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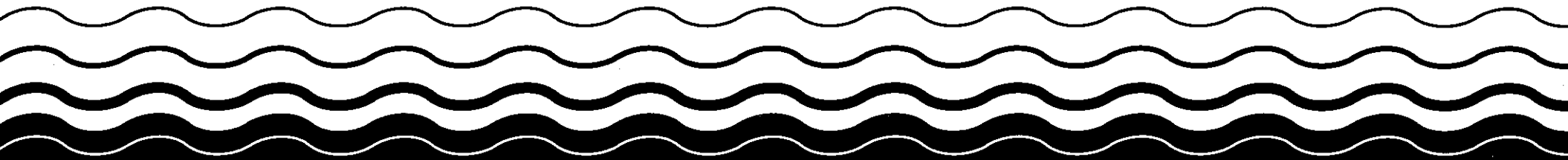
Office of Solid Waste And  
Emergency Response  
Washington, DC 20460

EPA/540/2-91/001  
Number 2  
September 1991

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# Innovative Treatment Technologies: Semi-Annual Status Report



EPA/540/2-91/001  
Number 2  
September 1991

# **INNOVATIVE TREATMENT TECHNOLOGIES: SEMI-ANNUAL STATUS REPORT**

U.S. Environmental Protection Agency  
Office of Solid Waste and Emergency Response  
Technology Innovation Office  
Washington, DC 20460

## NOTICE

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## FOREWORD

In April 1990 the U.S. Environmental Protection Agency's (EPA) Office of Solid Waste and Emergency Response (OSWER) established the Technology Innovation Office (TIO) to promote the use of innovative treatment technologies for contaminated site cleanup. TIO's mission is to increase the application of innovative treatment technology by government and industry to contaminated waste sites, soils, and ground water. One of TIO's goals is the removal of regulatory and institutional barriers to the development and use of innovative technologies. Another is the provision of richer technology and market information to targeted audiences of federal agencies, States, consulting engineering firms, responsible parties, technology developers, and the investment community.

This report documents the selection and use of innovative treatment in the Superfund program. It will allow better communication between experienced technology users and those who are considering innovative technologies to clean up contaminated sites. The information will also enable technology vendors to evaluate the market for innovative technologies in Superfund for the next several years.

As more information becomes available, we plan to expand this document to include cleanup programs other than Superfund. The use of innovative treatment in Superfund and other EPA waste programs is addressed by a directive, "Furthering the Use of Innovative Treatment Technologies in OSWER Programs" (OSWER Directive 9380.0-17, June 10, 1991). This directive sets forth seven new initiatives to remove impediments from and create incentives to the use of innovative treatment for Superfund, corrective action under the Resource Conservation and Recovery Act (RCRA), and underground storage tank cleanups. It is hoped that efforts such as the directive and this document will increase the reliance on new, less costly, or more effective technologies to address the problems associated with Superfund, hazardous waste, and petroleum contamination.

Walter W. Kovalick, Jr., Ph.D.  
Director, Technology Innovation Office

## ABSTRACT

This twice-yearly report documents and analyzes the selection and use of innovative treatment technologies in the Superfund Program. It will allow better communication between experienced technology users and those who are considering innovative technologies to clean up contaminated sites. In addition, the information will enable technology vendors to evaluate the market for innovative technologies in Superfund for the next several years and will be used by EPA's Technology Innovative Office to track progress in the application of innovative treatment.

Alternative treatment technologies are "alternatives" to land disposal. Innovative treatment technologies are alternative treatment technologies for which use at Superfund-type sites is inhibited by lack of data on cost and performance. This report documents the use of the following innovative treatment technologies to treat groundwater (in situ), soils, sediments, sludge, and solid-matrix wastes:

- Ex situ Bioremediation
- Chemical treatment
- In situ flushing
- Soil washing
- Thermal desorption
- In situ Bioremediation
- Dechlorination
- In situ vitrification
- Solvent extraction
- Vacuum extraction

The document includes information on 140 applications of innovative treatment technologies for remedial actions and 18 applications for emergency response actions. It contains several summary lists of the Superfund sites for which innovative treatment technologies have been selected or used. Table 1 lists the sites by EPA region. Table 2 lists the sites by type of innovative technology and gives the status of application of the innovative treatment technology. The principal part of the document is Table 3 which contains detailed, site-specific information for sites where innovative treatment has been selected. The information for Table 3 was collected through analyses of Records of Decision, review of OSWER tracking systems and telephone interviews with EPA regional staff. The information in that table is analyzed and summarized in narrative and figures in the overview of the document.

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## LIST OF ABBREVIATIONS

AM	Action Memorandum	PCBs	Polychlorinated biphenyls
APEG	Alkaline metal hydroxide/polyethylene glycol	PCE	Perchloroethylene (tetrachloroethylene)
ARCS	Alternative remedial contracts strategy	PCP	Pentachlorophenol
ATTIC	Alternative Treatment Technology Information Center	PRP	Potentially responsible party
BCD	Base Catalyzed Dechlorination	RA	Remedial action
BTEX	Benzene, toluene, ethylbenzene, xylene	RCRA	Resource Conservation and Recovery Act
BTX	Benzene, toluene, xylene	RD	Remedial design
cy	Cubic yards	RODs	Records of Decision
DCA	Dichloroethane	RPM	Remedial project manager
DCE	Dichloroethylene	RSKERL	Robert S. Kerr Environmental Research Laboratory, Ada, OK (U.S. EPA)
FAA	Federal Aviation Administration	SARA	Superfund Amendment and Reauthorization Act of 1986
FY	Fiscal year	SVOCs	Semivolatile organic compounds
gw	Ground water	TCA	Trichloroethane
KPEG	Potassium hydroxide/polyethylene glycol	TCE	Trichloroethylene
NAPL	Nonaqueous Phase Liquids	TIO	Technology Innovation Office
NPL	National Priorities List	USACE	U. S. Army Corps of Engineers
OSC	On scene coordinator	USDA	U. S. Department of Agriculture
OSWER	Office of Solid Waste and Emergency Response	VOCs	Volatile organic compounds
PAHs	Polynuclear aromatic hydrocarbons		



## ACKNOWLEDGEMENTS

This document was prepared under the direction of Ms. Linda Fiedler, work assignment manager for the U.S. Environmental Protection Agency's Technology Innovation Office.

Collecting and analyzing information on 140 applications of innovative treatment technologies and summary information on RODs required the help of many individuals, including; Butch Fries, Dana Mun and Nancy Willis of PRC Environmental Management Inc.; William Hannon and Lynn Eberhardt of Booz-Allen & Hamilton; and the Regional Coordinators in the Design and Construction Management Branch of the EPA Office of Emergency and Remedial Response.

Special acknowledgement goes to the regional and State staff listed as contacts for individual sites. They provided the detailed information contained and summarized here. Their cooperation and willingness to share their knowledge and expertise on innovative treatment technologies encourages the application of those technologies at other sites.

## OVERVIEW

### Introduction

The Technology Innovation Office (TIO) of the U.S. Environmental Protection Agency's (EPA) Office of Solid Waste and Emergency Response (OSWER) has prepared this *Innovative Treatment Technologies: Semi-Annual Status Report* to document the use of innovative treatment technologies to remediate Superfund sites. The report contains site-specific information on Superfund sites (both remedial and emergency response actions) using innovative treatment. The report is designed for use by site managers in evaluating cleanup alternatives and for innovative technology vendors in identifying potential markets. The information is also used by TIO to track progress in the application of innovative treatment.

The report is updated biannually. This September 1991 issue of the report updates and expands information provided in the January 1991 report. Additional information includes 45 innovative treatment technologies selected for remedial actions in fiscal year (FY) 1990 Superfund *Records of Decision (RODs)* and 18 innovative technologies used in emergency response actions. (A ROD is the decision document used to specify the way a site (or part of a site) will be remediated.)

### What Are Alternative and Innovative Treatment Technologies?

Alternative treatment technologies are "alternatives" to land disposal. The most frequently used alternative technologies are incineration and solidification/stabilization. Innovative treatment technologies are alternative treatment technologies for which lack of data on performance and cost inhibit their use for many Superfund types of applications. In general, a treatment technology is considered innovative if it has had limited full-scale application. Often, it is the application of a technology or process to soils, sediments, sludge, and solid-matrix waste (such as mining slag) that is innovative. Ground water treatment after the water has been pumped to the surface often resembles traditional water treatment technologies; thus, in general,

pump-and-treat remedies are considered established. *In situ* bioremediation of ground water, however, is considered an innovative technology.

This report documents the use of the following innovative treatment technologies to treat soils, sediments, sludge, and solid-matrix waste:

- |                          |                         |
|--------------------------|-------------------------|
| • Ex situ Bioremediation | • In situ vitrification |
| • In situ Bioremediation | • Soil washing          |
| • Chemical treatment     | • Solvent extraction    |
| • Dechlorination         | • Thermal desorption    |
| • In situ flushing       | • Vacuum extraction     |

In addition, the five sites using in-situ bioremediation for ground water are included with the in situ bioremediation projects.

### Sources of Information for This Report

EPA initially used RODs to compile information on remedial actions, and *Pollution Reports, On-Scene Coordinators Reports*, and the OSWER *Removal Tracking System* to compile data on emergency response actions. EPA then verified and updated the draft information by telephone interviews with remedial project managers (RPMs) and on-scene coordinators (OSCs). The data concerning project status do not duplicate data in *CERCLIS*, EPA's Superfund tracking system. This report provides more detailed information specifically on the portion of the remedy pertaining to an innovative technology. In addition, technologies and sites identified here may differ from information found in the ROD annual reports and the *RODs Database*. These differences are the result of design changes in the treatment trains used at sites that may or may not require official documentation (i.e., a ROD amendment or an Explanation of Significant Differences).

Increasing Use of Alternative and Innovative Treatment Technologies

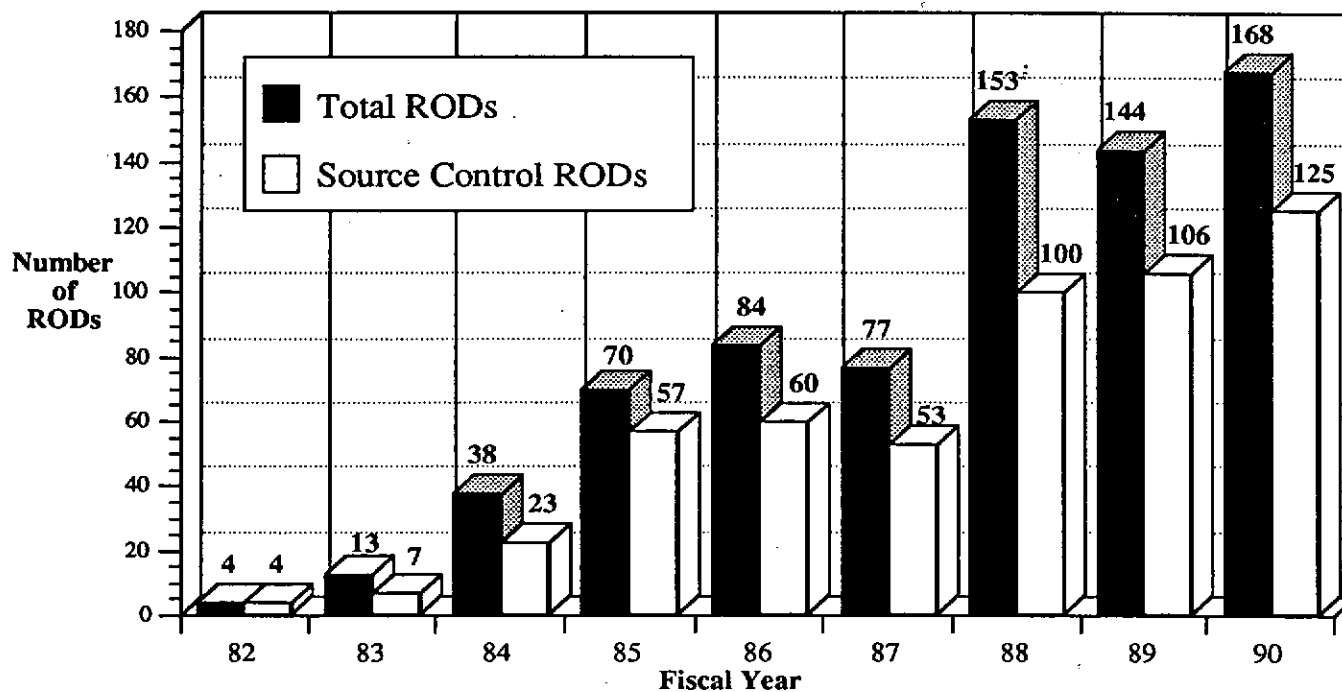
ROD Statistics. Currently, there are 1,211 sites on or proposed for the National Priorities List (NPL). Through FY90 ending September 30, 1990, 751 RODs had been signed describing the remedies to be used to clean up 435 sites. Most RODs for remedial actions address the source of contamination, such as soil, sludge, sediments, solid-type wastes, and nonaqueous phase liquids (NAPL). These RODs are

referred to as "source control" RODs. Other RODs address ground water only or specify that no action is necessary. Figure 1 shows the number of source control RODs relative to the total number of RODs for each fiscal year.

An analysis of source control RODs allows a comparison of the frequency of selection of treatment versus containment or disposal to remedy site contamination. Source control RODs are classified by the

**FIGURE 1**  
**REMEDIAL ACTIONS: RODS SIGNED BY FISCAL YEAR \***

( Total = 751 )

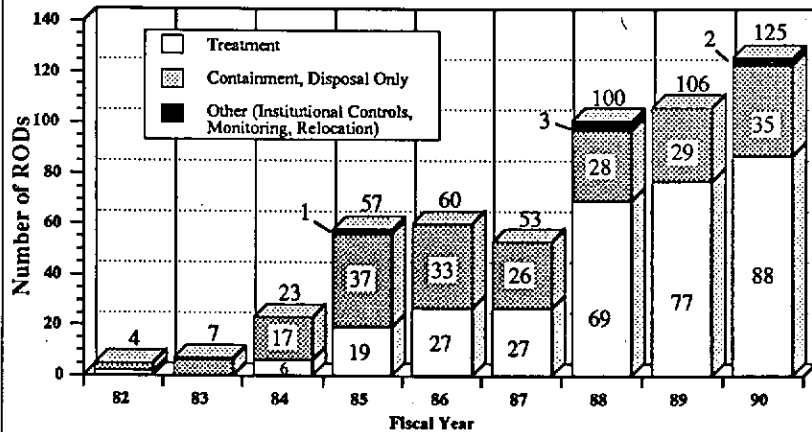


\* 751 RODs corresponds to 435 NPL sites.

Source: USEPA Office of Emergency and Remedial Response.

**FIGURE 2  
REMEDIAL ACTIONS: SOURCE CONTROL RODs BY  
FISCAL YEAR\***

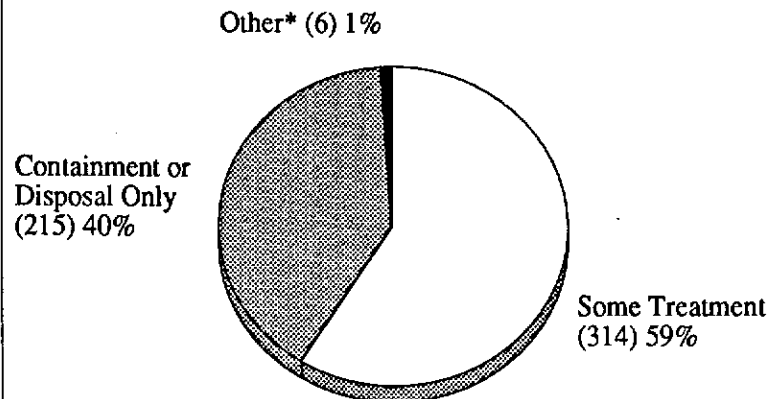
( Total = 535 )



\* 535 RODs corresponds to 421 NPL sites.

Source: USEPA Office of Emergency and Remedial Response.

**FIGURE 3  
REMEDIAL ACTIONS: OVERVIEW OF ALL SOURCE  
CONTROL RODs THROUGH FY 90**



\* Includes institutional controls, monitoring, and relocation.

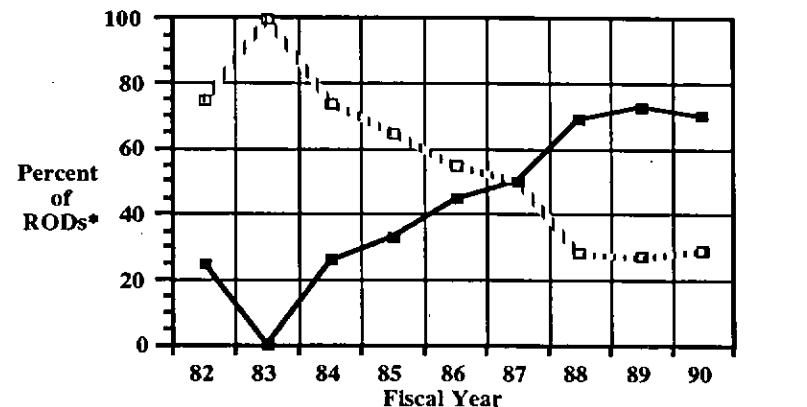
( ) Number of Records of Decision (RODs) for source control.

Source: USEPA Office of Emergency and Remedial Response.

general type of technology selected: (1) RODs specifying some alternative treatment; (2) RODs specifying containment/disposal only; (3) RODs specifying other action (such as land use restrictions, monitoring, or relocation). Figure 2 shows the number of source control RODs that fall under each category. RODs selecting some treatment may include containment of treatment residuals or of waste from another part of the site.

Overall, 59% of source control RODs have selected at least one treatment technology for source control (Figure 3). The proportion of source control RODs selecting some treatment for site wastes is increasing (Figure 4). The increase becomes more dramatic in FY88, a year after the passage of the Superfund Amendments and Reauthorization Act (SARA) in late 1986. Fifty percent of RODs in FY87 selected some treatment for source control, whereas 70% of RODs in FY88 selected some treatment. SARA required that EPA favor permanent remedies (that is, alternative treatment) over containment or disposal to remediate Superfund sites.

**FIGURE 4  
REMEDIAL ACTIONS: TREATMENT VERSUS  
DISPOSAL RODs FOR SOURCE CONTROL**



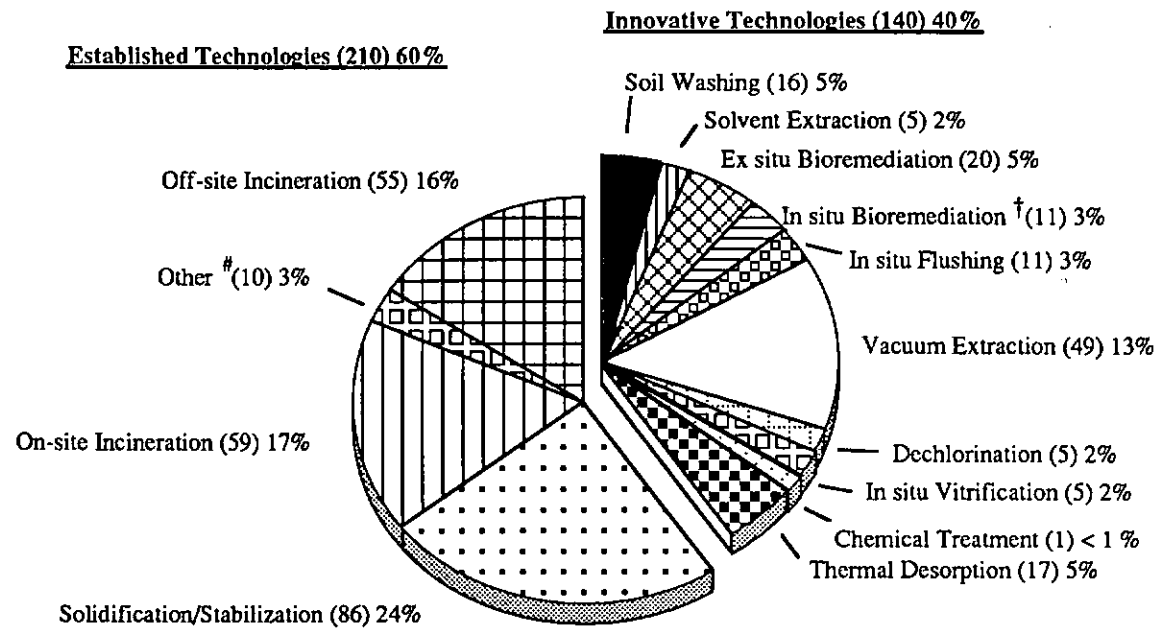
■ Some Treatment

□ Containment, Containment & Disposal, or Off-Site Disposal

\* RODs - Records of Decision

Source: USEPA Office of Emergency and Remedial Response.

**FIGURE 5  
REMEDIAL ACTIONS: SUMMARY OF ALTERNATIVE TREATMENT TECHNOLOGIES THROUGH FY 90\***



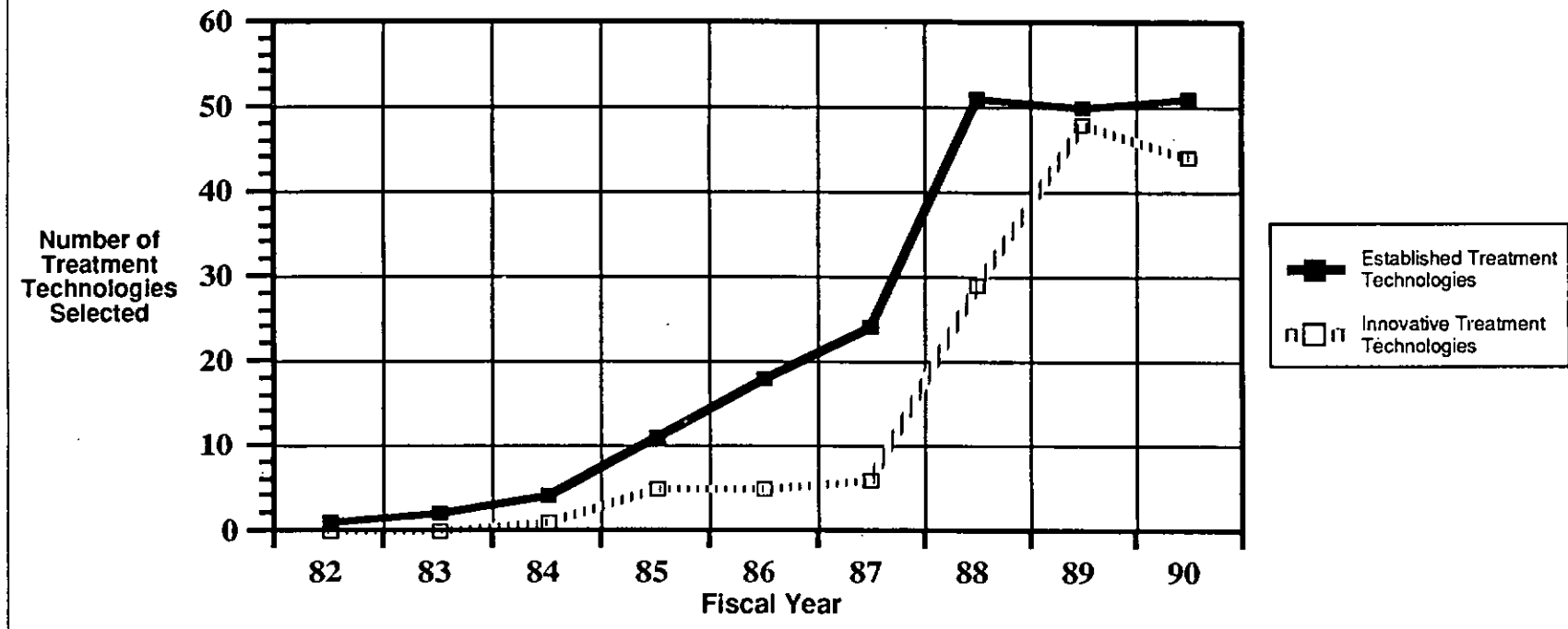
- \* Data are derived from 1982 – 1990 Records of Decision (RODs) and anticipated design and construction activities as of August 1991. The 350 technologies are associated with 301 sites; the difference reflects the use of more than one technology per site.
- ( ) Number of times this technology was selected or used.
- # "Other" technologies are soil aeration, in situ flaming, and chemical neutralization.
- † Includes in situ groundwater treatment.

**Technology Statistics.** Another way of illustrating the greater use of treatment is by quantifying the number and kinds of treatment technologies selected and used. The remainder of the information contained in this document focuses on *technologies*, not RODs. Each ROD specifying treatment may have selected several alternative treatment technologies.

Through FY90, 350 treatment technologies have been selected in 313 source control RODs for 301 sites. In addition, EPA has selected in situ bioremediation of ground water for five sites. The selection

of multiple technologies results from the use of treatment trains or from the treatment of different wastes or areas of the site. For the 313 RODs specifying treatment for source control, Figure 5 lists each type of treatment technology selected and how often it has been selected or used for source control. The five in situ groundwater remedies are included in the totals for in situ bioremediation. Figure 5 illustrates that, through FY90, 40% of the 350 treatment technologies selected were innovative and 60% were conventional. This report contains summary information on the innovative treatment technology projects and a list of sites using established technologies (Appendix A).

**FIGURE 6  
REMEDIAL ACTIONS: NUMBER OF ESTABLISHED VERSUS INNOVATIVE TREATMENT TECHNOLOGIES**



The proportion of alternative treatment technologies selected that are innovative increased dramatically between FY87 and 89. In FY90, the number dropped slightly. This decrease is due, in part, to several FY90 RODs where the technology is being reconsidered. Figure 6 compares the numbers of established and innovative technologies by fiscal year.

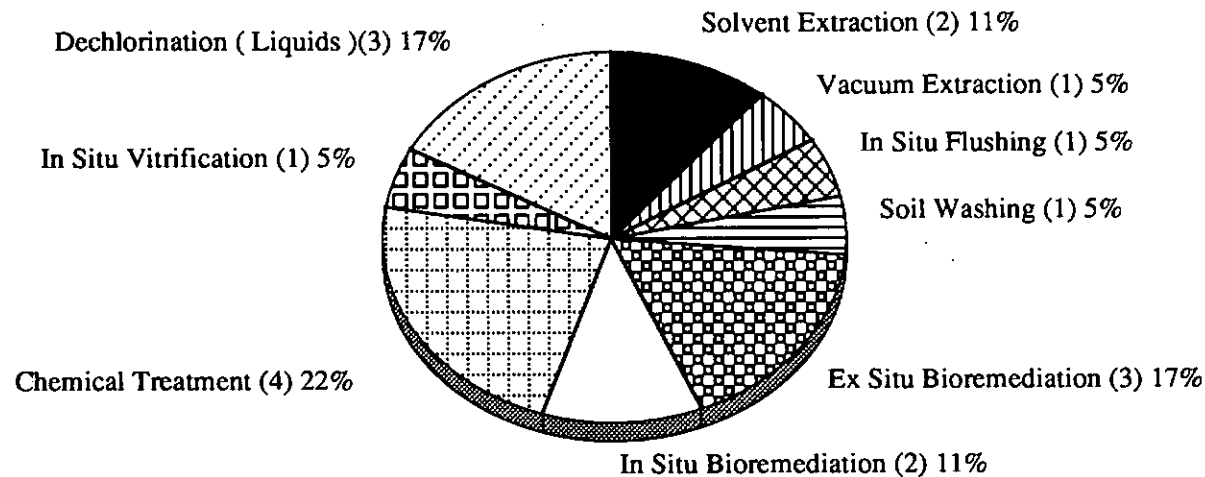
**Emergency Response Actions.** Emergency response actions are conducted in response to an immediate threat caused by a release of hazardous substances. Emergency responses do not require RODs. To date, innovative treatment has been used in relatively few emergency response actions. The innovative technologies addressed in this report have been used 18 times in 15 emergency response actions (Figure 7). In addition, infrared incineration, no longer considered innovative, was first used at two emergency response actions.

Many emergency responses involve small quantities of waste or immediate threats requiring a quick action to alleviate the hazard. Often, these types of activities do not lend themselves to on-site treatment approaches. In addition, SARA does not contain the same preference for innovative treatment for removals as it does for remedial actions. As a result, the selection of innovative treatment for removals has remained relatively constant—one to five selected per year since FY84.

EPA would like to increase the use of innovative treatment methods to address emergency response problems. One of the seven initiatives contained in the EPA directive described in the foreword concerns emergency response actions. It is expected that more innovative technology will be used for the larger, and less time-critical emergency responses in the future.

**FIGURE 7**  
**EMERGENCY RESPONSES: SUMMARY OF INNOVATIVE TECHNOLOGIES THROUGH AUGUST 1991\***

( Total = 18 )



\* Data from the OSWER Removal Tracking System, CERCLIS, and phone survey of regional TAT offices.

( ) Number of times this technology was selected or used.

### Status of Innovative Technology Implementation

Many of the innovative technologies documented in this report have been selected in the last several years. The design of these projects typically takes one to three years; therefore, relatively few innovative technologies have been contracted and installed, and even fewer have been completed (Figure 8). In the next several years, though, many projects now in design should become operational.

### Summary of Updates to Last Report

As noted earlier, this September 1991 report adds remedial sites where innovative technologies were selected in FY90 RODs. The use of innovative technologies at 15 emergency response sites is also documented. An appendix (Appendix A) has been added that lists

remedial sites for which established technologies (for example, incineration, solidification/stabilization) have been selected. The information in the site/technology tables has been expanded to include information on treatability/pilot studies and design completion dates, where appropriate. Other changes to the report include the following:

- Based on Regional telephone interviews, several sites and technologies have been dropped from the report because the innovative technologies of interest are being reconsidered or are no longer a part of the site remedy. These sites are:
  - Leetown Pesticide, PA—Bioremediation
  - Northwest Transformer, WA—*In situ* Vitrification
  - Harvey Knott, DE—*In situ* Soil Flushing

**FIGURE 8**  
**REMEDIAL ACTIONS: PROJECT STATUS OF INNOVATION TREATMENT TECHNOLOGIES AS OF AUGUST 1991**

<b>Technology</b>	<b>Predesign/ In Design</b>	<b>Design Complete/ Being Installed/ Operational</b>	<b>Project Completed</b>	<b>Total</b>
Vacuum Extraction	36	12	1	49
Ex Situ Bioremediation	15	4	1	20
Thermal Desorption	14	0	3	17
Soil Washing	16	0	0	16
In Situ Bioremediation †	8	2	1	11
In Situ Flushing	9	2	0	11
In Situ Vitrification	5	0	0	5
Solvent Extraction	4	1	0	5
Dechlorination	3	1	1	5
Chemical Treatment	0	0	1	1
<b>TOTAL</b>	<b>110 (78%)</b>	<b>22 (16%)</b>	<b>8 (6%)</b>	<b>140</b>

\* Data derived from 1982 – 1990 Records of Decision (RODs) and anticipated design and construction activities.

† Includes in situ groundwater treatment.

- SMS Instruments, NY (Deer Park) is now listed under Vacuum Extraction instead of Thermal Desorption.
  - GE Wiring Services, PR is now listed under Soil Washing rather than Chemical Extraction because the selected technology is water based. It should be noted however, that this technology is being reconsidered for this site.
  - Dechlorination has been classified separately from Chemical Treatment.
  - Bioremediation is divided into ex situ and in situ bioremediation.
- In addition, there are several noteworthy changes to innovative technologies that were documented in FY90 RODs:
- Hardage/Criner, OK: The vacuum extraction remedy selected by EPA was not included in the court judgment.
  - Bofers Noble, MI: Thermal desorption is being reconsidered, and is not included in this report.



### Contents of this Report

This report contains several summary lists of the Superfund sites for which innovative treatment technologies have been selected or used. Table 1 lists the sites by EPA Region. Table 2 lists the sites by the general type of innovative treatment technology selected and gives the project status.

Table 3 contains the detailed site-specific data on which the other tables are based. It shows each site where an innovative treatment technology has been selected and provides the site information relevant to the application of that technology.

Lastly, Appendix A includes a list of NPL sites for which established technologies have been selected for source control in RODs.

### Cost and Performance Data

A major area of interest to TIO is the availability of cost and performance information for the Superfund projects listed in this report. This edition notes those sites for which treatability studies have been performed, so that this information may become more widely available. However, few innovative technologies have been implemented, and only 19 have been completed (8 remedial projects and 11 removals). Some treatability information is available through the Alternative Treatment Technology Information Center (ATTIC). To obtain access to this information, call (301) 670-6294. EPA is gathering available information on completed projects, and this information will become available later.

**TABLE 1**

**EPA REGIONAL SUMMARY FOR INNOVATIVE TREATMENT TECHNOLOGIES**

Table 1 summarizes the innovative treatment technologies used at sites on the National Priorities List (NPL) and sites where emergency response actions were conducted in each EPA region. As shown in this table, the frequency of use of innovative technologies varies by region. Seven of EPA's ten regional offices have 10 or more applications of innovative treatment technologies underway.

TABLE 1  
EPA REGIONAL SUMMARY FOR INNOVATIVE TREATMENT TECHNOLOGIES

September, 1991

TECHNOLOGY	SITE NAME	STATE	TECHNOLOGY	SITE NAME	STATE
<u>Region 1</u>			<u>Region 2 (continued)</u>		
Vacuum Extraction	Kellogg-Deering Well Field	CT	Soil Washing	King of Prussia	NJ
Ex situ Bioremediation	Iron Horse Park	MA	Soil Washing	Myers Property*	NJ
Solvent Extraction	Norwood PCBs	MA	Soil Washing	Vineland Chemical*	NJ
Dechlorination	Re-Solve*	MA	Solvent Extraction	Ewan Property*	NJ
Thermal Desorption	Cannon Engineering/Bridgewater	MA	Thermal Desorption	Caldwell Trucking	NJ
Thermal Desorption	Re-Solve*	MA	Thermal Desorption	Metaltec/Aerosystems	NJ
Vacuum Extraction	Groveland Wells	MA	Thermal Desorption	Reich Farms	NJ
Vacuum Extraction	Wells G&H	MA	Thermal Desorption	Waldick Aerospace Devices	NJ
Solvent Extraction	O'Connor	ME	Vacuum Extraction	FAA Technical Center*	NJ
Solvent Extraction	Pinette's Salvage Yard	ME	Dechlorination	Signo Trading/Mt. Vernon (Removal)	NY
Thermal Desorption	McKin	ME	Dechlorination	Wide Beach Development	NY
Thermal Desorption	Ottati & Goss	NH	In situ Flushing	Byron Barrel & Drum	NY
Vacuum Extraction	South Municipal Water Supply Well	NH	Thermal Desorption	American Thermostat	NY
Vacuum Extraction	Tinkham Garage	NH	Thermal Desorption	Claremont Polychemical	NY
Vacuum Extraction	Stamina Mills	RI	Thermal Desorption	Fulton Terminals	NY
<u>Region 2</u>			Thermal Desorption	Marathon Battery	NY
In situ Bioremediation	FAA Technical Center - Area D. (gw)*	NJ	Thermal Desorption	Sarney Farm	NY
Dechlorination	Myers Property*	NJ	Vacuum Extraction	SMS Instruments (Deer Park)	NY
In situ Flushing	Goose Farm	NJ	Vacuum Extraction	Vestal Water Supply 1-1	NY
In situ Flushing	Lipari Landfill	NJ	Soil Washing	GE Wiring Devices	PR
In situ Flushing	Vineland Chemical*	NJ	Vacuum Extraction	Upjohn Manufacturing Co.	PR
Soil Washing	Ewan Property*	NJ			

\* Indicates more than one technology selected in the same ROD.

TABLE 1 (continued)  
EPA REGIONAL SUMMARY FOR INNOVATIVE TREATMENT TECHNOLOGIES

September, 1991

TECHNOLOGY	SITE NAME	STATE	TECHNOLOGY	SITE NAME	STATE
<u>Region 3</u>			<u>Region 4 (continued)</u>		
Vacuum Extraction	Bendix	PA	Soil Washing	Southeastern Wood Preserving (Removal)*	MS
Vacuum Extraction	Henderson Road	PA	In situ Flushing	Jadco-Hughes	NC
Vacuum Extraction	Lord-Shope Landfill	PA	Soil Washing	Cape Fear Wood Preserving	NC
Vacuum Extraction	Tyson's Dump	PA	Vacuum Extraction	Jadco-Hughes	NC
Ex situ Bioremediation	L.A. Clarke & Sons*	VA	Chemical Treatment	Palmetto Wood Preserving	SC
Chemical Treatment	Avtex Fibers (Removal)	VA	Vacuum Extraction	Hinson Chemical (Removal)	SC
In situ Flushing	L.A. Clarke & Sons*	VA	Thermal Desorption	Wanchem	SC
In situ Flushing	U.S. Titanium	VA	Vacuum Extraction	SCRDI Bluff Road	SC
Ex situ Bioremediation	Ordnance Works Disposal	WV			
<u>Region 4</u>			<u>Region 5</u>		
Ex situ Bioremediation	American Creosote Works* (Pensacola)	FL	Ex situ Bioremediation	Galesburg/Koppers	IL
Ex situ Bioremediation	Brown Wood Preserving	FL	In situ Vitrification	Sangamo/Crab Orchard Nat'l Wildlife Refuge	IL
Ex situ Bioremediation	Coleman Evans Wood Preserving*	FL	Thermal Desorption	Outboard Marine/Waukegan Harbor	IL
Ex situ Bioremediation	Dubose Oil Products	FL	In situ Bioremediation	Seymour Recycling*	IN
In situ Bioremediation	Cabot/Koppers*	FL	In situ Flushing	Ninth Avenue Dump	IN
Soil Washing	American Creosote Works* (Pensacola)	FL	Vacuum Extraction	Fisher Calo Chem	IN
Soil Washing	Cabot/Koppers*	FL	Vacuum Extraction	MIDCO I	IN
Soil Washing	Coleman Evans Wood* Preserving	FL	Vacuum Extraction	Seymour Recycling*	IN
Solvent Extraction	General Refining (Removal)	GA	Vacuum Extraction	Wayne Waste Reclamation	IN
Ex situ Bioremediation	Southeastern Wood Preserving (Removal)*	MS	Ex situ Bioremediation	Cliff/Dow Dump (soil)	MI
			In situ Bioremediation	Cliff/Dow Dump (gw/soil)	MI
			Chemical Treatment	PBM Enterprises (Removal)	MI

\* Indicates more than one technology selected in the same ROD.

TABLE 1 (continued)  
EPA REGIONAL SUMMARY FOR INNOVATIVE TREATMENT TECHNOLOGIES

September, 1991

TECHNOLOGY	SITE NAME	STATE	TECHNOLOGY	SITE NAME	STATE
<u>Region 5 (continued)</u>			<u>Region 6 (continued)</u>		
In situ Flushing	U.S. Aviex	MI	Ex situ Bioremediation	Old Inger Oil Refinery	LA
In situ Vitrification	Anderson Development	MI	Ex situ Bioremediation	AT&SF/Clovis	NM
In situ Vitrification	Ionia City Landfill	MI	In situ Bioremediation	AT&SF/Clovis	NM
In situ Vitrification	Parsons Chemical (Removal)	MI	Dechlorination	Fruitland Drum (Removal)	NM
Vacuum Extraction	Kysor Industrial	MI	Vacuum Extraction	South Valley/Edmunds	NM
Vacuum Extraction	Springfield Township Dump	MI	Dechlorination	Tenth Street	OK
Vacuum Extraction	Verona Well Field	MI	Solvent Extraction	Traband Warehouse (Removal)	OK
Ex situ Bioremediation	Burlington Northern (Railroad Tie Treating Plant)	MN	Vacuum Extraction	Tinker AFB	OK
Ex situ Bioremediation	Joslyn Manufacturing & Supply Co.	MN	Ex situ Bioremediation	North Cavalcade Street	TX
Thermal Desorption	University of Minnesota	MN	Ex situ Bioremediation	Sheridan Disposal Services	TX
Vacuum Extraction	Long Prairie	MN	In situ Bioremediation	French Limited	TX
Soil Washing	United Scrap Lead/SIA	OH	Solvent Extraction	United Creosoting	TX
Vacuum Extraction	Miami County Incinerator	OH	Dechlorination	Sol Lynn/Industrial Transformers	TX
Vacuum Extraction	Pristine (Amendment)	OH	In situ Flushing	South Cavalcade Street*	TX
Ex situ Bioremediation	Moss-American*	WI	In situ Vitrification	Crystal Chemical	TX
In situ Bioremediation	Onalaska Municipal Landfill	WI	Soil Washing	Koppers/Texarkana	TX
Soil Washing	Moss-American*	WI	Soil Washing	South Cavalcade Street*	TX
Vacuum Extraction	Hagen Farm	WI	<u>Region 7</u>		
Vacuum Extraction	Wausau Groundwater Contamination	WI	Ex situ Bioremediation	Vogel Paint & Wax	IA
<u>Region 6</u>			Ex situ Bioremediation	Scott Lumber (Removal)	MO
Soil Washing	Arkwood	AR	Dechlorination	Crown Plating (Removal)	MO
			Vacuum Extraction	Hastings Groundwater Contamination - Well #3	NE

\* Indicates more than one technology selected in the same ROD.

TECHNOLOGY	SITE NAME	STATE
<u>Region 7 (continued)</u>		
Vacuum Extraction	Hastings Groundwater Contamination - Colorado Ave.	NE
Vacuum Extraction	Hastings Groundwater Contamination - Far Marco	NE
Vacuum Extraction	Lindsay Manufacturing	NE
Vacuum Extraction	Waverly Groundwater Contamination	NE
<u>Region 8</u>		
In situ Vitrification	Rocky Mountain Arsenal (OU16)	CO
Soil Washing	Sand Creek Industrial (OU5)	CO
Thermal Desorption	Martin Marietta (Denver Aerospace)*	CO
Vacuum Extraction	Martin Marietta (Denver Aerospace)*	CO
Vacuum Extraction	Rocky Mountain Arsenal (OU18)	CO
Vacuum Extraction	Sand Creek Industrial (OU1)	CO
Ex situ Bioremediation	Burlington Northern (Somers Plant) (soil)	MT
Ex situ Bioremediation	Libby Ground Water Contamination (soil)	MT
In situ Bioremediation	Burlington Northern (Somers Plant) (gw)	MT
In situ Bioremediation	Libby Ground Water Contamination (gw)	MT
<u>Region 9</u>		
Chemical Treatment	Gila River Indian Reservation (Removal)*	AZ

TECHNOLOGY	SITE NAME	STATE
<u>Region 9 (continued)</u>		
Chemical Treatment	Stanford Pesticide #1 (Removal)	AZ
In situ Bioremediation	Gila River Indian Reservation (Removal)*	AZ
Vacuum Extraction	Motorola 52nd Street	AZ
Vacuum Extraction	Phoenix-Goodyear Airport Area	AZ
Ex situ Bioremediation	J.H. Baxter	CA
In situ Bioremediation	Roseville Drums (Removal)	CA
In situ Bioremediation	Koppers (Oroville Plant)*	CA
In situ Bioremediation	Solvent Service (gw)*	CA
Soil Washing	Koppers (Oroville Plant)*	CA
Vacuum Extraction	Fairchild Semiconductor/MTV-I	CA
Vacuum Extraction	Fairchild Semiconductor/MTV-II	CA
Vacuum Extraction	Fairchild Semiconductor (San Jose)	CA
Vacuum Extraction	IBM (San Jose)	CA
Vacuum Extraction	Intel, Mountain View	CA
Vacuum Extraction	Intersil/Siemens	CA
Vacuum Extraction	Raytheon, Mountain View	CA
Vacuum Extraction	Solvent Service*	CA
Vacuum Extraction	Watkins-Johnson	CA
Ex situ Bioremediation	Poly-Carb (Removal)*	NV
In situ Flushing	Poly-Carb (Removal)*	NV
<u>Region 10</u>		
In situ Flushing	United Chrome Products	OR

\* Indicates more than one technology selected in the same ROD.

## TABLE 2

### PROJECT STATUS SUMMARY BY INNOVATIVE TREATMENT TECHNOLOGY

Table 2 lists the applications of innovative treatment technologies at NPL and removal sites by technology and summarizes the status of the specific technology application. The symbols used in this table are:

- PD - In **pre**design. A site may be considered in predesign if EPA is negotiating the consent decree for the design with the responsible party, the lead agency is preparing the predesign report, the lead agency is contracting for the design firm, or the lead agency is conducting a treatability study or field investigation before beginning actual design work.
- D - In **design**. A site is considered in design after the design contractor has begun work.
- D/I - This symbol is used if the design work has been completed but installation work has not yet begun when this report is published.
- I - Being **installed**. An innovative treatment technology is "being installed" after the construction contract has been awarded and before the treatment system has begun operation. For some technologies, this is a relatively short phase of the project because they are assembled on site quickly. For other technologies, the period of installation lasts several construction seasons.
- O - **Operational**. A treatment technology is operational once it is constructed and has been proven to be functional. The length of time required to complete the operation phase depends on such factors as the nature of the technology, the quantity of material to be treated, and the concentration of the contaminants at the start of treatment.
- C - **Completed**. A treatment technology project is considered complete when the operation of the treatment technology ceases. Other site activities may still be planned or ongoing.

TABLE 2  
PROJECT STATUS SUMMARY BY INNOVATIVE TREATMENT TECHNOLOGY

September, 1991

<u>BIOMEDIATION (EX SITU)</u>	<u>STATUS</u>	<u>BIOREMEDIATION (IN SITU)</u>	<u>STATUS</u>
Iron Horse Park, MA, 01	D	Cliff/Dow Dump, MI, 05	PD
L.A. Clarke & Sons, VA, 03	D	Onalaska Municipal Landfill, WI, 05	D
Ordnance Works Disposal, WV, 03	D	Seymour Recycling, IN, 05	C
American Creosote Works, FL, 04 (Pensacola)	D	AT&SF/Clovis, NM, 06	I
Brown Wood Preserving, FL, 04	C	French Limited, TX, 06	D
Coleman Evans Wood Preserving, FL, 04	D	Burlington Northern (Somers Plant), MT, 08	D
Dubose Oil Products, FL, 04	PD	Libby Ground Water Contamination, MT, 08	D
Southeastern Wood Preserving (Removal), MS, 04	O	Gila River Indian Reservation (Removal), AZ, 09	C
Burlington Northern, MN, 05 (Railroad Tie Treating Plant)	O	Koppers (Oroville Plant), CA, 09	D
Cliff/Dow Dump, MI, 05	PD	Roseville Drums (Removal), CA, 09	C
Galesburg/Koppers, IL, 05	PD	Solvent Service, CA, 09	O
Joslyn Manufacturing and Supply Company, MN, 05	O		
Moss-American, WI, 05	PD	<u>CHEMICAL TREATMENT</u>	<u>STATUS</u>
Old Inger Oil Refinery, LA, 06	I	Avtex Fibers (Removal), VA, 03	C
AT&SF/Clovis, NM, 06	D	Palmetto Wood Preserving, SC, 04	C
North Cavalcade Street, TX, 06	D	PBM Enterprises (Removal), MI, 05	C
Sheridan Disposal Services, TX, 06	PD	Gila River Indian Reservation (Removal), AZ, 09	C
Vogel Paint & Wax, IA, 07	D	Stanford Pesticide #1 (Removal)	C
Scott Lumber, MO, 07	O		
Burlington Northern (Somers Plant), MT, 08	D	<u>DECHLORINATION</u>	<u>STATUS</u>
Libby Ground Water Contamination, MT, 08	O	Re-Solve, MA, 01	PD
J. H. Baxter, CA, 09	D	Myers Property, NJ, 02	PD
Poly-Carb (Removal), NV, 09	C	Signo Trading/Mt. Vernon (Removal), NY, 02	C
FAA Technical Center, NJ, 02	D	Wide Beach Development, NY, 02	C
Cabot/Koppers, FL, 04	D	Fruitland Drum (Removal), NM, 06	PD
		Sol Lynn/Industrial, TX, 06 Transformers	I/O



TABLE 2 (continued)  
PROJECT STATUS SUMMARY BY INNOVATIVE TREATMENT TECHNOLOGY

September, 1991

<u>DECHLORINATION (continued)</u>	<u>STATUS</u>
Tenth Street, OK, 06	D
Crown Plating (Removal), MO, 07	C

<u>IN SITU FLUSHING</u>	<u>STATUS</u>
Byron Barrel & Drum, NY, 02	D
Goose Farm, NJ, 02	D
Lipari Landfill, NJ, 02	I
Vineland Chemical, NJ, 02	PD
L.A. Clarke & Sons, VA, 03	D
U.S. Titanium, VA, 03	PD
Jadco-Hughes, NC, 04	D
Ninth Avenue Dump, IN, 05	D
U.S. Aviex, MI, 05	D
South Cavalcade Street, TX, 06	D
Poly-Carb (Removal), NV, 09	C
United Chrome Products, OR, 10	O

<u>IN SITU VITRIFICATION</u>	<u>STATUS</u>
Anderson Development, MI, 05	PD
Ionia City Landfill, MI, 05	D
Parsons Chemical (Removal), MI, 05	I
Sangamo/Crab Orchard Nat'l Wildlife Refuge, IL, 05	PD
Crystal Chemical, TX, 06	PD
Rocky Mountain Arsenal, (OU16), CO, 08	D

<u>SOIL WASHING</u>	<u>STATUS</u>
Ewan Property, NJ, 02	PD
GE Wiring Devices, PR, 02	PD
King of Prussia, NJ, 02	PD
Myers Property, NJ, 02	PD
Vineland Chemical, NJ, 02	PD
Cabot/Koppers, FL, 04	D
Cape Fear Wood Preserving, NC, 04	D
American Creosote Works, FL, 04	D
Coleman-Evans Wood Preserving, FL, 04	D
Southeastern Wood Preserving (Removal), MS, 04	O
Moss-American, WI, 05	PD
United Scrap Lead/SIA, OH, 05	D
Arkwood, AR, 06	PD
Koppers/Texarkana, TX, 06	PD
South Cavalcade Street, TX, 06	D
Sand Creek Industrial (OU5), CO, 08	D
Koppers (Oroville Plant), CA, 09	D

<u>SOLVENT EXTRACTION</u>	<u>STATUS</u>
Norwood PCBs, MA, 01	PD
O'Connor, ME, 01	D
Pinette's Salvage Yard, ME, 01	D/I
Ewan Property, NJ, 02	PD
General Refining (Removal), GA, 04	C
Traband Warehouse (Removal), OK, 06	C
United Creosoting, TX, 06	D

TABLE 2 (continued)  
PROJECT STATUS SUMMARY BY INNOVATIVE TREATMENT TECHNOLOGY

September, 1991

<u>THERMAL DESORPTION</u>	<u>STATUS</u>
Cannon Engineering/Bridgewater, MA, 01	C
McKin, ME, 01	C
Ottati & Goss, NH, 01	C
Re-Solve, MA, 01	PD
American Thermostat, NY, 02	D
Caldwell Trucking, NJ, 02	D
Claremont Polychemical, NY, 02	D
Fulton Terminals, NY, 02	PD
Marathon Battery, NY, 02	PD
Metaltec/Aerosystems, NJ, 02	D
Reich Farms, NJ, 02	D
Sarney Farm, NY, 02	PD
Waldick Aerospace Devices, NJ, 02	D
Wanchem, SC, 04	D
Outboard Marine/Waukegan Harbor, IL, 05	D
University of Minnesota, MN, 05	D
Martin Marietta, CO, 08	PD

<u>VACUUM EXTRACTION</u>	<u>STATUS</u>
Groveland Wells, MA, 01	D
Kellogg-Deering Well, CT, 01 Field	D
South Municipal Water, NH, 01 Supply Well	D
Stamina Mills, RI, 01	PD
Tinkham Garage, NH, 01	D
Wells G&H, MA, 01	D

<u>VACUUM EXTRACTION (continued)</u>	<u>STATUS</u>
FAA Technical Center, NJ, 02	D
SMS Instruments (Deer Park), NY, 02	D/I
Upjohn Manufacturing Co., PR, 02	C
Vestal Water Supply 1-1, NY, 02	PD
Bendix, PA, 03	D
Henderson Road, PA, 03	D
Lord-Shope Landfill, PA, 03	PD
Tyson's Dump, PA, 03	D
Hinson Chemical (Removal), SC, 04	D
Jadco-Hughes, NC, 04	D
SCRDI Bluff Road, SC, 04	PD
Fisher Calo Chem, IN, 05	PD
Hagen Farm, WI, 05	D
Kysor Industrial, MI, 05	D
Long Prairie, MN, 05	D/I
MIDCO I, IN, 05	PD
Miami County Incinerator, OH, 05	PD
Pristine (Amendment), OH, 05	PD
Seymour Recycling, IN, 05	D
Springfield Township Dump, MI, 05	PD
Verona Well Field, MI, 05	D
Wausau Groundwater Contamination, WI, 05	D
Wayne Waste Reclamation, IN, 05	PD
South Valley/Edmunds, NM, 06	D
Tinker AFB, OK, 06	PD

TABLE 2 (continued)  
 PROJECT STATUS SUMMARY BY INNOVATIVE TREATMENT TECHNOLOGY

September, 1991

<u>VACUUM EXTRACTION (continued)</u>	<u>STATUS</u>
Hastings Groundwater Contamination, Colorado Ave., NE, 07	D
Hastings Groundwater Contamination, Far-Marco, NE, 07	D
Hastings Groundwater Contamination, Well No. 3, NE, 07	D
Lindsay Manufacturing, NE, 07	PD
Waverly Groundwater Contamination, NE, 07	O
Martin Marietta, CO, 08	PD
Rocky Mountain Arsenal (OU18), CO, 08	D/I
Sand Creek Industrial (OU1), CO, 08	D/I
Motorola 52nd Street, AZ, 09	D
Phoenix-Goodyear Airport, AZ, 09 Area	D
Fairchild Semiconductor, CA, 09 (San Jose)	O
Fairchild Semiconductor/MTV-I, CA, 09	D
Fairchild Semiconductor/MTV-II, CA, 09	D
IBM (San Jose), CA, 09	I
Intel, Mountain View, CA, 09	D
Intersil/Siemens, CA, 09	O
Raytheon, Mountain View, CA, 09	D
Solvent Service, CA, 09	O
Watkins-Johnson, CA, 09	PD

## TABLE 3

### DETAILED SITE INFORMATION BY TREATMENT TECHNOLOGY

Table 3 is the principal part of this document. It contains the most detailed, site-specific information for sites where innovative treatment has been selected. The columns of Table 3 present the following information:

#### Site Name, State, Region, ROD Date

This column identifies the site and the operable unit for which innovative treatment was selected.

A Record of Decision (ROD) documents the selection of remedy in the remedial program. The date shown in this column is the date a ROD was signed by an EPA official.

An asterisk in this column indicates that a treatability study has been completed for this technology at this site.

#### Specific Technology

The second column describes the specific type of technology selected within a general category of innovative treatment. For example, within the general category of bioremediation, the specific technologies of land treatment or slurry-phase bioremediation may be chosen.

#### Site Description

This column provides information on the industrial source of the contamination at the site and allows analysis of the selection of innovative technologies by site type. For example, by using the information in this column, one may determine the most frequently selected innovative technology for wood preserving sites.

### **Media (quantity)**

This column provides information on the media and quantity of material to be treated. If a treatment is used in situ, an effort was made to include the maximum depth of the treatment to provide the reader with another important parameter regarding the application.

### **Key Contaminants Treated**

The major contaminants or contaminant groups targeted by the treatment technology are shown in this column. There may be other contaminants as well that will be treated. Other contaminants that may be present, but are not being addressed by the listed technology, are not included.

### **Status**

This column gives the status of the application of the innovative treatment technology. **Predesign** indicates that the ROD has been signed but design has not begun. During predesign, EPA may be negotiating with the potentially responsible parties, procuring the services of a design firm, or collecting information (such as a treatability study) needed in the design stage. If a project is in **design**, the engineering documents needed to contract and build the remedy are being prepared. If a remedy is **being installed**, the lead agency has signed a contract for the construction work needed to set up the remedy. The remedy is **operational** if it is constructed and is now being operated as a treatment system and it is **completed** if the goals of the ROD for that treatment technology have been met and treatment ceases.

### **Lead Agency, Treatment Contractor**

The "lead" indicates whether federal dollars are to be used to implement the remedy (Fund lead) or the potentially responsible parties will conduct the remedy with EPA/State oversight (PRP lead). If a remedy is Fund lead, EPA may manage the design/construction through its contractors, the State may manage the project with Superfund dollars or the U.S. Army Corps of Engineers (USACE) may act for EPA to manage the design or construction. Whichever agency or organization is responsible for managing the remedy, the contractor responsible for the actual installation and operation of the innovative technology is also identified if the lead agency has selected one.

## **Contacts/Phone**

This final column gives the names and telephone numbers of useful contacts for the site or technology. The first name is usually the EPA Remedial Project Manager (RPM) (for remedial actions) or On-Scene Coordinator (OSC) (for emergency response actions) responsible for the site. If a remedy is being managed by the State, the name and phone number of the State RPM is also provided. Information on any other useful contacts is provided.



TABLE 3  
DETAILED SITE INFORMATION BY TREATMENT TECHNOLOGY

September, 1991

Bioremediation (Ex situ)

Region	Site Name, State, Region (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
1	Iron Horse Park, MA* (09/15/88)	Land treatment	Industrial Complex & Railyard Wastes	Sludge, Soil (28,000 cy combined)	Petroleum Hydrocarbons, VOCs (BTEX), and PAHs	In design; Design completion planned Summer '91	PRP Lead; ENSR, Consulting	Don McElroy 617-223-5518 FTS 833-1518
3	L.A. Clarke & Sons, VA* (03/31/88)  Also see In situ Flushing	On-site bioremediation - type to be determined	Wood Preserving	Soil (73,700 cy), Sediments (45,300 cy)	Creosote, PAHs, and VOCs (Benzene)	Pilot study planned 1992; Design completion planned Winter '93	PRP Lead	Gene Wingert 215-597-1727 FTS 597-1727
3	Ordnance Works Disposal, WV (09/29/89)	Land treatment	Chemical Formulation	Soil (13,460 cy)	Carcinogenic PAHs	In design; Design completion planned Summer '92	PRP Lead	Drew Lausch 215-597-1286 FTS 597-1286
4	American Creosote Works, FL* (09/28/89)  Also see Soil Washing	Slurry-phase bioremediation for fines from soil washing	Wood Preserving	Fines from 21,000 cy of soil	Creosote, PAHs, SVOCs (PCP), and Dioxins	In design; undergoing additional treatability testing	Fund Lead	Madelaine Streng 404-347-2643 FTS 257-2643
4	Brown Wood Preserving, FL* (04/08/88)	Land treatment	Wood Preserving	Soil (7,500 cy)	Creosote and PAHs	Project completed; Operational 10/88 - 8/91	PRP Lead; Remediation Technology, Inc.	Martha Berry 404-347-2643 FTS 257-2643
4	Coleman Evans Wood Preserving, FL* (9/26/90)  Also see Soil Washing	Slurry-phase bioremediation of fines from soil washing	Wood Preserving	Fines from 27,000 cy of soil	SVOCs (PCP), Dioxin	Pilot study planned; Design completion planned Spring '92	Fund Lead	Tony Best 404-347-2643 FTS 257-2643
4	Dubose Oil Products, FL (03/29/90)	Solid-phase bioremediation	Oil Recycling	Soil (15,000 cy)	PCP	Predesign; Pilot studies planned	PRP Lead	Mike McKibben 404-347-2643 FTS-257-2643

\* Indicates that a treatability study has been completed.

Note: Contacts listed are EPA regional staff unless otherwise indicated.



## Bioremediation (Ex situ)

Region	Site Name, State, Region (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
4	Southeastern Wood Preserving, MS (Emergency Response -AM signed 9/30/90)  Also see Soil Washing	Slurry-phase bioremediation of fines from soil washing	Wood Preserving	4,000 cy of fines from soil washing	SVOCs (PCP), PAHs, and Creosote	Project Ongoing; Demonstration on 700 cy 2/91 - 8/91; Full-scale cleanup began 8/91	Fund Lead OHM Remediation Services Corp.	Don Rieger 404-347-3931 FTS 257-3931
5	Burlington Northern (Railroad Tie Treating Plant), MN* (06/04/86)	Land treatment	Wood Preserving	Soil (9,500 cy), Sludge (9,600 cy)	Creosote, PAHs, and SVOCs (Phenols)	Operational; Expected completion 1993	PRP Lead; Remediation Technologies, Inc.	Amy Blumberg 312-353-9306 FTS 886-9306 Todd Goeks (MN) 612-296-7710 Rich Truax (Retec) 303-493-3700
5	Cliff/Dow Dump, MI* (09/27/89)  Also see Bioremediation (In situ)	Excavation/on-site bioremediation - type to be determined	Waste Disposal for Charcoal Manufacturing Plant	Soil (9,200 cy)	Tar, PAHs, VOCs (BTX and PCE), and SVOCs (Phenol)	Predesign	PRP Lead	Lida Tan 312-886-1842 FTS 886-1842
5	Galesburg/Koppers, IL (06/30/89)	Land treatment	Wood Preserving	Soil (15,200 cy)	Creosote, PAH, Phenols, and PCP	Predesign	PRP Lead/State Enforcement; Remediation Technologies, Inc.	Brad Bradley 312-886-4742 FTS 886-4742 Steve Davis (IL) 217-785-3913
5	Joslyn Manufacturing and Supply Co., MN (ROD Planned)	Land treatment	Wood Preserving	Soil (75,000 cy)	PAHs and SVOCs (PCP)	Operational since 8/89; scheduled completion end of 1991	PRP Lead/State Enforcement; ECOVA Corp.	Kevin Turner 312-886-4444 FTS 886-4444 Cliff Twaroski (MN) 612-296-7827
5	Moss-American, WI (09/27/90)  Also see Soil Washing	Slurry-phase of fines from soil washing and sediments	Wood Preserving	Sediments (5,200 cy), Fines from soil (80,000 cy)	PAHs	Predesign; Design completion planned winter '93	PRP Lead; Weston, Inc.	Betty Lavis 312-886-4784 FTS 886-4784

\* Indicates that a treatability study has been completed.

Note: Contacts listed are EPA regional staff unless otherwise indicated.

## Bioremediation (Ex situ)

Region	Site Name, State, Region (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
6	Old Inger Oil Refinery, LA* (09/25/84)	Land treatment	Oil Refining & Waste Oil Reclamation	Soil (approx. 100,000 cy), Waste oil and sludge (3,964 cy combined)	Petroleum Hydrocarbons and VOCs (Benzene, Ethylbenzene),	Installation underway; operation to be bid Winter '91/'92	State Lead/Fund Financed; Westinghouse Haztech (Construction)	Paul Sieminski 214-655-6710 FTS 255-6710 Sandra Greenwich (LA) 504-765-0487
6	Atchison/Santa Fe/Clovis, NM (09/23/88)  Also see Bioremediation (In situ)	Land treatment of soils/sludge	Railyard Wastes (Industrial Wastewater)	Soil, Sludges (28,599 cy combined)	Phenols, Petroleum Hydrocarbons, and Diesel Fuel	In design; Design completion planned Spring '92	PRP Lead; Radian Corp.	Susan Webster 214-655-6730 FTS 255-6730
6	North Cavalcade Street, TX* (06/28/88)	Modified land treatment	Wood Preserving	Soil (22,300 cy)	Creosote, PAHs, and VOCs (BTX)	In design; Design completion planned Fall '92	State Lead/Fund Financed	Deborah Griswold 214-655-6715 FTS 255-6715 Lewis Rogers (TX) 512-463-8188
6	Sheridan Disposal Services, TX* (12/29/88)	Slurry-phase bioremediation	Commercial Waste Disposal	Soil (13,000 cy), Sludge (31,000 cy), Oil/emulsion (300 cy)	VOCs (Benzene, Toluene) and SVOCs (Phenols)	Predesign; pilot study underway; design completion planned Summer '93	PRP Lead	Ruth Israeli 214-655-6735 FTS 255-6735
7	Vogel Paint & Wax, IA* (09/25/89)	Land treatment	Paint Manufacturing Wastes	Soil (10,000 - 40,000 cy)	VOCs (Methyl Ethyl Ketone and BTX)	In design; Design completion planned Summer '91	PRP Lead/ State Enforcement; Geotek Engineering and Testing Services, Inc.	Steve Jones 913-551-7755 FTS 276-7755 Bob Drustrup (IA) 515-281-8900
7	Scott Lumber, MO (Emergency Response -AM signed 7/10/87)	Land treatment	Wood preserving	Soil (16,000 tons)	PAHs and Benzo(a)pyrene	Ongoing; Process started in 1987	Fund Lead; Remediation Technologies, Inc.	Bruce Morrison 913-551-5014 FTS 276-5014
8	Burlington Northern (Somers Plant), MT* (09/27/89) Also see Bioremediation (In situ)	Land treatment	Wood Preserving	Soil, Sediments (11,700 cy combined)	Creosote, PAHs, and SVOCs (Phenols)	In design; Design completion planned Fall '92	PRP Lead; Remediation Technologies, Inc.	Jim Harris 406-449-5414 FTS 585-5414

\* Indicates that a treatability study has been completed.

Note: Contacts listed are EPA regional staff unless otherwise indicated.

## Bioremediation (Ex situ)

Region	Site Name, State, Region (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
8	Libby Ground Water Contamination, MT* (12/30/88)  Also see Bioremediation (In situ)	Land treatment	Wood Preserving	Soil (45,000 cy)	Creosote, SVOCs (PCP), VOCs (Benzene), and PAHs	Operational; 2-year, 1-acre demonstration completed 8/89; full-scale treatment to be completed in 1999	PRP Lead	Julie Dalsoglio 406-449-5614 FTS 585-5414 Bert Bledsoe (RSKERL) 405-332-2313 FTS 743-2313
9	J.H. Baxter, CA* (09/27/90)	Solid-phase bioremediation	Wood Preserving	Soil (10,000 cy)	SVOCs (PCP), PAHs, and Dioxins	In design; Design completion planned Summer '92	Fund Lead	Mary Masters 415-744-2370 FTS 484-2370
9	Poly-Carb, NV (Emergency Response -AM signed 5/14/87)  Also see In situ Flushing	Land treatment in conjunction with soil flushing	Commercial Waste Management	Soil (1,500 cy)	Phenols and Cresol	Process completed; Operational 7/87 - 8/88	Fund Lead; Crosby and Overton, EMI (subcontractors to Reidel Environmental Services)	Bob Mandel 415-744-2290 FTS 484-2290

\* Indicates that a treatability study has been completed.

Note: Contacts listed are EPA regional staff unless otherwise indicated.

## Bioremediation (In situ)

Region	Site Name, State, Region (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
2	FAA Technical Center, NJ - Area D (09/26/89) Also see Vacuum Extraction	In situ gw bioremediation (Area D only)	Jet Fuel Tank Farm	gw	VOCs (BTEX)	In design; Design completion planned 9/91	PRP Lead	Carla Struble 212-264-4595 FTS 264-4595 Keith Buch (FAA) 609-484-6644
4	Cabot/Koppers, FL (09/27/90) Also see Soil Washing	In situ soil bioremediation	Wood treating and pine tar distillation facility	Soil (5,000 cy)	SVOCs [Bis(2-ethyl-hexyl)phthalate, 2,4-Dimethylphenol, 2,4-Dinitrotoluene, Di-n-octylphthalate, Penta-chlorophenol, Phenol], PAHs	In design; Treatability study planned  Design completion planned Spring '93	PRP Lead	Martha Berry 404-347-2643 FTS-257-2643
5	Cliff/Dow Dump, MI* (09/27/89) Also see Bioremediation (Ex situ)	In situ soil and gw bioremediation	Waste Disposal for Charcoal Manufacturing Plant	gw, soil	VOCs (BTX), PAHs, and SVOCs (Phenols)	Predesign	PRP Lead	Lida Tan 312-886-1842 FTS 886-1842
5	Onalaska Municipal Landfill, WI (08/14/90)	In situ soil bioremediation	Municipal Landfill	Soil (=20,000 cy; to 15' depth)	VOCs (TCE, BTEX, DCE, TCA, DCA) and SVOCs (Naphthalene)	In design; bench study planned Fall '91; design completion planned Summer '92	Fund Lead	Kevin Adler 312-886-7078 FTS 886-7078
5	Seymour Recycling, IN* (09/30/87) Also see Vacuum Extraction	In situ soil bioremediation	Chemical Waste Management and Incineration	Soil	Petroleum Hydrocarbons, BTEX, and various SVOCs	Remedial action completed (small component of total remedy)	PRP Lead; ABB Environmental Services (subcontractor to Geraghty & Miller)	Jeff Gore 312-886-6552 FTS 886-6552
6	Atchison/Santa Fe/ Clovis, NM (09/23/88) Also see Bioremediation (Ex situ)	In situ soil bioremediation	Railyard Wastes (Industrial Wastewater)	Soil, Sludges (28,599 cy combined)	Phenols, Petroleum Hydrocarbons, and Diesel Fuel	Construction underway; startup planned Oct. '91.	PRP Lead; Radian Corp.	Susan Webster 214-655-6730 FTS 255-6730

\* Indicates that a treatability study has been completed.

Note: Contacts listed are EPA regional staff unless otherwise indicated.

## Bioremediation (In situ)

Region	Site Name, State, Region (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
6	French Limited, TX (03/24/88)	In situ lagoon bioremediation	Petrochemical	Sludge, Sediments (70,100 cy)	VOCs (BTEX), PAHs, Petroleum Hydrocarbons, and PCBs	In design	PRP Lead	Judith Black 214-655-6735 FTS 255-6735
8	Burlington Northern (Somers Plant), MT* (09/27/89)	In situ gw bioremediation	Wood Preserving	gw	Creosote, PAHs, and SVOCs (Phenol)	In design; Design completion planned Fall '92	PRP Lead; Remediation Technologies, Inc.	Jim Harris 406-449-5414 FTS 585-5414
8	Libby Ground Water Contamination, MT* (12/30/88)	In situ gw bioremediation	Wood Preserving	gw	Creosote, VOCs (Benzene), PAHs, SVOCs (PCP), and Oil	In design; Phase 1 design completion planned Summer '91; Phase 2 design completion planned Spring '93	PRP Lead	Julie Dalsoglio 406-449-5414 FTS 585-5414 Bert Bledsoe (RSKERL) 405-332-2313 FTS 743-2313
9	Gila River Indian Reservation, AZ (Emergency Response -AM signed 7/31/84)  Also see Chemical Treatment	In situ anaerobic soil biodegradation (preceded by chemical treatment)	Airfield with buried drums of pesticides	Soil (3,200 cy)	Toxaphene	Project completed; Operational 6/85 - 10/85	Fund Lead	Richard Martin 414-744-2288 FTS 484-2288
9	Koppers (Oroville Plant), CA (09/13/89)  Also see Soil Washing	In situ soil bioremediation	Wood Preserving	Soil (110,000 cy)	SVOCs (PCP), Creosote, PAHs, VOCs (BTX), Dioxin	In design; Design completion planned Summer '92	PRP Lead	Fred Schaffler 415-744-2365 FTS 484-2365
9	Roseville Drums, CA (Emergency Response -AM signed 3/3/88)	In situ soil bioremediation	Midnight dump on dirt road in undeveloped area	Soil (14 cy)	Dichlorobenzene and Phenols	Project completed; Operational 2/88 - 11/88	Fund Lead	Brad Shipley 415-744-2287 FTS 484-2287
9	Solvent Service, CA (09/27/90)  Also see Vacuum Extraction	In situ gw bioremediation	Solvent operation	gw	VOCs (Total, Acetone, Ethylbenzenes, TCA, and Xylenes) and SVOCs (Dichlorobenzene)	Operational	State Lead site under RCRA authority	Marie Lacey 415-744-2234 FTS 484-2234

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## Chemical Treatment

Region	Site Name, State, Region (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
3	Avtex Fibers, VA (Emergency Response -AM signed 11/14/89)	Chemical Treatment	Rayon manufacturing facility - wastewater treatment plant	Sludge (~39,000g)	Carbon Disulfide	Project Completed 8/91	Fund Lead; OH Materials	Vincent Zenone 215-597-3038 FTS 597-3038
4	Palmetto Wood Preserving, SC* (09/30/87)	Reduction of Cr(VI) to Cr(III) (Followed by Solidification)	Wood Preserving	Soil (12,680 cy)	Metals (Chromium, Arsenic, and Copper)	Project Completed; operational 09/88 - 02/89	Fund Lead/ Negotiation; Roy F. Weston	Al Cherry 404-342-7791 FTS 257-7791
5	PBM Enterprises (Van Dusen Airport Service), MI (Emergency Response -AM signed 4/10/88)	Chemical Oxidation with Sodium Hypochlorite	Silver recovery facility	Cyanide-tainted x-ray film chips (1,300 cy)	Cyanide	Project completed; operational 5/85 - 10/85	Fund Lead; Mid-American Environmental Service, Inc.	Ross Powers 312-378-7661 FTS 378-7661
9	Gila River Indian Reservation, AZ (Emergency Response -AM signed 7/31/84)	In situ Chemical Treatment using sodium hydroxide	Inactive airfield with buried drums of pesticides	Soil (3,200 cy)	Toxaphene, Ethyl Parathion, and Methyl Parathion	Project completed; Operational 4/85 - 10/85	Fund Lead	Richard Martin 414-744-2288 FTS 484-2288
9	Stanford Pesticide #1, AZ (Emergency Response -AM signed 4/20/87)	In situ Chemical Treatment using soda ash and activated carbon	Farm equipment and pesticide storage yard	Soil (200 cy)	Pesticides (Methyl Parathion)	Project completed; operational 7/87 - 9/87	Fund Lead; Crosby and Overton	Dan Shane 415-744-2286 FTS 484-2286

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## Dechlorination

Region	Site Name, State, Region (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
1	Re-Solve, MA* (09/24/87)  Also see Thermal Desorption	Dechlorination of Residuals from Thermal Desorption	Chemical Reclamation Facility	Residuals from Thermal Desorption of 22,500 cy of Soil	PCBs	Design completion planned 1993	PRP Lead/ Mixed Funding; Chemical Waste Management, Inc.	Lorenzo Thanto 617-223-5500 FTS 883-1500
2	Myers Property, NJ* (09/28/90)  Also see Soil Washing	Dechlorination (followed by soil washing)	Pesticide Manufacturing	Soil and Sediments (50,000 cy combined)	SVOCs (Hexachlorobenzene), DDT, Dioxin, TCDD, DDD, and DDE	Predesign	Fund lead/In Negotiation	John Prince 212-264-1213 FTS 264-1213
2	Signo Trading/Mt. Vernon, NY (Emergency Response -AM signed 12/19/86)	KPEG Treatment	Waste management facility (warehouse)	Sludge (15 gals)	Dioxin (2,3,7,8 TCDD-laden herbicides)	Project completed; Operational 10/20/87 - 10/21/87	Fund Lead; Galson Research Corp. (subcontractor to OHM)	Charles Fitzsimmons 201-321-6608 FTS 340-6608
2	Wide Beach Development, NY* (09/30/85)	APEG dechlorination using anaerobic thermal process unit	Contaminated Road Dust, Driveways, and Ditches	Soil (22,000 cy)	PCBs	Project complete; Operational 10/90 - 6/91	Fund Lead/USACE; SoilTech, Inc. (subcontractor to Kimmins)	Herb King 212-264-1129 FTS 264-1129
6	Fruitland Drum, NM (Emergency Response -AM signed 9/8/90)	Dechlorination	Operation and maintenance facility	Liquid (150 gals/bench scale)	Dioxins (2,4,5,T)	Treatability study for APEG/KPEG was unsuccessful; EPA considering BCD	Fund Lead; Galson Research Corp.	Craig Carlton 214-655-2270 FTS 255-2270
6	Sol Lynn/Industrial Transformers, TX* (03/25/88)	APEG - Plus Dechlorination	Transformer and Solvent Recycler	Soil (800 cy); Oil (400 gals)	PCBs	Installation scheduled to begin Fall '91	PRP Lead; Galson Research Corp. (subcontractor to ENSR Consulting)	John Meyer 214-655-6735 FTS 255-6735
6	Tenth Street Dump/Junkyard, OK* (09/27/90)	Dechlorination	Salvage yard and industrial waste dump	Soil (7,500 cy)	PCBs	In design; Design completion planned Spring '92	Fund Lead	Noel Bennett 214-655-6715 FTS 655-6715
7	Crown Plating, MO (Emergency Response -AM signed 8/29/89)	KPEG Treatment	Electroplating facility	Liquid (55 gals)	Herbicide (silvex; 2,4,5 TP)	Project completed in 1989	Fund Lead	Mark Roberts 913-236-3881 FTS 757-3881

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## In situ Flushing

Region	Site Name, State, Region (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
2	Byron Barrel & Drum, NY* (09/29/89)	In situ soil flushing	Uncontrolled Dump Site and Landfill	Soil (5,200 cy)	VOCs (PCE, TCE, DCE, and DCA)	In design; Design completion planned January '92	PRP Lead	Eduardo Gonzales 212-264-5714 FTS 264-5714
2	Goose Farm, NJ (09/27/85)	In situ soil flushing	Uncontrolled Dump Site	Soil (quantity not available)	VOCs (Toluene, Ethylbenzene, Dichloromethane, and TCE), SVOCs, PCBs, and PAHs	In design; Design completion planned Winter '91	PRP Lead	Laura Lombardo 212-264-6787 FTS 264-6787
2	Lipari Landfill, NJ* (09/30/85)	In situ flushing	Commercial Dump Site	Soil (650,000 cy)	VOCs (Benzene, DCA, Dichloromethane, and Toluene), Phenol, and Metals (Chromium, Nickel, Lead, and Mercury)	Under construction; will be operational Fall '91	Fund Lead; Bechtel Environmental, Inc.	Fred Cataneo 212-264-9542 FTS 264-9542
2	Vineland Chemical, NJ, 02 (09/29/89) Also see Soil Washing	In situ soil flushing	Pesticide Manufacturing	Soil (126,000 cy)	Arsenic and VOCs (Dichloromethane)	Pre-design; Design completion planned Fall '92	Fund Lead	Matthew Westgate 212-264-3406 FTS 264-3406
3	L.A. Clarke & Sons, VA* (03/31/88) Also see Bioremediation (Ex situ)	In situ soil flushing	Wood Preserving	Soil (6,000 cy)	Creosote, PAHs, and Benzene	In design; Design completion planned Winter '93	PRP Lead	Eugene Wingert 215-597-1727 FTS 597-1727
3	U.S. Titanium, VA (11/21/89)	In situ dissolution of waste	Titanium Dioxide Plant	Waste (16,000 cy of ferrous sulfate)	Ferrous Sulfate	Pre-design	PRP Lead	Kim Hummell 215-597-1727 FTS 597-1727
4	Jadco-Hughes, NC (09/27/90) Also see Vacuum Extraction	In situ soil flushing (After Vacuum Extraction)	Solvent Recovery and Storage Facility	Soil (6,000 cy)	PCBs and Metals (Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, and Silver)	In design; design completion planned Winter '93	PRP Lead	Barbara Benoy 404-347-7791 FTS 257-7791

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## In situ Flushing

Region	Site Name, State, Region (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
5	Ninth Avenue Dump, IN (06/30/89)	In situ soil flushing	Commercial Dump Site	Soil (64,000 cy)	VOCs (BTEX, TCE), PAHs, Phenols, Lead, PCBs, and other Metals	In design; Design completion planned Winter '93	PRP Lead	Alison Hiltner 312-353-6417 FTS 353-6417
5	U.S. Aviex, MI (09/07/88)	In situ soil flushing	Chemical Packaging Facility	Soil (11,500 cy)	VOCs (Carbon Tetrachloride, DCA, Ethylbenzene, PCE, TCE, Toluene, TCA, Freon, Xylene, and Chloroform)	In design; Design completion planned Summer '91	Fund Lead	Robert Whippro 312-886-4759 FTS 886-4759
6	South Cavalcade Street, TX (09/26/88) Also see Soil Washing	In situ soil flushing	Wood Preserving & Coal Tar Distillation	Soil (10,500 cy)	PAHs	In design; Design completion planned Summer '93	PRP Lead	Mark Fite 214-655-6715 FTS 255-6715
9	Poly-Carb, NV (Emergency Response -AM signed 5/14/87) Also see Bioremediation (In situ)	Soil Flushing In conjunction with land treatment	Commercial waste management	Soil (1,500 cy)	Phenols and Cresol	Process completed; Operational 7/87 - 8/88	Fund Lead; Crosby and Overton, EMI (subcontractors to Reidel Environmental Services)	Bob Mandel 415-744-2290 FTS 484-2290
10	United Chrome Products, OR* (09/12/86)	In situ Flushing	Chrome Plating Facility	Soil (quantity not available)	Chromium	Operational since 8/88	Fund Lead	Loren McPhillips 206-553-4903 FTS 399-4903

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## In situ Vitrification

Region	Site Name, State, Region (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
5	Anderson Development, MI (09/28/90)	In situ Vitrification (Thermal desorption being considered)	Chemical Manufacturing Facility Waste Lagoon	Soil, Sludge, and Clay (4000 cy)	MBOCAs (4' Methylene Bis-dichloroaniline)	Predesign; treatability study underway	PRP Lead	Mike Valentino 312-886-4785 FTS 886-4785
5	Ionia City Landfill, MI* (09/29/89)	In situ Vitrification	Municipal Landfill	Soil, Debris (5,000 cy combined)	VOCs (Methylene Chloride, Styrene, Toluene, 1-1-1 Trichloroethane), and Lead	In design	PRP Lead	Michael Gifford 312-886-7257 FTS 886-7257
5	Parsons Chemical (ETM Enterprise), MI (Emergency Response)	In situ Vitrification	Agricultural chemical facility	Soil (2,000 cy)	Dioxin, Pesticides, and Mercury	Waste staging in final stages; treatment postponed until Summer 1993	Fund Lead; Geosafe	Len Zentack 312-886-4246 FTS 886-4246
5	Sangamo/Crab Orchard National Wildlife Refuge, IL (08/01/90)	In situ Vitrification (Alternative is incineration)	Federal Facility	Soil, Sediments (38,400 cy combined)	PCBs and Metals (Lead and Cadmium)	Predesign; Design completion planned Summer '94	PRP Lead	Mary Logan 312-353-9288 FTS 353-9288
6	Crystal Chemical, TX (09/27/90)	In situ Vitrification (Technology being reconsidered)	Herbicide Manufacturing	Soil, Sediments (16,500 cy combined) (15' deep)	Arsenic	Predesign	Fund Lead/In negotiation	Lisa Price 214-655-6735 FTS 255-6735
8	Rocky Mountain Arsenal (OU 16), CO (02/26/90)	In situ Vitrification	Federal Facility	Soil (4,600 cy), Sludge (5,800 cy)	Metals (Arsenic and Mercury) and Pesticides	In design; Design completion planned Fall '91	PRP Lead; (US Army)	Linda Jacobson 303-294-1977 FTS 330-1977

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## Soil Washing

Region	Site Name, State, Region (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
2	Ewan Property, NJ* (09/29/89) Also see Solvent Extraction	Soil Washing (preceded by Solvent Extraction)	Industrial Waste Dumping	Soil (22,000 cy)	VOCs (BTX), SVOCs (Naphthalene and 2,4-dimethylphenol) and Metals (Chromium and Lead)	Predesign; Design completion planned Summer '94	PRP Lead	Craig DeBiase 212-264-5393 FTS 264-5393
2	GE Wiring Devices, PR (09/30/88)	Hydrometallurgical Treatment	Wiring Services Facility	Soil (5,500 cy)	Mercury	Predesign; Alternative being reconsidered	PRP Lead	Craig De Biase 212-264-5393 FTS 264-5393
2	King of Prussia, NJ (09/28/90)	Soil Washing	Recycling Facility	Soil, Sludges, Sediments (20,150 cy combined)	Metals (Chromium, Copper, and Silver)	Predesign; Design completion planned Summer '93	PRP Lead	Jim Hahnenberg 212-264-5387 FTS 264-5387
2	Myers Property, NJ (09/28/90) Also see Dechlorination	Soil Washing (preceded by Dechlorination)	Pesticide Manufacturing	Soil, Sediments (50,000 cy combined)	Metals (Aluminum, Cadmium, Chromium, Silver, and Sodium)	Predesign	Fund lead/In Negotiation	John Prince 212-264-1213 FTS 264-1213
2	Vineland Chemical, NJ (09/29/89) Also see In situ Flushing	Soil Washing	Pesticide Manufacturing	Sediments (62,600 cy)	Arsenic	Predesign	Fund Lead	Matthew Westgate 212-264-3406 FTS 264-3406
4	Cabot/Koppers, FL (09/27/90) Also see Bioremediation (In situ)	Soil Washing (may be followed by bioremediation of residual)	Wood Treating and Pine Tar Distillation Facility	Soil (6,400 cy)	SVOCs [Bis(2-ethylhexyl)phthalate, Dimethylphenol, Dinitrotoluene, Di-n-octyl-phthalate, Pentachlorophenol, and Penol], and PAHs	In design; pilot study planned; Design completion planned Spring '93	PRP Lead	Martha Barry 404-347-2643 FTS 257-2643
4	Cape Fear Wood Preserving, NC* (06/30/89)	Soil Washing	Wood Preserving	Soil (20,000 cy)	Creosote, PAHs, Copper, Chromium, Arsenic, and Benzene	In design; Design completion planned Fall '91; Bid advertisement scheduled for late Fall	Fund Lead	Jon Bornholm 404-347-7791 FTS 257-7791

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## Soil Washing

Region	Site Name, State, Region (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
4	American Creosote Works, FL* (09/28/89) Also see Bioremediation (Ex Situ)	Soil Washing (slurry-phase bioremediation for fines)	Wood Preserving	Soil (21,000 cy)	Creosote, PAHs, SVOCs (PCP), and Dioxins	In design; Design delayed for additional treatability testing	Fund Lead	Madelaine Streng 404-347-2643 FTS 257-2643
4	Coleman-Evans Wood Preserving, FL* (09/26/90) Also see Bioremediation (Ex situ)	Soil Washing (bioremediation of fines)	Wood Preserving	Soil (27,000 cy)	PCP, Dioxin	In design; Design completion planned Spring '92	Fund Lead	Tony Best 404-347-2643 FTS 257-2643
4	Southeastern Wood Preserving, MS (Emergency Response -AM signed 9/30/90) Also see Bioremediation (Ex situ)	Soil washing followed by slurry phase bioremediation	Wood preserving	Solids (8,000 cy)	SVOCs (PCP), PAHs, and creosote	Project ongoing; Demonstration on 700 cy 2/91 - 8/91; Full-scale cleanup began 8/91	Fund Lead; OHM Remediation Services Corp.	Don Reiger 404-347-3931 FTS 257-7931
5	Moss American, WI (09/27/90) Also see Bioremediation (Ex situ)	Soil Washing (bioremediation of fines)	Wood Preserving	Soil (80,000 cy)	PAHs	Pre-design; design completion planned 3/93	PRP Lead; Weston, Inc.	Betty Lavis 312-886-4784 FTS 886-4784
5	United Scrap Lead/SIA, OH* (09/30/88)	Soil Washing	Lead Battery Recycling	Soil (45,000 cy), Sediments (45,550 cy)	Lead and Arsenic	In design; Design completion planned Spring '93	Fund Lead	Anita Boseman 312-886-6941 FTS 886-6941
6	Arkwood, AR (09/28/90)	Soil Washing (incineration of residuals)	Wood Preserving	Soil (20,400 cy)	PCP, PNA, and Dioxins	Pre-design	PRP Lead	Rick Erhart 214-655-6582 FTS 255-6582
6	Koppers/Texarkana, TX* (09/23/88)	Soil Washing	Wood Preserving	Soil (19,400 cy)	PAHs and SVOCs (PCP)	Pre-design	PRP Lead	Ursula Lennox 214-655-6735 FTS 255-6735

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## Soil Washing

Region	Site Name, State, Region (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
6	South Cavalcade Street, TX (09/26/88) Also see In situ Flushing	Soil Washing	Wood Preserving & Coal Tar Distillation	Soil (19,500 cy)	PAHs	In design; Design completion planned Summer '93	PRP Lead	Mark Fite 214-655-6715 FTS 255-6715
8	Sand Creek Industrial (OU 5), CO* (09/28/90)	Soil Washing	Refinery, Pesticide Manufacturing, and Landfill	Soil (14,000 cy)	Chlordane, Dieldrin, 4,4-DDT, 2-4 D, Heptachlor, and Metals (Arsenic and Chromium)	In design; Design completion planned Spring '92	Fund Lead	Brian Pinkowski 303-293-1512 FTS 330-1512
9	Koppers (Oroville Plant), CA (09/13/89) Also see Bioremediation (In situ)	Soil Washing	Wood preserving	Soil, Sediments (200,000 cy combined)	PAHs, SVOCs (PCP), and Dioxin	In design; Design completion planned Summer '92	PRP Lead	Fred Schauffler 415-744-2365 FTS 484-2365

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## Solvent Extraction

Region	Site Name, State, Region (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
1	Norwood PCBs, MA (09/29/89)	Solvent Extraction	Industrial Waste Dumping	Soil (28,000 cy)	PCBs, PAHs and VOCs (TCE, Trichlorobenzene)	Predesign; Treatability study planned Fall '91; Design completion planned Summer '93	Fund Lead	Jane Downing 617-573-5730 FTS 833-1708
1	O'Connor, ME* (09/27/89)	Solvent Extraction	Salvage & Electrical Transformer Recycling	Soil, Sediments (23,500 cy combined)	PCB, PAHs, and Lead	In design; Design completion planned Spring '93	PRP Lead	Mike Jasinski 617-573-5786 FTS 833-1786
1	Pinette's Salvage Yard, ME* (05/30/89)	Solvent Extraction	Salvage and Vehicle Repair	Soil (2,080 cy)	PCBs, VOCs (Chlorobenzene), SVOCs (Dichlorobenzene and Trichlorobenzene)	Contract awarded Oct. '90; to be installed Spring '92	Fund Lead; Sanivan Group (subcontractor to Severson)	Ross Gilleland 617-573-5766 FTS 833-1766
2	Ewan Property, NJ* (09/29/89) Also see Soil Washing	Solvent Extraction (followed by Soil Washing)	Industrial Waste Dumping	Soil (22,000 cy)	VOCs (BTX), SVOCs (Naphthalene and 2,4-dimethylphenol), and Metals	Predesign; Design completion planned Summer '94	PRP Lead	Craig DeBiase 212-264-5393 FTS 264-5393
4	General Refining, GA* (Emergency Response -AM signed 8/13/85)	Basic Extractive Sludge Treatment (BEST)	Waste oil recycling facility	Sludge (2,700 cy), Solids (700 cy) Waste Oil (6,600 gals)	PCBs, Metals (Arsenic, Copper, and Lead)	Project completed; Operational 8/86 - 10/86, 1/87 - 2/87	Fund Lead; Resource Conservation Co.	Shane Hitchcock 404-347-3136 FTS 257-3136
6	Traband Warehouse, OK (Emergency Response)	Solvent Extraction	Storage management complex	Concrete and processed sand from sandblasting operation (quantity not available)	PCBs	Project Completed Feb. '89	Fund Lead; Terra-Clean	Pat Hammack 214-655-2270 FTS 255-2270

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## Solvent Extraction

Region	Site Name, State, Region (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
6	United Creosoting, TX* (09/29/89)	Critical Fluid Extraction	Wood Preserving	Soil (67,000 cy)	PAHs, SVOCs (PCP), and Dioxin	In design; Design completion planned Spring '92	State Lead/ Fund Financed	Deborah Griswold 214-655-6715 FTS 255-6715 Paul Cravens (TX) 512-463-8182

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## Thermal Desorption

Region	Site Name, State, Region (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status	Lead Agency and Treatment Contractor (if available)	Contacts/Phone
1	Cannon Engineering/ Bridgewater, MA (03/31/88)	Thermal Aeration	Chemical Waste Handling, Storage, & Incineration Facility	Soil (11,330 cy)	VOCs (Benzene, TCE, and Vinyl Chloride)	Project completed; Operational 5/90 - 10/90	PRP Lead; Canonie Engineering	Dan Coughlin 617-573-9620 FTS 833-9620
1	McKin, ME* (07/22/85)	Thermal Aeration	Waste Storage, Transfer, Disposal Facility	Soil (11,456 cy)	VOCs (TCE, BTX)	Project completed; Operational 7/86 - 2/87	PRP Lead; Canonie Engineering	Sheila Eckman 617-573-5784 FTS 833-1784
1	Ottati & Goss, NH (01/16/87)	Thermal Aeration	Drum Reconditioning Facility	Soil (16,000 cy)	VOCs (TCE, PCE, 1,2-DCA, and Benzene)	Project completed; Operational 6/89 - 9/89	PRP Lead; Canonie Engineering	Stephen Calder 617-573-9626 FTS 833-1626
1	Re-Solve, MA* (09/24/87)  Also see Dechlorination	Rotary Thermal X*TRAX® Desorber (Dechlorination of residues)	Chemical Reclamation Facility	Soil (22,500 cy)	PCBs	Predesign; Pilot test planned for Fall '91; Design completion planned 1993	PRP Lead/ Mixed Funding; Chemical Waste Management, Inc.	Lorenzo Thantu 617-223-5500 FTS 833-1500
2	American Thermostat, NY (06/29/90)	Thermal Desorption	Thermostat Manufacturing	Soil (6,500 cy), Sediments (300 cy)	VOCs (PCE, TCE, DCE, and Vinyl Chloride)	In design; Design completion planned Spring '92	Fund Lead	Christos Tsiamis 212-264-5713 FTS 264-5713
2	Caldwell Trucking, NJ,* 02 (09/25/86)	Low Temperature Vaporization	Unpermitted Septic Waste Facility	Soil (20,000 cy)	VOCs (TCE, PCE, and TCA)	In design; Design completion planned Spring '92	Fund Lead	Ed Finnerty 212-264-3555 FTS 264-3555

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## Thermal Desorption

Region	Site Name, State, Region (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
2	Claremont Polychemical, NY (09/28/90)	Thermal Desorption	Chemical Facility	Soil (1,600 cy)	DDT, DDD, DDE, VOCs (DCE, PCE, TCE, and Toluene), SVOCs [Benzoic acid, Bis(2-ethylhexyl)phthalate, Butyl benzyl phthalate, Di-n-butyl phthalate, Naphthalene, and PCP], and PAHs (Benzo(a)pyrene)	In design; Design completion planned Winter '92	Fund Lead; USACE	Carlos R. Ramos 212-264-5636 FTS 264-5636
2	Fulton Terminals, NY (09/29/89)	Low Temperature Thermal Treatment	Former Waste Tank Farm	Soil (4,000 cy)	VOCs (Xylene, Styrene, TCE, Ethylbenzene, Toluene)	Predesign	PRP Lead	Christos Tsiamis 212-264-5713 FTS 264-5713
2	Marathon Battery, NY* (09/30/88)	Enhanced Volatilization	Former Battery Manufacturer	Soil (85,000 cy)	VOCs (PCE, Toluene, and TCE)	Predesign	Fund Lead	Pam Tames 212-264-1036 FTS 264-1036
2	Metaltec/Aerosystems, NJ (06/30/86)	Low Temperature Thermal Treatment	Metal Manufacturing	Soil (9,000 cy)	VOCs (TCE)	In design; Design completion planned Summer '91	Fund Lead; USACE	Jim Baly (USACE) 816-426-5221
2	Reich Farms, NJ (09/30/88)	Enhanced Volatilization	Uncontrolled Waste Disposal	Soil (1,120 cy)	VOCs and Semivolatiles	Pilot studies planned for early '92; design completion planned: Fall '92	PRP Lead	Gary Adamkiewicz 212-264-7592 FTS 264-7592
2	Sarney Farm, NY (09/27/90)	Low Temperature Thermal Treatment	Industrial and Municipal Landfill	Soil (2,365 cy)	VOCs (Benzene, Butanone, Chloroform, Methylpentanone, TCE, and Toluene)	Predesign; Design completion planned: Spring '93	Fund Lead	Kevin Willis 212-264-8777 FTS 264-8777

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## Thermal Desorption

Region	Site Name, State, Region (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
2	Waldick Aerospace Devices, NJ* (09/29/87)	Low Temperature Thermal Treatment	Manufacturing and Electroplating of Plane Parts	Soil (2,000 cy)	VOCs (TCE and PCE)	In design; Design completion planned October '91	Fund Lead	USACE Contracts Technical Issues: William McFarland (816) 426-5805 Contract Issues: Susan Anderson (816) 426-7424
4	Wanchem, SC* (06/30/88)	Low Temperature Thermal Treatment	Former Dye Manufacturing Plant	Soil (2,000 cy)	VOCs (BTX)	In design; Design completion planned Fall '91	PRP Lead	George Reedy 404-347-7791 FTS 257-7791
5	Outboard Marine/Waukegan Harbor, IL* (03/31/89)	Low Temperature Thermal Extraction (Taciuk Process)	Marine Products Manufacturing	Soil, Sediments (16,000 cy combined)	PCBs	In design; Design completion planned Fall '94	PRP Lead; Canonic Engineering	Cindy Nolan 312-886-0400 FTS 886-0400
5	University of Minnesota, MN (06/11/90)	Thermal Desorption (Fume Incineration of PCB Vapors)	University Wastes	Soil (6,300 cy), Debris (160 cy)	PCBs	In design; Design completion planned Fall '92	PRP Lead-State Oversight	Darrell Owens 312-886-7089 FTS 886-4089 David Douglas (MN) 612-296-7818
8	Martin Marietta (Denver Aerospace), CO* (09/24/90) See also Vacuum Extraction	Low Temperature Thermal Treatment	Aerospace Equipment Manufacturer	Soil (24,400 cy)	VOCs (TCE)	Predesign	State Lead (under RCRA Corrective Action Authority)	George Dancik 303-293-1506 FTS 330-1506

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## Vacuum Extraction

Region	Site Name, State, Region (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
1	Groveland Wells, MA* (09/30/88)	Vapor Extraction	Manufacturing	Soil (19,000 cy)	VOCs (TCE, Methylene Chloride, and 4-methyl-2-pentanone)	In design;	PRP Lead	Bob Leger 617-573-5734 FTS 833-1734
1	Kellogg-Deering Well Field, CT (09/29/89)	Vacuum Extraction	Municipal Landfill	Soil (quantity not available)	VOCs (TCE, PCE, BTEX, DCE, TCA, DCA, and Vinyl Chloride)	In design; Design completion planned Summer '92	PRP Lead	Leslie McVickar 617-573-9689 FTS 833-1689
1	South Municipal Water Supply Well, NH (09/27/89)	Vacuum Extraction	Commercial Manufacturing	Soil (7,500 cy)	VOCs (PCE, TCA, and TCE)	In design; Design completion planned Summer '92	PRP Lead	Roger Duwart 617-573-9628 FTS 833-1628
1	Stamina Mills, RI (09/28/90)	Vacuum Extraction	Textile Manufacturing	Soil (6,000 cy) (to 12' depth)	VOCs (DCE and TCE)	Pre-design	PRP Lead	Neil Handler 617-573-9630 FTS 833-1630
1	Tinkham Garage, NH* (09/30/86)	Vacuum Extraction	Uncontrolled Dump Site	Soil (9,000 cy)	VOCs (Benzene, Chloroform, DCE, PCE, TCE, and Vinyl Chloride)	In design; Design completion planned Fall '91	PRP Lead; Terra Vac	Diana King 617-573-9676 FTS 833-1676
1	Wells G&H, MA (09/14/89)	In situ Volatilization	Uncontrolled Dump Site	Soil (7,400 cy)	VOCs (PCE and TCE)	In design	PRP Lead	Barbara Newman 617-573-5736 FTS 833-1736
2	FAA Technical Center, NJ (09/26/89) Also see Bioremediation (In situ)	Vacuum Extraction	Jet Fuel Farm	Soil (33,000 cy)	VOCs (BTEX), SVOCs (Chlorophenol, Phenol), PAHs	In design; Design completion planned 9/91	PRP Lead	Carla Struble 212-264-4595 FTS 264-4595 Keith Buch (FAA) 609-484-6644
2	SMS Instruments (Deer Park), NY (09/29/89)	Vapor Extraction	Military Aircraft Component Overhauler	Soil (1,250 cy) (to 25' depth)	VOCs (TCE, Xylene, Ethylbenzene, and Chlorobenzene)	Cleanup contract award scheduled for 9/91	Fund Lead	Miko Fayon 212-264-4706 FTS 264-4706

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## Vacuum Extraction

Region	Site Name, State, Region (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
2	Upjohn Manufacturing Co., PR (09/30/88 for gw; treatment completed prior to ROD)	Vacuum Extraction	Industrial Facility, Chemical Leak	Soil (quantity not available)	VOCs (Carbon Tetrachloride and Acetonitrile)	Project completed; operational late 1984 - to 3/88	PRP Lead; Terra Vac	Alison Hess 212-264-6040 FTS 264-6040
2	Vestal Water Supply 1-1, NY (09/27/90)	Vacuum Extraction	2 Areas within an Industrial Park	Soil; Area (1) 19,000 cy; Area (2) 6,000 cy	VOCs (DCA, TCA, TCE, and DCE)	Pre-design; Design completion planned Summer '92	Area (1) PRP Lead Area (2) Fund Lead	Ed Als 212-264-0522 FTS 264-0522
3	Bendix, PA (09/30/88)	Vacuum Extraction	Aircraft Manufacturing	Soil (quantity not available)	VOCs (TCE, Toluene, Vinyl Chloride, DCE, and Carbon Tetrachloride), and SVOCs	In design; Design completion planned Fall '92	PRP Lead	Humane Zia 215-597-0913 FTS 597-0913
3	Henderson Road, PA* (06/30/88)	In situ Volatilization	Injection Well	Soil (quantity not available)	VOCs (BTEX, Chlorobenzenes, DCA, and 1,1,1-TCA)	In design; Design completion planned Fall '91	PRP Lead	Michael Towle 215-597-3166 FTS 597-3166
3	Lord-Shope Landfill, PA (06/29/90)	Vacuum Extraction	Industrial Drum Landfill	Soil/source (approximately 50,000 cy; to 15' depth)	VOCs (Benzene, PCE, and Toluene)	Pre-design	PRP Lead	Jim Feeney 215-597-8257 FTS 597-8257
3	Tyson's Dump, PA* (03/31/88)	Vacuum Extraction	Commercial Surface Impoundment	Soil (30,000 cy)	VOCs (Benzene, Toluene, TCE, PCE, and Trichloropropane)	Operational since 11/88	PRP Lead; Terra Vac	Eugene Dennis 215-597-8555 FTS 597-8555
4	Hinson Chemical, SC (Emergency Response - AM signed 11/28/88)	Vacuum Extraction with In situ Flushing with Air	Waste Reclaiming Facility	Soil (≈80,000 cy; to 50' depth)	VOCs	Process ongoing 12/88 - present	Fund Lead	Fred Stroud 404-347-3136 FTS 257-3136
4	Jadco-Hughes, NC (09/27/90) Also see In situ Flushing	Vacuum Extraction (followed by in situ soil flushing)	Solvent Recovery and Storage Facility	Soil (6,000 cy)	VOCs (Carbon Tetrachloride, Chloroform, and Vinyl Chloride) and SVOCs (Dichlorobenzene)	In design; Design completion planned Winter '93	PRP Lead	Barbara Benoy 404-347-7791 FTS 257-7791

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## Vacuum Extraction

Region	Site Name, State, Region (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
4	SCRDI Bluff Road, SC (09/12/90)	Vacuum Extraction	Solvent Reclamation	Soil (29,500 cy)	VOCs (Carbon Tetrachloride, Acetone, Chloroform, TCA, DCA, PCA, PCE, TCE, DCE, Methylene Chloride, 2-Butanone, BTEX, 4,methyl-2,pentanone, Vinyl Chloride)	Pre-design; Design completion planned Summer '92	PRP Lead	Steve Sandler 404-347-2643 FTS 257-2643
5	Fisher Calo Chem, IN (08/07/90)	Vapor Extraction	Solvent Reclamation	Soil (29,500 cy)	VOCs (PCE, DCA, and TCA)	Pre-design; Design completion planned Spring '93	Fund Lead	Brad Bradley 312-886-4742 FTS 886-4742
5	Hagen Farm, WI (09/17/90)	Vapor Extraction (evaluating effectiveness of vapor extraction in enhancing bioremediation of SVOCs)	Industrial and Municipal Waste Disposal	Soil/Waste (24,000 cy)	VOCs (BTEX, Butanone, Tetrahydrofuran, and Vinyl Chloride)	Pilot Test scheduled for Winter '91 - Design completion planned Summer '92	PRP Lead	Jay Lee 312-886-4749 FTS 886-4749  Don DiGiulio (RSKERL) 405-332-8800 FTS 743-2011
5	Kysor Industrial, MI (09/29/89)	Vacuum Extraction	Truck Parts Manufacturing	Soil (13,200 cy)	VOCs (Xylene, Toluene, Ethylbenzene, and TCE)	In design; Design completion planned Summer '92	PRP Lead (RD); RA in negotiation	Mary L. Gustafson 312-886-6144 FTS 886-6144
5	Long Prairie, MN (06/27/88)	Vacuum Extraction	Dry Cleaning Facility	Soil (3,600 cy)	VOCs (DCE, PCE, TCE, and Vinyl Chloride)	Cleanup contract award scheduled for Fall '91.	State Lead/Fund Financed	Kevin Turner 312-886-4444 FTS 886-4444
5	MIDCO I, IN* (06/30/89)	Vapor Extraction	Commercial Dump Site	Soil (12,400 cy)	VOCs (BTX, TCE, Phenol, Dichloromethane, 2-Butanone, and Chlorobenzene), PAHs, and SVOCs	Pre-design	Fund Lead/In Negotiation	Richard Boice 312-886-4740 FTS 886-4740

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## Vacuum Extraction

Region	Site Name, State, Region (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
5	Miami County Incinerator, OH (06/30/89)	Vapor Extraction	Municipal Landfill and Surface Impoundment	Soil (98,000 cy)	VOCs (TCE, PCE, and Toluene)	Predesign	PRP Lead	Anthony Rutter 312-886-8961 FTS 886-8961
5	Pristine (Amendment), OH (03/30/90)	Vapor Extraction (Replaces in situ vitrification)	Commercial Dump Site	Soil (quantity unknown - to 12' depth)	VOCs (Benzene, Chloroform, Dichloroethane, PCE, and TCE) and SVOCs (Phenol)	Predesign	PRP Lead; Hydrogeo-Chem	Thomas Alcamo 312-886-7278 FTS 886-7278
5	Seymour Recycling, IN* 05 (09/30/87)  Also see Bioremediation (In situ)	Vacuum Extraction	Chemical Waste Management & Incineration	Soil (154,000 cy)	VOCs (TCA, Carbon Tetrachloride, PCE, Benzene, Vinyl Chloride, Chloroethane, and TCE)	Operational since April 1991	PRP Lead; Canonie Engineering (Installation), Geraghty & Miller (Operation)	Jeff Gore 312-886-6552 FTS 886-6552
5	Springfield Township Dump, MI (09/29/90)	Vacuum Extraction	Industrial Waste Dump	Soil (100,000 cy)	VOCs (Butanone, Chlorobenzene, TCA, TCE, and Toluene)	Predesign	PRP Lead	Mary Lou Martin 312-353-6284 FTS 353-6284
5	Verona Well Field, MI* (08/12/85)	Vacuum Extraction	Railroad Paint Shop, Solvent Reclaiming/ Distribution	Soil (35,000 cy)	VOCs (Dichloromethane, Chloroform, Carbon Tetrachloride, DCA, TCA, Vinyl Chloride, and BTEX) and Naphthalene	Operational since 3/88	Fund Lead; Terra Vac (subcontractor to CH2M-Hill)	Margaret Guerriero 312-886-0399 FTS 886-0399
5	Wausau Groundwater Contamination, WI* (09/29/89)	Vapor Extraction	Bulk Chemical Distribution, Machine Shop	Soil (1,300 cy)	VOCs (TCE, PCE, and DCE)	In design; Design completion planned Spring '92	PRP Lead; Hydrogeo-Chem	Margaret Guerriero 312-886-0399 FTS 886-0399
5	Wayne Waste Reclamation, IN (03/30/90)	Vapor Extraction	Dump Site	Soil (300,000 cy - approximately 10 acres to 20' depth)	VOCs (TCE, DCE, BTEX, and Vinyl Chloride)	Predesign	PRP Lead	Tinka Hyde 312-886-9296 FTS 886-9296
6	South Valley/Edmunds, NM (09/30/88)	Vapor Extraction	Aircraft Engine Manufacturing	Soil (36,000 cy)	VOCs (TCE)	In Design; Start planned 11/91	PRP Lead	Tim Underwood 214-655-6730 FTS 255-6730

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## Vacuum Extraction

Region	Site Name, State, Region (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
6	Tinker AFB (Soldier Creek/Bldg. 3001), OK (08/16/90)	Vacuum Extraction	Maintenance Facility for Aircraft	Soil (quantity not available)	VOCs (TCE, Acetone, Chlorobenzene, Ethylbenzene, Methylene Chloride, Styrene, Toluene, and Xylene)	Predesign; Design completion planned Summer '92	PRP Lead (Air Force)	Susan Webster 214-655-6730 FTS 255-6730
7	Hastings Groundwater Contamination, Colorado Ave., NE* (09/28/88)	Vapor Extraction	Industrial Metal Finishing	Soil (42,700 cy)	VOCs (PCE, TCE, and TCA)	In design	PRP Lead	Darrel Sommerhauser 913-551-7711 FTS 276-7711
7	Hastings Groundwater Contamination, Far-Mar-Co, NE* (09/30/88)	Vapor Extraction	Former Grain Storage Area (Fumigants)	Soil (400 cy)	VOCs (Carbon Tetrachloride and Ethylene Dibromide)	In design; Design completion planned Spring '92	PRP Lead	Susan Hoff 913-551-7786 FTS 276-7786
7	Hastings Groundwater Contamination, Well No. 3, NE* (09/26/89)	Vapor Extraction	Former Grain Storage Area (Fumigants)	Soil (quantity not available) (7 extraction wells planned)	VOCs (Carbon Tetrachloride and Chloroform)	In design; Design completion planned Fall '91; Construction bid package to be advertised Fall '91.	Fund Lead	Diane Easley 913-551-7797 FTS 276-7797 Steve Roe (Morrison Knudsen) 303-793-5054
7	Lindsay Manufacturing, NE (09/28/90)	Vapor Extraction	Metal Finishing Site	Soil (to 50' depth)	VOCs (DCA, DCE, TCE, and PCE)	Predesign	PRP Lead	Cecelia Tapla 913-551-7052 FTS 276-7052
7	Waverly Groundwater Contamination, NE (09/26/90)	Vapor Extraction	Grain Storage (Fumigants)	Soil (5 acres to 10 - 20 feet deep)	VOCs (Carbon Tetrachloride and Chloroform)	System Operating since 2/88	PRP Lead (USDA)	Gene Gunn 913-551-7776 FTS 276-7776
8	Martin Marietta (Denver Aerospace), CO (09/24/90) Also see Thermal Desorption	Vapor Extraction	Aerospace Equipment Manufacturer	Soil	VOCs (TCE)	Predesign	State Lead (under RCRA Corrective Action Authority)	George Dancik 303-293-1506 FTS 330-1506

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## Vacuum Extraction

Region	Site Name, State, Region (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
8	Rocky Mountain Arsenal (OU 18), CO (02/26/90)	Vapor Extraction	Federal Facility	Soil (4,000 cy)	TCE	Initial design completed 1/91 Pilot study underway; may modify design	PRP Lead (U.S. Army)	Linda Jacobson 303-294-1977 FTS 330-1977
8	Sand Creek Industrial (OU1), CO* (09/29/89)	Vacuum Extraction	Refinery, Pesticides Manufacturing, Acid Dilution Company, and Landfill	Soil (>100,000 cy)	VOCs (TCE, PCE, Methylene Chloride, and Chloroform)	Design completed; will install after NAPLs addressed	Fund Lead; URS	Brian Pinkowski 303-293-1512 FTS 330-1512  John Chinnook (URS) 303-796-9700
9	Motorola 52nd Street, AZ* (09/30/88)	Vapor Extraction	Manufacturing Facility	Soil (60' radius to 25' depth)	VOCs (TCA, TCE, PCE, Carbon Tetrachloride, and Ethylbenzene)	In design; pilot test planned for Summer '91	PRP Lead/ State Oversight; Dames and Moore	Mike Montgomery 415-744-2394 FTS 484-2394 Don Atkinson (AZ) 602-257-6899
9	Phoenix-Goodyear Airport Area (North Facility and South Facility), AZ* (09/26/89)	Vapor Extraction	Defense-related Manufacturing Facility	Soil; North Facility (140,000 sq. ft. to 50 ft. depth) 260,000 cy; South Facility 870 cy	North Facility VOCs (TCE, Methylene Ketone, Acetone) South Facility VOCs (TCE, TCA)	In design; Design completion planned North - Spring 1992 South - Fall 1992	PRP Lead	Craig Cooper 415-744-2370 FTS 484-2370
9	Fairchild Semiconductor (San Jose), CA* (03/20/89)	Vapor Extraction	Semiconductor Manufacturing Facility	Soil (3,400 cy)	VOCs (TCA, Xylenes, Acetone, Freon, DCE, and PCE)	Operational since 1988	PRP Lead/ State Enforcement; Canonie Engineering	Helen McKinley 415-744-2236 FTS 484-2236 Will Bruhns (CA) 415-464-0838
9	Fairchild Semiconductor/MTV-I, CA* (06/09/89)	Vapor Extraction	Semiconductor Manufacturing Facility, Metal Finisher	Soil (quantity not available)	VOCs (TCE, PCE, Vinyl Chloride, DCA, DCE, and Freon) and SVOCs (Phenol)	In design; Design completion planned '93	PRP Lead	Pattie Collins 415-744-2229 FTS 484-2229
9	Fairchild Semiconductor/MTV-II, CA* (06/30/89)	Vapor Extraction	Semiconductor Manufacturing Facility, Metal Finisher	Soil (quantity not available)	VOCs (TCE, PCE, Vinyl Chloride, DCA, DCE, and Freon) and SVOCs (Phenol)	Design completion planned '93	PRP Lead	Pattie Collins 415-744-2229 FTS 484-2229

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## Vacuum Extraction

Region	Site Name, State, Region (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
9	IBM (San Jose), CA* (12/15/88) (site delisted 10/04/89)	Vapor Extraction	Computer Manufacturer	Soil (24,000 cy)	VOCs (Xylenes, Acetone, Freon, Isopropyl Alcohol, Petroleum Naphtha, and TCA)	Installation underway; will be operational in 1991	PRP Lead/ State Enforcement; Terra Vac	Helen McKinley 415-744-2236 FTS 484-2236 Will Bruhns (CA) 415-464-0838
9	Intel, Mountain View, CA* (06/09/89)	Vapor Extraction	Semiconductor Manufacturing Facility, Metal Finisher, Aircraft Maintenance	Soil (quantity not available)	VOCs (TCE, PCE, Vinyl Chloride, DCA, DCE, and Freon) and SVOCs (Phenol)	In design; Design completion planned '93	PRP Lead	Pattie Collins 415-744-2229 FTS 484-2229
9	Intersil/Siemens, CA (09/27/90)	Vapor Extraction	Semiconductor Manufacturer	Soil (quantity not available)	VOCs (total)	Operational	State Lead; Levine-Frinks	Marie Lacey 415-744-2234 FTS 484-2234
9	Raytheon, Mountain View, CA* (06/09/89)	Vapor Extraction	Semiconductor Manufacturing Facility, Metal Finisher, Aircraft Maintenance	Soil (quantity not available)	VOCs (TCE, PCE, Vinyl Chloride, DCA, DCE, and Freon) and SVOCs (Phenol)	In design; Design completion planned '93	PRP Lead	Pattie Collins 415-744-2229 FTS 484-2229
9	Solvent Service, CA* (09/27/90)	Vacuum Extraction (Heat enhanced SVE)	Solvent Operation	Soil (quantity not available)	VOCs (Total, Acetone, Ethylbenzene, TCA, and Xylenes), and SVOCs (Dichlorobenzene)	Operational	State Lead under RCRA Authority	Marie Lacey 415-744-2234 FTS 484-2234
9	Watkins-Johnson, CA* (06/29/90)	Vapor Extraction	Electronics Manufacturing	Soil (up to 20' depth - quantity not available)	VOCs (DCE, TCA, and TCE)	Pre-design	PRP Lead	Elizabeth Keicher 415-744-2361 FTS 484-2361
10	Commencement Bay/S. Tacoma Channel/Well 12A WA (1987) (This site was inadvertently omitted from the tabulations used for the graphics in the Introduction)	Soil aeration	Solvent Recycling	Soil (100,000 cy; to 35 ft deep)	VOCs (PCE, TCE, and TCA)	Contracted; installation to begin late October 1991	Fund lead AWD Technologies, Inc.	Kevin Rochlin 206-553-2106 FTS 399-2106

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**APPENDIX A**  
**REMEDIAL SITES USING ESTABLISHED TREATMENT TECHNOLOGIES**

The table included as Appendix A shows NPL sites where established treatment technologies have been selected as part of the remedy. Established treatment technologies include: incineration, solidification/stabilization, and others. The sites are ordered by fiscal year to give some initial information as to the status of implementation; i.e., the older the ROD, the more likely that design and construction have begun.

APPENDIX A  
 REMEDIAL ACTION SITES USING ESTABLISHED TREATMENT TECHNOLOGIES

September, 1991

On Site Incineration

On Site Incineration (continued)

FY	REGION	SITE NAME	STATE
85	02	Bog Creek Farm	NJ
85	02	Bridgeport Rental & Oil	NJ
85	05	ACME Solvent	IL
85	06	MOTCO	TX
86	01	Baird & McGuire	MA
86	04	Mowbray Engineering	AL
86	05	LaSalle Electrical Utilities	IL
86	05	Arrowhead Refinery	MN
86	05	Fields Brook	OH
86	06	Sikes Disposal Pit	TX
87	01	Ottati & Goss	NH
87	01	Davis Liquid Waste	RI
87	04	Tower Chemical	FL
87	04	Geiger/C&M Oil	SC
87	05	Rose Township Dump	MI
87	05	Laskin/Poplar Oil	OH
87	06	Bayou Bonfouca	LA
87	06	Cleve Reber	LA
88	01	Rose Disposal Pit	MA
88	02	Tipari Landfill	NJ
88	02	Love Canal	NY
88	03	Delaware Sand & Gravel	DE
88	03	Southern Maryland Wood Treating	MD
88	03	Drake Chemical/Phase III	PA
88	03	Ordnance Works Disposal	WV
88	04	Zellwood Groundwater	FL
88	05	LaSalle Electrical Utilities	IL
88	05	Fort Wayne Reduction	IN
88	05	Forest Waste Products	MI
88	05	Pristine	OH
88	05	Summit National Liquid Disposal	OH
88	06	Old Midland Products	AR
88	06	Brio Refining	TX
88	07	Times Beach	MO
88	08	Broderick Wood Products	CO
89	01	Baird and McGuire	MA
89	01	Wells G&H	MA
89	02	Bog Creek Farm	NJ
89	02	De Rewal Chemical	NJ
89	03	Douglasville Disposal	PA
89	04	Smith's Farm Brooks	KY
89	04	Aberdeen Pesticide Dumps/ Fairway	NC
89	04	Celanese	NC
89	04	American Creosote Works	TN
89	05	Ninth Avenue Dump	IN
89	05	New Brighton/Arden Hills	MN
89	05	Big D Campground	OH
89	05	Laskin/Poplar Oil	OH

FY	REGION	SITE NAME	STATE
90	01	New Bedford	MA
90	03	M.W. Manufacturing	PA
90	05	Fisher Calo	IN
90	05	Bofors Nobel	MI
90	05	Springfield Township Dump	MI
90	05	Pristine (Amendment)	OH
90	06	Vertac	AR
90	06	Texarkana Wood Preserving	TX
90	07	Missouri Electric Works	MO
90	07	Hastings Groundwater Contamination (East Industrial Park)	NE
90	10	FMC Yakima Pit	WA

Off Site Incineration

FY	REGION	SITE NAME	STATE
84	05	Berlin & Farro Liquid Incineration	MI
84	05	Laskin/Poplar Oil	OH
84	10	Western Processing Phase I	WA
85	02	Swope Oil & Chemical	NJ
85	05	Byron/Johnson Salvage Yard	IL
85	06	Triangle Chemical	TX
85	08	Woodbury Chemical	CO
86	03	Drake Chemical/Phase II	PA
86	03	Westline	PA
86	05	Metamora Landfill	MI
86	05	Spiegelberg Landfill	MI
86	07	Ellisville Area/Bliss	MO
87	02	Williams Property	NJ
87	04	Sodyeco	NC
87	06	Sand Springs Petrochemical Complex	OK
88	01	Cannon Engineering/Plymouth	MA
88	02	Ewan Property	NJ
88	02	Reich Farms	NJ
88	02	Brewster Well Field	NY
88	03	Wildcat Landfill	DE
88	03	Berks Sand Pit	PA
88	03	Douglasville Disposal	PA
88	03	Fike Chemical	WV

APPENDIX A  
REMEDIAL ACTION SITES USING ESTABLISHED TREATMENT TECHNOLOGIES

September, 1991

Off Site Incineration (continued)

FY	REGION	SITE NAME	STATE
88	05	Belvidere Municipal Landfill #1	IL
88	07	Minker/Stout/Romaine Creek (R&S)	MO
88	07	Syntex	MO
89	01	W.R. Grace (Acton Plant)	MA
89	01	O'Connor	ME
89	01	Pinette's Salvage Yard	ME
89	02	Claremont Polychemical	NY
89	03	M.W. Manufacturing	PA
89	03	Whitmoyer Laboratories	PA
89	04	Newsom Brothers Old Reichold	MS
89	05	Cross Brothers Pail	IL
89	05	Wedzeb	IN
89	05	Cliff/Dow Dump	MI
89	05	Alsco Anaconda	OH
89	06	United Creosoting	TX
89	08	Woodbury Chemical	CO
90	01	Beacon Heights Landfill	CT
90	01	Kearsarge Metallurgical	NH
90	02	FAA Technical Center	NJ
90	02	Hooker Chemical-Ruco Polymer	NJ
90	02	Sayreville landfill	NJ
90	02	Mattiace Petrochemicals	NY
90	02	Sealand Restoration	NY
90	03	Greenwood Chemical	VA
90	06	Jacksonville Municipal Landfill	AR
90	06	Rogers Road Municipal Landfill	AR
90	06	Hardage/Criner (Amendment)	OK
90	07	Fairfield Coal Gasification Plant	IA
90	07	Shenandoah Stables	MO
90	08	Martin Marietta (Denver Aerospace)	CO
90	08	Sand Creek Industrial	CO
90	08	Ogden Defense Depot	UT

Solidification/Stabilization

FY	REGION	SITE NAME	STATE
82	03	Bruin Lagoon	PA
84	06	Bioecology Systems	TX
85	04	Davie Landfill	FL
85	10	Western Processing/Phase II	WA
86	02	Marathon Battery	NY
86	03	Bruin Lagoon	PA
86	04	Pepper's Steel & Alloy	FL
86	04	Sapp Battery Salvage	FL

Solidification/Stabilization (continued)

FY	REGION	SITE NAME	STATE
86	05	Burrows Sanitation	MI
86	05	Forest Waste Products	MI
87	01	Davis Liquid Waste	RI
87	02	Chemical Control	NJ
87	04	Gold Coast	FL
87	04	Geiger/C&M Oil	SC
87	04	Independent Nail	SC
87	04	Palmetto Wood Preserving	SC
87	05	Liquid Disposal	MI
87	05	Northern Engraving	WI
87	06	Gurley Pit	AR
87	06	Mid-South Wood	AR
87	06	Cleve Reber	LA
87	06	Sand Spring Petrochemical Complex	OK
88	01	Charles George Land Reclamation	MA
88	02	Love Canal	NY
88	02	Marathon Battery	NY
88	02	York Oil	NY
88	03	Alladin Plating	PA
88	03	Fike Chemical	WV
88	04	Brown Wood Preserving	FL
88	04	Flowood	MS
88	04	Chemtronics	NC
88	05	Velsicol Chemical	IL
88	05	Mid-State Disposal Landfill	WI
88	06	Industrial Waste Control	AR
88	06	Bailey Waste Disposal	TX
88	06	Brio Refining	TX
88	06	French Limited	TX
88	07	Midwest Manufacturing/ North Farm	IA
88	09	Selma Pressure Treating	CA
88	10	Pacific Hide & Fur Recycling	ID
88	10	Gould	OR
88	10	Commencement Bay/NTF	WA
88	10	Frontier Hard Chrome	WA
89	01	Sullivan's Ledge	MA
89	01	W.R. Grace (Acton Plant)	MA
89	01	O'Connor	ME
89	02	DeRwal Chemical	NJ
89	02	Marathon Battery	NY
89	03	Craig Farm	PA
89	03	Douglassville Disposal	PA
89	03	Hebelka Auto Salvage Yard	PA
89	03	Ordnance Works Disposal	WV
89	04	Kassouf-Kimerling Battery	FL
89	04	Celanese	NC
89	04	Annicola Dump	TN
89	05	MIDCO I	IN

APPENDIX A  
REMEDIAL ACTION SITES USING ESTABLISHED TREATMENT TECHNOLOGIES

September, 1991

<u>Solidification/Stabilization (continued)</u>				<u>Other</u>			
FY	REGION	SITE NAME	STATE	FY	REGION	SITE NAME	STATE TECHNOLOGY
89	05	MIDCO II	IN	85	06	Triangle Chemical	TX Soil Aeration
89	05	Auto Ion Chemicals	MI	86	04	Hollingsworth Solderless	FL Soil Aeration
89	06	Pesses Chemical	TX	87	03	West Virginia Ordnance	WV In situ Flammng
89	06	Sheridan Disposal Services	TX	88	03	Bendix Flight System	PA Soil Aeration
89	07	Vogel Paint & Wax	IA	88	07	Arkansas City Dump	KS Chemical
89	09	Koppers (Oroville Plant)	CA				Neutralization
89	09	Purity Oil Sales	CA	89	09	Fairchild Semiconductor/ MTV-I	CA Soil Aeration
90	01	New Bedford	MA				
90	02	Roebing Steel	NJ	89	09	Fairchild Semiconductor/ MTV-II	CA Soil Aeration
90	03	M.W. Manufacturing	PA				
90	03	C&R Battery	VA	89	09	Intel, Mountain View	CA Soil Aeration
90	03	Greenwood Chemical	VA	89	09	Raytheon, Mountain View	CA Soil Aeration
90	04	62nd Street Dump	FL	90	04	Howe Valley Landfill	KY Soil Aeration
90	04	Cabot/Koppers	FL				
90	04	Coleman-Evans Wood Preserving (Amendment)	FL				
90	04	Kassourf-Kimerling Battery Disposal	FL				
90	04	Schuylkill Metal	FL				
90	04	Yellow Wate Road	FL				
90	04	Zellwood Groundwater Contamination (Amendment)	FL				
90	05	Wayne Waste Oil	IN				
90	05	Springfield Township Dump	MI				
90	05	Oconomowoc Electroplating	WI				
90	06	Jacksonville Municipal Landfill	AR				
90	06	Rogers Road Municipal Landfill	AR				
90	07	Shenandoah Stables	MO				
90	07	Hastings Groundwater Contamination (East Industrial Park)	NE				
90	08	Martin Marietta (Denver Aerospace)	CO				
90	08	Rocky Mountain Arsenal (OU 17)	CO				
90	09	J.H. Baxter	CA				
90	10	Teledyne Wah Chang Albany (TWCA)	OR				

September, 1991

**DOCUMENT REQUEST FORM**

The "Innovative Treatment Technologies: Semi-Annual Status Report" (EPA/540/2-91/001) is distributed twice a year to Superfund management in U.S. EPA Headquarters and regional offices, pertinent EPA laboratories, states, EPA libraries, and representatives of other federal agencies. All project contacts listed in the report also receive a copy. If you did not receive this report directly, and would like to get on the mailing list, please complete the following form, and send to:

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PRC Environmental Management Inc.  
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If you have questions or additional information regarding the use of innovative treatment technologies at these or other Superfund sites, please call Linda Fiedler at FTS 398-8799 or (703) 308-8799.