

FEDERAL REMEDIATION TECHNOLOGIES ROUNDTABLE

TECHNOLOGY COST AND PERFORMANCE CASE STUDIES: FACT SHEET AND ORDER FORM



The Federal Remediation Technologies Roundtable (FRTR) has announced the release of 29 new cost and performance case study reports describing the use of remedial technologies and 11 new reports describing the use of site characterization and monitoring technologies at hazardous waste sites. All the reports are accessible at www.frtr.gov. With these new reports, the FRTR now has a total of 342 case studies on remedial technologies and 121 reports on site characterization and monitoring technologies.

The FRTR leads the federal government's efforts to promote interagency cooperation to advance the use of innovative technologies for the remediation of hazardous waste sites. One of the FRTR's priorities is to document the cost and performance of completed and ongoing site remediation projects. Primary members of the FRTR include the U.S. Departments of Defense, Energy, and Interior, National Aeronautics and Space Administration, and the U.S. Environmental Protection Agency (EPA). More recently, the FRTR has been working with states to capture results from their efforts to document innovative remediation and characterization technology applications.

Areas of emphasis in previous cost and performance updates have included in situ groundwater remediation technologies and cleanup of dry cleaner sites (2002); treatment of MTBE in groundwater and drinking water and optimization of groundwater cleanup systems (2001); bioremediation of halogenated volatiles and dense non-aqueous phase liquid (DNAPL) treatment (2000); groundwater pump and treat and incineration

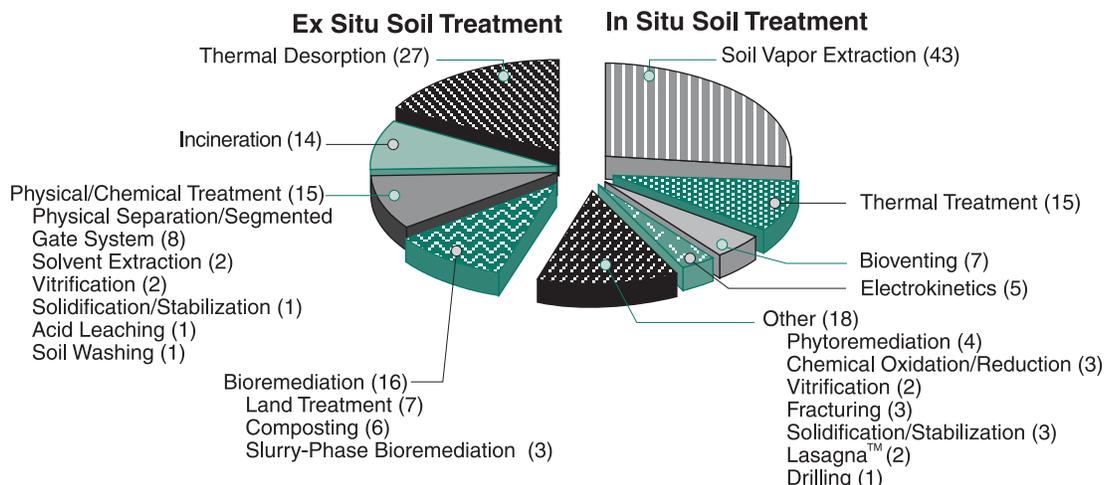
HIGHLIGHTS

- 12 new case studies addressing cleanup of halogenated volatile compounds in groundwater using aggressive abiotic in situ technologies such as thermal treatment, chemical oxidation, and air sparging
- 16 new case studies focusing on in situ or ex situ soil treatment, including 4 new case studies covering cleanup of soil at dry cleaner sites
- 11 new site characterization and monitoring case studies covering innovative technologies for organic chemical and explosive characterization, strategies for field-based site characterization, geophysical techniques, leak detection for bulk fuel tanks and fuel pipelines, and air emissions characterization
- Updated on-line database system providing ability to search and screen all 342 remedial technology case studies at <www.frtr.gov>

(1998); and thermal desorption, soil vapor extraction, and land treatment (1995).

All the case studies on remediation describe actual applications of technologies at full-scale or large scale demonstrations. The case studies document real experiences and lessons learned in selecting and implementing technologies to treat a wide range of soil and groundwater contamination at a variety of sites. The FRTR has seen increasing use of this information by federal and state project managers, technology providers, consulting engineers, academia, and international parties in identifying smarter solutions for and making better engineering judgements about site remediation.

EXHIBIT 1. SOIL REMEDIATION CASE STUDIES



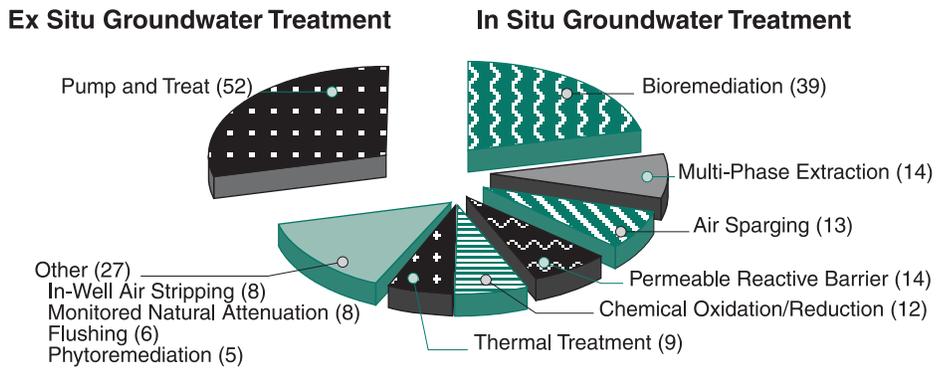
CASE STUDY REPORTS – CURRENT STATUS

The 342 FRTR case study reports now available cover a wide range of technology types and contaminants. Each report (10-40 pages in length) provides information about site background and hydrogeology, a description of the technology design and operation, data about cost and performance, information about lessons learned from the project, and points of contact. All the remediation case studies are accompanied by abstracts (2 pages in length) that summarize key information about the site-specific technology application as recommended in the *Guide to Documenting and Managing Cost and Performance Information for Remediation Projects* (EPA-542-B-98-007, October 1998).

The Guide provides procedures for documenting the matrix characteristics and technology operation, performance, and cost for conventional and innovative cleanup technologies. It includes a set of parameters, organized by technology, that shows the types of factors that affect technology performance and cost. By following the Guide's recommended procedures, the abstracts provide information in a consistent, standardized manner that helps to increase comparability among projects. The abstracts can be viewed before accessing the case study reports in the on-line database system. Abstracts for the new reports are also available in the seventh volume of *Abstracts of Remediation Case Studies* (EPA 542-R-03-011, July 2003). The 342 reports, along with additional related FRTR resources, are also available on CD-ROM (EPA 542-C-03-002, July 2003).

The FRTR case study reports include more than 30 types of technologies for treating soil and groundwater contamination, with 160 reports addressing soil cleanup and 180 reports

EXHIBIT 2. GROUNDWATER REMEDIATION CASE STUDIES



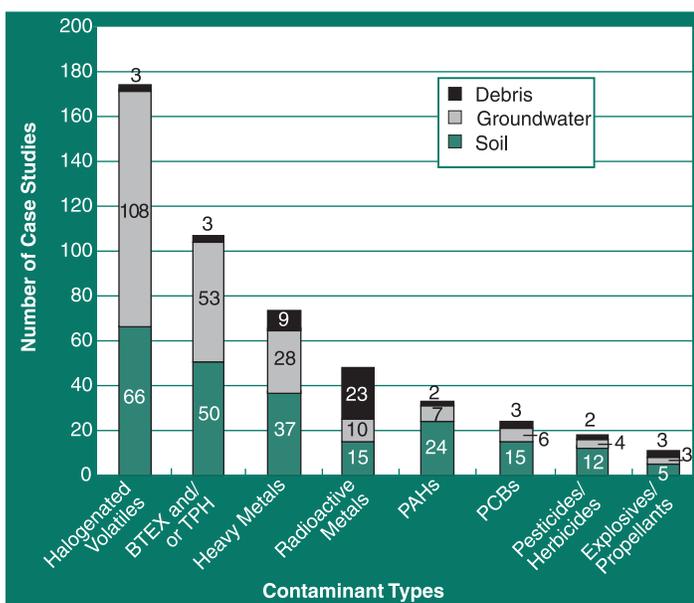
concerning groundwater. Exhibits 1 and 2 show the specific soil and groundwater technologies covered by the site remediation reports, along with the number of reports for each technology.

Exhibit 3 provides a summary of the contaminants and media types addressed by the FRTR case studies. This exhibit shows that a variety of contaminants and media are addressed, with halogenated volatiles and benzene, toluene, ethylbenzene, and xylene (BTEX)/total petroleum hydrocarbons (TPH) being the contaminants most frequently addressed.

SITE CHARACTERIZATION AND MONITORING

The FRTR has added 11 case study reports about field-based site characterization technologies in the areas of organic chemical and explosives characterization, strategies for field-based site characterization, geophysical techniques, leak detection methods for bulk fuel tanks and fuel pipelines, and air emissions characterization. The case studies, totaling 121 reports, cover the full range of activities used to conduct site characterization and monitoring, with most case studies focused on technologies used in the investigation stage of site cleanup.

EXHIBIT 3. SUMMARY OF CONTAMINANTS AND MEDIA FOR REMEDIATION CASE STUDIES*



* Some case studies address more than one type of media and/or contaminant

IN SITU SOLIDIFICATION/STABILIZATION OF SEDIMENTS PROJECT - HIGHLIGHT OF NEW CASE STUDY

Historic wood-preserving operations at the Koppers Ashley River Superfund Site in South Carolina generated wastewaters that were released into the river, causing the sediments to become contaminated with polycyclic aromatic hydrocarbons (PAHs). In situ solidification/stabilization was implemented for 1 acre of contaminated sediments in a part of the river containing an active marine area. A slurry of cement-based grout augmented with proprietary chemicals was used to solidify the upper two feet of sediment in-place to create a solid, cohesive layer. The resulting "cap" was intended to be less susceptible to erosion than natural sediments and decrease the impact of contamination on the aquatic life. Innovative construction techniques were used in the project and the work was completed over a period of 35 days in 2002. There are only a few other projects to date that have used in situ solidification/stabilization to remediate river sediments.

PROGRESS OVER TIME

Over the past thirteen years, the FRTR has made significant contributions to increasing the supply and availability of cost and performance information from federal cleanups. The inventory of reports now encompasses a wide variety of technologies and contaminants and is continually being expanded by new case studies from contributing federal agencies. The FRTR has also been collaborating with states to include their efforts to prepare case study reports.

More recently, the FRTR has begun an effort to compile multi-site remediation technology assessment reports prepared by federal agencies and the Interstate Technology Regulatory Council (ITRC). As technologies mature, federal agencies and states are moving beyond documenting individual projects to providing more comprehensive analyses of technologies used at multiple sites, including lessons learned based on practical field experience. Some of these multi-site assessment reports contain information on the design, implementation, and selection of a technology. These reports can be used by site managers, regulators, technology vendors, contractors, and the public to identify resources to help screen remediation technologies, and evaluate design. Currently, there are 52 multi-site technology assessment reports available on www.frtr.gov

In the future, the FRTR will continue to focus on providing cost and performance case studies about timely topics and sharing experiences and lessons learned based on actual field applications of technologies.

LASAGNA™ PROJECT - HIGHLIGHT OF NEW CASE STUDY

Disposal of chemicals used in cylinder testing processes at the Paducah Gaseous Diffusion Plant Superfund site in Kentucky caused the surrounding soil and groundwater to become contaminated with trichloroethene (TCE). This case study describes activities under one phase of the cleanup, which covered soil contaminated with TCE. The average concentration of TCE in soil was 84 mg/kg with a maximum concentration greater than 1,500 mg/kg, indicating the presence of pure phase product. The mandated cleanup goal for TCE in soil was 5.6 mg/kg. Lasagna™, which uses an applied direct current electric field to drive contaminated soil-water through treatment zones comprised of iron filings and Kaolin clay, was implemented at the site and operated for two years at full-scale. Verification sampling after system shutdown (late 2001) indicated average TCE concentrations of 0.38 mg/kg, with a high of 4.5 mg/kg, thus meeting the cleanup goal for soil. A cost saving measure implemented during the project was monitoring the system remotely using a data acquisition system, which also had shutdown capabilities for fault conditions.

TECHNOLOGY COST AND PERFORMANCE CASE STUDIES - ORDERING INFORMATION

The following FRTR documents are available free-of-charge from the U.S. EPA/National Service Center for Environmental Publications (NSCEP), while supplies last. To order, mail this completed form to:

U.S. EPA/National Service Center for Environmental Publications
P.O. Box 42419
Cincinnati, OH 45242

or FAX to (513) 489-8695. Also, telephone orders may be placed at (800) 490-9198 or (513) 489-8190.

On-Line Access

The case studies and case study abstracts are available through the FRTR web site at <http://www.frtr.gov>.

- FRTR Cost and Performance Remediation Case Studies and Related Information CD-ROM, Fourth Edition, July 2003 (EPA-542-C-03-002)
- Abstracts of Remediation Case Studies, Volume 7, July 2003 (EPA-542-R-03-011)
- Guide to Documenting and Managing Cost and Performance Information for Remediation Projects, Revised Version, October 1998 (EPA-542-B-98-007).

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July 2003
Fact Sheet and Order Form

Technology Cost and Performance: Case Studies:



Federal Remediation Technologies Roundtable



Solid Waste and
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