The Centers also develop Issue Papers and provide workshops on critical technical topics identified by the Forums. Since the Technical Support Project was initiated in late 1987, the Centers have responded to over 1200 requests for technical assistance in support of remedial activities at Superfund sites.

The Center at the Environmental Monitoring and Support Laboratory (EMSL-Las Vegas) in Las Vegas is most often asked to conduct, oversee, or provide information on portable XRF, soil gas, geophysical surveys, field monitoring and analysis, and radiological analysis.

Requests to the Center at the Environmental Research Laboratory (ERL-Athens) in Athens, Georgia, most frequently involve data and ecorisk analysis, usually by applying mathematical models. They also review reports and work plans.

At the Risk Reduction Engineering Laboratory (RREL) in Cincinnati, requests are generally related to reviewing and overseeing treatability work plans and studies, remedial designs, remedial actions, remedial processes, and traditional and innovative technologies.

The Center at the Robert S. Kerr Environmental Research Laboratory (RSKERL) in Ada, Oklahoma, regularly reviews and oversees work plans and studies related to bioremediation, soil vapor extraction, treatability studies, ground water modeling, pump-and-treat, and other activities concerned with *in situ* soil and ground water remediation.

RSKERL-ADA technology support center

Each of the Centers operates in a somewhat different manner because of their organizational structure and different research missions. A major area of RSKERL research deals with transport and transformation of contaminants in the subsurface environment, including: use of soil systems in treating waste; characterization of hydrogeologic, abiotic, and biotic processes controlling contaminant transport and fate; and expression of these processes in mathematical models. This in-house program and its extension through extramural research with universities and other research entities is the foundation for the RSKERL Technology Support Center (TSC). The mission of the RSKERL TSC is to make available to site remediation decision makers state-of-the-science information on the transport and fate of contaminants in soils and ground water, along with scientific expertise needed to determine how it may influence remediation selection and performance.

The RSKERL-Ada Technology Support Center is part of the Applications and Assistance Branch, one of the four branches in the Laboratory structure (Fig. 1). The Applications and Assistance Branch was created in 1984 to serve

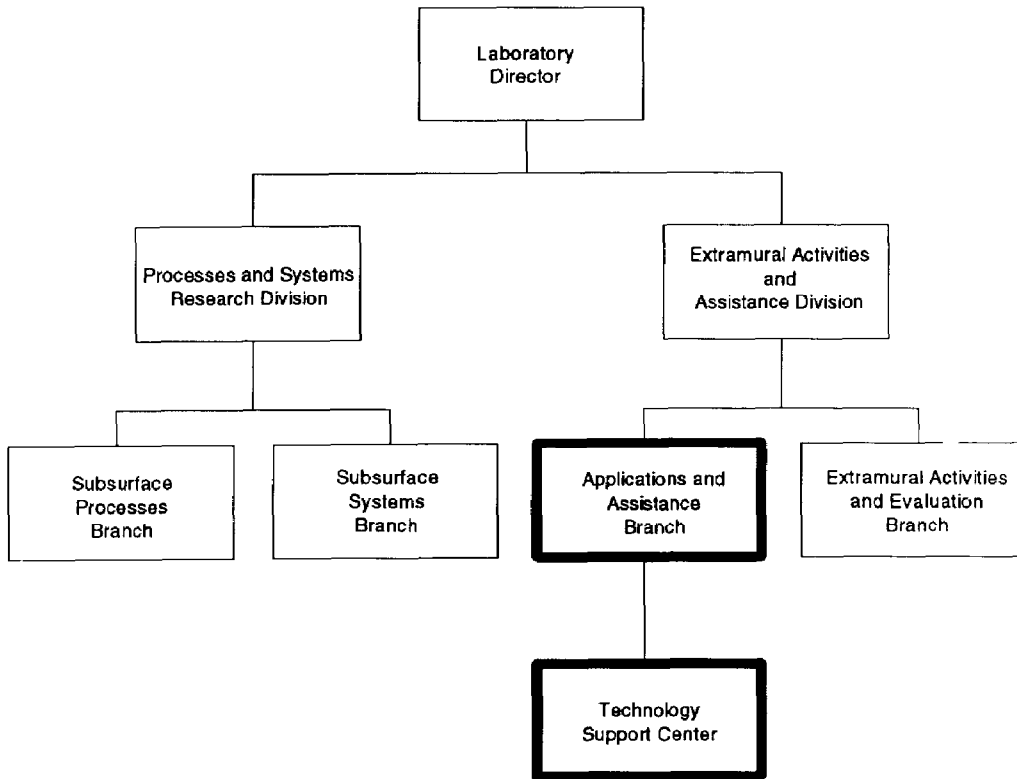


Fig. 1. The TSC in the RSKERL organization.

as the focal point for Laboratory technology transfer and technical assistance. Although many of the Branch staff have research responsibilities, their major responsibility is technology transfer in much the same manner as USDA's extension service. Branch staff make up the TSC Core Team which currently consists of five hydrogeologists, two environmental engineers, two soil scientists, two microbiologists, a biologist, and a chemist. The Core Team is supported by in-house scientists from the Laboratory's Research Division and scientists from the National Center for Ground Water Research (NCGWR), a consortium of Oklahoma, Oklahoma State, Texas and Rice Universities. A contractor with on-site scientific and information transfer personnel, over 100 off-site consultants, and subcontracts with GeoTrans and firms for treatability studies provides additional support to the Core Team (Fig. 2).

With an increasing number of Agency decisions being based on mathematical models as demonstrated by increasing requests for modeling support, RSKERL has established the Center for Subsurface Modeling Support (CSMoS) under the umbrella of the Technology Support Center. CSMoS consists of RSKERL modelers, the NCGWR, the International Ground Water Modeling Center now at the Colorado School of Mines, and an extensive list of ground water modeling consultants available via the on-site technical sup-

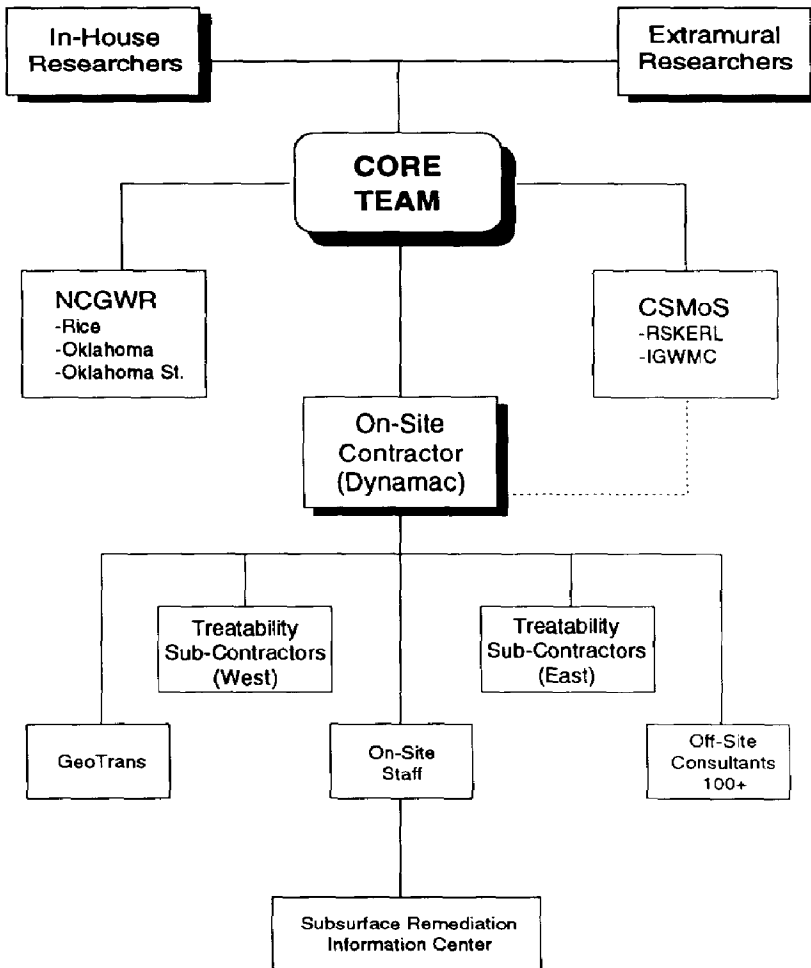


Fig. 2. Position of the Core Team in the project organization.

port contractor. CSMoS distributes and services all models and databases developed by RSKERL, and provides review and assistance to Regional staff on applications of a variety of ground water and vadose zone models.

The RSKERL TSC responds to requests for technical publications with approximately 500 reprints per month and, since its inception in late 1987, has conducted in excess of 60 workshops, seminars, or conferences in all ten EPA Regions; completed 15 issue papers (Fig. 3) with another 10 currently being prepared; and provided site-specific technical support at more than 200 different Superfund sites encompassing all ten Regions (Fig. 4).

The type and duration of site-specific technical support varies greatly among the different sites. Often, the request is for review of a contractor report or workplan for treatability studies or full-scale remediation involving technologies such as pump-and-treat, soil venting, or bioremediation. In many cases,

SF ISSUE PAPERS COMPLETED

- Accuracy of Depth to Water Measurements
- Ground Water Sampling for Metals Analyses
- Colloidal-Facilitated Transport of Inorganic Contaminants in GW: Part 1, Sampling Considerations
- Facilitated Transport
- Contaminant Transport in Fractured Media: Models for Decision-Makers
- Performance Evaluations of Pump-and-Treat Remediations
- Basics of Pump-and-Treat GW Remediation Technology
- Dense Non-Aqueous Phase Liquids
- Basic Concepts of Organic Contaminant Sorption at Hazardous Waste Sites
- Characterizing Soil for Hazardous Waste Site Assessments
- Bioremediation of Contaminated Surface Soils
- Reductive Dehalogenation of Organic Halogenated Pollutants in Soil and GW

Fig. 3. RSKERL TSC project papers completed since 1987.

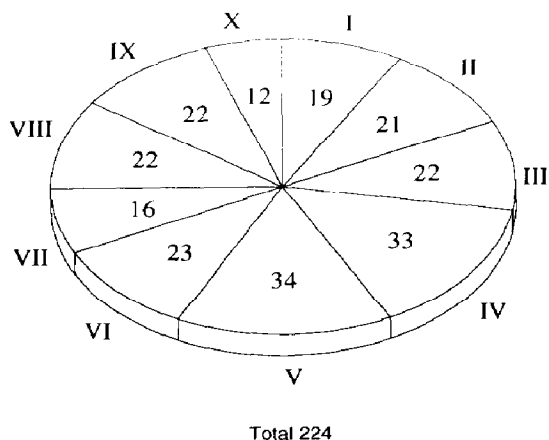


Fig. 4. Distribution of site-specific support given by RSKERL TSC to all ten regional EPA offices.

involvement is much more extensive. RSKERL has been providing intermittent technical support at some Superfund sites for more than four years. Such support has sometimes involved extensive field investigations to better define site characteristics, treatability studies to determine technology applicability, and/or extensive modeling efforts to evaluate the performance of existing remediation efforts.

Conclusions

Remediation of hazardous waste sites, especially the subsurface component, is a relatively new, extremely complex, interdisciplinary science. Success is determined more by experience than by hardware. The Technical Support Project has been very successful in minimizing the time between development of the science and application of that scientific knowledge to decision making in the field. The Technical Support Project not only transfers knowledge from

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