United States
Environmental Protection
Agency

Office of Solid Waste And
Emergency Response
Washington, DC 20460

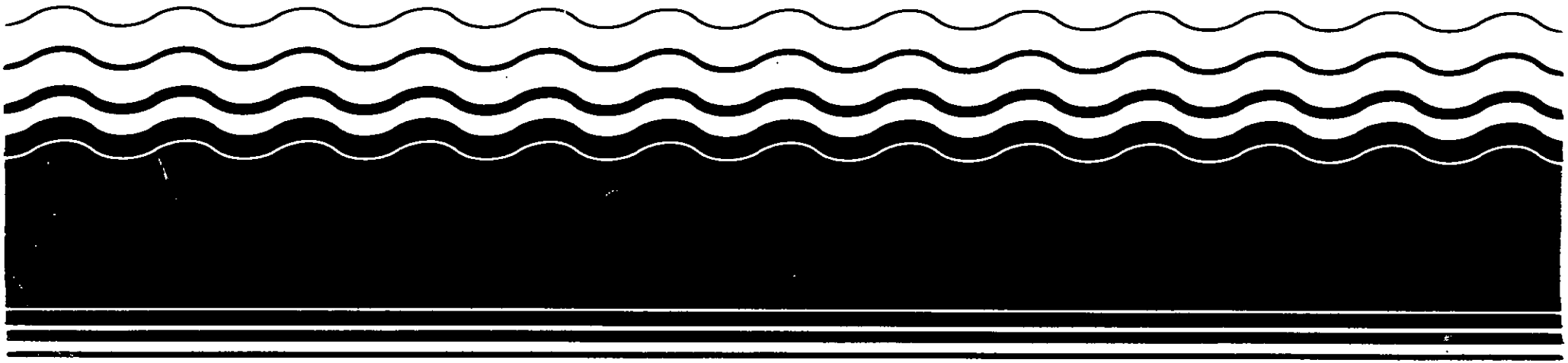
EPA/540/2-91/001
Number 3
April 1992

Prepublication Copy

EPA

Innovative Treatment Technologies: Semi-Annual Status Report

(Third Edition)



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INNOVATIVE TREATMENT TECHNOLOGIES: SEMI-ANNUAL STATUS REPORT (Third Edition)

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 target audiences of federal agencies, States, consulting engineering firms, responsible parties, technology developers, technology vendors, 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 Innovation 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 ground water (in situ), soils, sediments, sludge, and solid-matrix wastes:

- Chemical treatment
- Dechlorination
- Ex situ bioremediation
- In situ bioremediation
- In situ flushing
- In situ vitrification
- Soil vapor extraction
- Soil washing
- Solvent extraction
- Thermal desorption
- Other technologies (Air sparging, contained recovery of oily wastes)

The document includes information on 210 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 Table3, 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 interviews with EPA regional staff. The information in that table is analyzed and summarized in narrative and figures in the overview of the document. Table 4, new in this edition of this report, summarizes performance and operating data on the 21 remedial and removal innovative projects that have been completed.

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LIST OF ABBREVIATIONS

AM	Action Memorandum
APC	Air Pollution Control
APEG	Alkaline metal hydroxide/polyethylene glycol
ARCS	Alternative remedial contracts strategy
ATTIC	Alternative Treatment Technology Information Center
BCD	Base Catalyzed Dechlorination
BTEX	Benzene, toluene, ethylbenzene, xylene
BTX	Benzene, toluene, xylene
cy	Cubic yards
DCA	Dichloroethane
DCE	Dichloroethylene
DEHP	Di (2-ethylhexyl) phthalate
FAA	Federal Aviation Administration
Ft	Feet
FY	Fiscal year
gw	Ground water
KPEG	Potassium hydroxide/polyethylene glycol
MBOCA	4,4' Methylene Bis-2-chloroaniline
NAPL	Nonaqueous Phase Liquids
NPL	National Priorities List
OERR	Office of Emergency and Remedial Response
OSC	On scene coordinator
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
PAHs	Polynuclear aromatic hydrocarbons
PCBs	Polychlorinated biphenyls
PCE	Perchloroethylene (tetrachloroethylene)
PCP	Pentachlorophenol
PRP	Potentially responsible party
RA	Remedial action
RCRA	Resource Conservation and Recovery Act
RD	Remedial design
RODs	Records of Decision
RPM	Remedial project manager
RSKERL	Robert S. Kerr Environmental Research Laboratory, Ada, OK (U.S. EPA)
SARA	Superfund Amendment and Reauthorization Act of 1986
SVOCs	Semivolatile organic compounds
S/S	Solidification/Stabilization
TCA	Trichloroethane
TCE	Trichloroethylene
TIO	Technology Innovation Office
USACE	U. S. Army Corps of Engineers
USDA	U. S. Department of Agriculture
VOCs	Volatile organic compounds

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 228 applications of innovative treatment technologies and summary information on RODs required the help of many individuals, including Nancy Dean, Maggie Breville, Jon Bornholm, Jack Burnette and Joe Greenblot of EPA.

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 the innovative treatment technologies to remediate Superfund sites. The report contains site-specific information on Superfund sites (both remedial and emergency response actions) where innovative treatment technologies are being used. Site managers can use this report in evaluating cleanup alternatives. Innovative technology vendors can use it in identifying potential markets. TIO also uses the information to track progress in the application of innovative treatment.

The report is updated biannually. This April 1992 issue of the report updates and expands information provided in the January 1991 and September 1991 reports. Additional information includes 70 innovative treatment technologies selected for remedial actions in fiscal year (FY) 1991 Superfund Records of Decision (RODs) and more detailed information on completed projects. (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. Groundwater treatment after the water has been pumped to the surface often resembles traditional water treatment technologies; thus, in general, pump-and-treat or ex situ groundwater remedies are considered established. In situ bioremediation and other methods to treat ground water in situ are considered innovative technologies.

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

- Bioremediation (Ex situ)
- Bioremediation (In situ)
- Chemical treatment
- Dechlorination
- In situ flushing
- In situ vitrification
- Soil vapor extraction
- Soil washing
- Thermal desorption
- Other technologies (air sparging, contained recovery of oily wastes)

In addition, the nine sites using in-situ bioremediation for ground water are included with the other 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 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 might 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. Such changes might or might not may or may not require

official documentation (that is, a ROD amendment or an Explanation of Significant Differences).

The information in this report on the selection of containment remedies and established treatment technologies in FY91 is based on a review of RODs by EPA's Office of Emergency and Remedial Response (OERR).

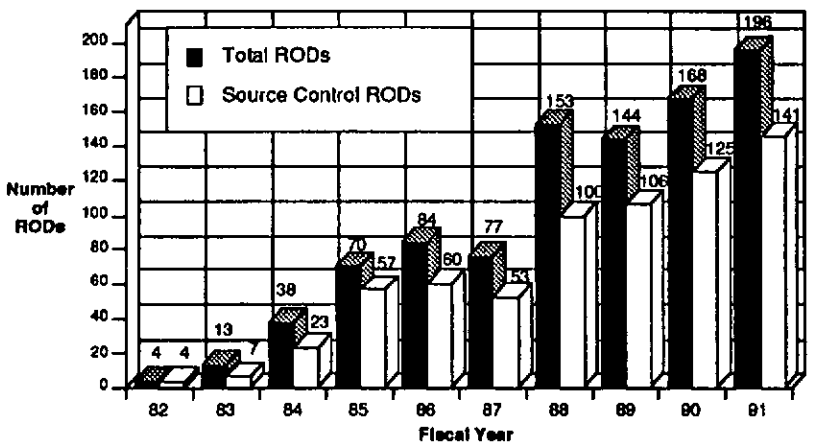
Increasing Use of Alternative and Innovative Treatment Technologies

ROD Statistics. Currently, there are 1,236 sites on or proposed for the National Priorities List (NPL). Through FY91, ending September 30, 1991, 947 RODs had been signed. 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 general type of technology selection: (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

FIGURE 1
REMEDIAL ACTIONS: RODS SIGNED BY FISCAL YEAR

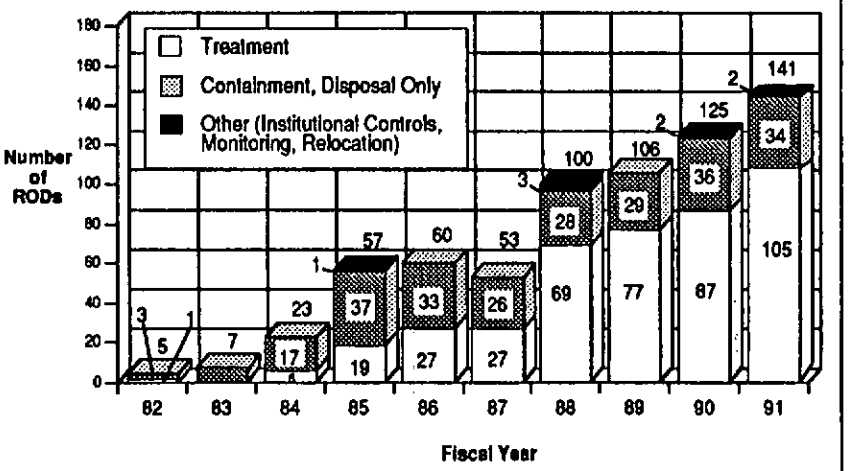
(Total Number of RODs = 947)



The difference between the total number of RODs and the number of source control RODs is the number of "groundwater treatment only" or "no action needed" RODs.

Source: USEPA Office of Emergency and Remedial Response.

FIGURE 2
REMEDIAL ACTIONS: SOURCE CONTROL RODS BY FISCAL YEAR

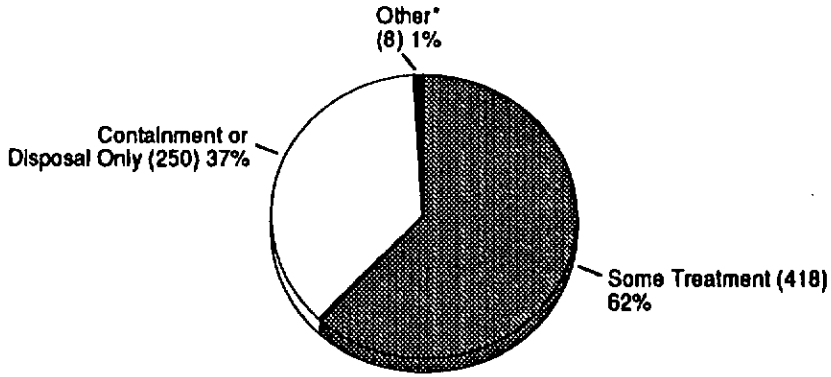


Source: USEPA Office of Emergency and Remedial Response.

control RODs that fall under each category. RODs selecting some treatment also may include containment of treatment residuals or of waste from another part of the site.

Overall, 62% of source control RODs have selected at least one treatment technology for source control (Figure 3). The Superfund Amendments and Reauthorization Act of 1986 (SARA) required that EPA favor permanent remedies (that is, alternative treatment) over containment or disposal to remediate Superfund sites. In each year following the passage of SARA, more than 70% of the RODs contain provisions for treatment of wastes. The increase is most dramatic in FY88. Fifty percent of RODs in FY87 selected some treatment for source control, whereas 70% of RODs in FY88 selected some treatment (Figure 4). The percentage has grown to 77% in FY 91.

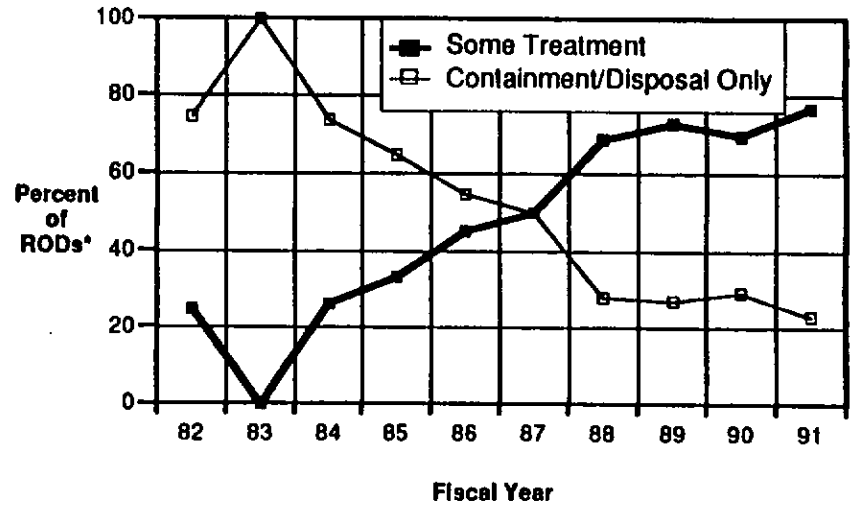
FIGURE 3
REMEDIAL ACTIONS: OVERVIEW OF SOURCE CONTROL RODS THROUGH FISCAL YEAR 91



* *Includes institutional controls, monitoring, and relocation.*
( ) *Number of RODs.*

Source: USEPA Office of Emergency and Remedial Response.

FIGURE 4
REMEDIAL ACTIONS: TREATMENT VERSUS DISPOSAL RODS FOR SOURCE CONTROL



* *RODs – Records of Decision*

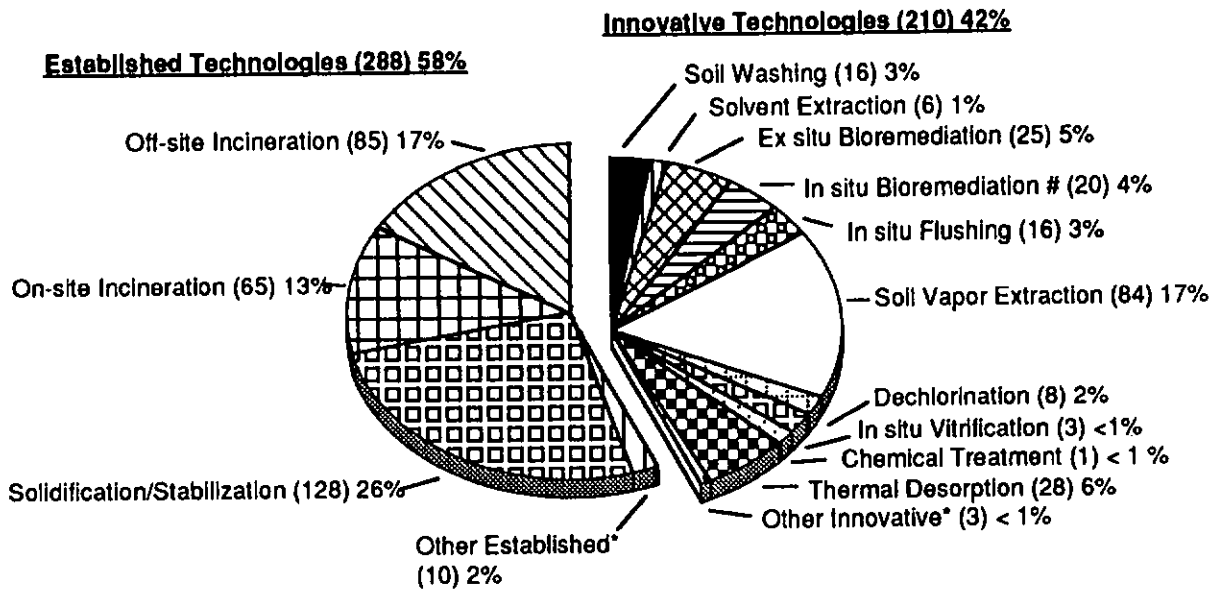
Source: USEPA Office of Emergency and Remedial Response.

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 FY91, 489 treatment technologies have been selected in 418 source control RODs. In addition, EPA has selected in situ bioremediation of ground water for nine sites for a total 498 treatment technologies. 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 418 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 nine in situ groundwater remedies are included in the totals for in situ bioremediation. Figure 5 illustrates that, through FY91, 42% of the 498 treatment technologies selected were innovative and 58% were conventional. This report contains summary information on the innovative treatment technology projects and a list of sites using established technologies (Appendix A). Information on the established treatment technologies for FY91 is based on the review of RODs by OERR, rather than Regional or State interviews.

FIGURE 5
REMEDIAL ACTIONS: SUMMARY OF ALTERNATIVE TREATMENT TECHNOLOGIES THROUGH FISCAL YEAR 1991
(Total Number of Technologies = 498)



Note *Data are derived from 1982 – 1991 Records of Decision (RODs) and anticipated design and construction activities as of February 1992. More than one technology per site may be used.*

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

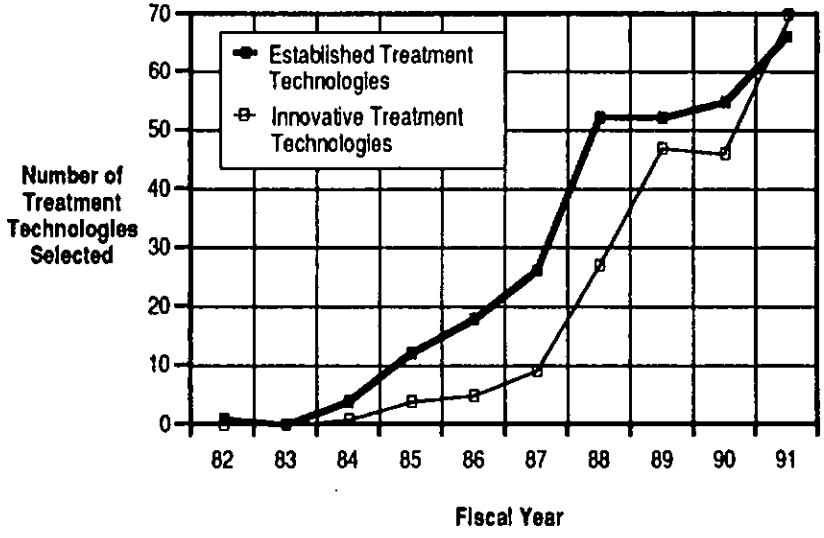
* *"Other" established technologies are soil aeration, in situ flaming, and chemical neutralization. "Other" innovative technologies are air sparging and contained recovery of oily wastes.*

\# *Includes nine in situ groundwater treatment remedies.*

In FY91, for the first time, innovative treatment technologies accounted for half of the treatment technologies selected. This increase is due, in part, to the large number of soil vapor extraction (SVE) projects selected in FY91, 33 in FY91 compared to 19 in FY90. Figure 6 compares the numbers of established and innovative technologies by fiscal year. Figure 7 shows the selection frequency for the four most frequently selected innovative treatment technologies, including SVE, by fiscal year.

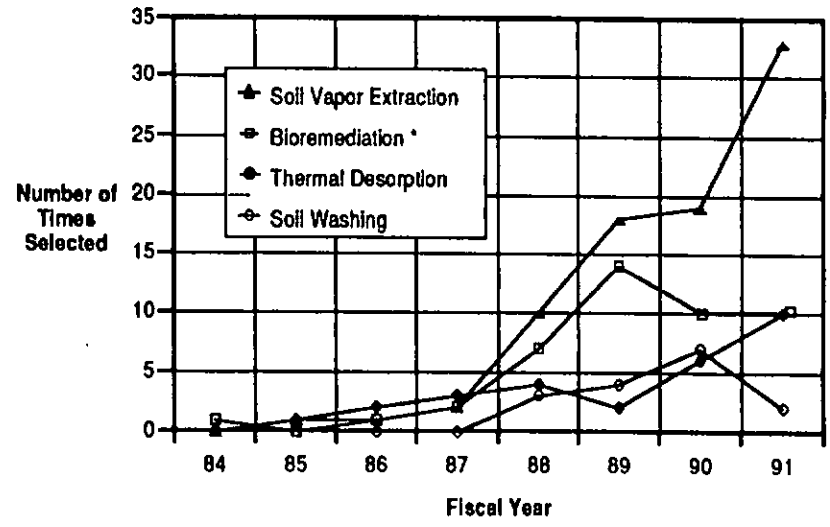
Emergency Response Actions. Emergency response actions are conducted in response to an immediate threat caused by a release of hazardous substances. Emergency responses do not require RODs.

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



Note: Data are derived from 1982 – 1991 Records of Decision (RODs) and anticipated design and construction activities as of February 1992. More than one technology per site may be used.

FIGURE 7
REMEDIAL ACTIONS: SELECTION TRENDS FOR FOUR INNOVATIVE TREATMENT TECHNOLOGIES

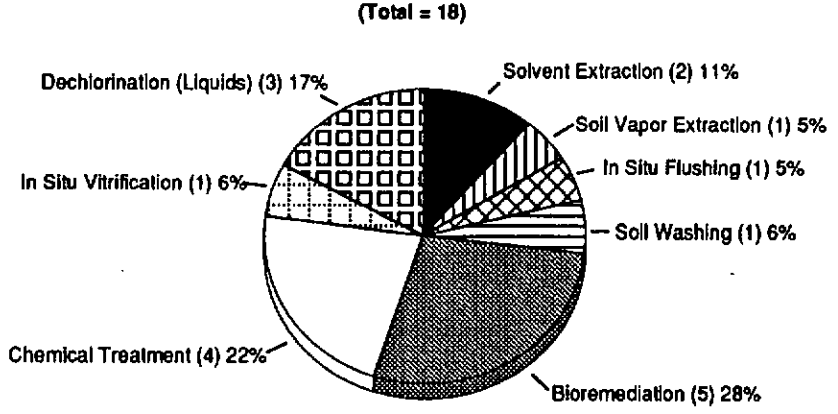


** Includes sites using ex situ and in situ bioremediation of source material and ground water.*

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 8). 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—zero to five selected per year since FY84.

FIGURE 8
EMERGENCY RESPONSES: SUMMARY OF INNOVATIVE TECHNOLOGIES USED FOR SOURCE CONTROL



Note: Data from the Removal Tracking System, CERCLIS, and phone survey of regional TAT offices. Includes all projects for FY 82 – 90 and one project from FY 91 as of February 1992.

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

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.

Definitions and Summary Statistics for Specific Innovative Treatment Technologies

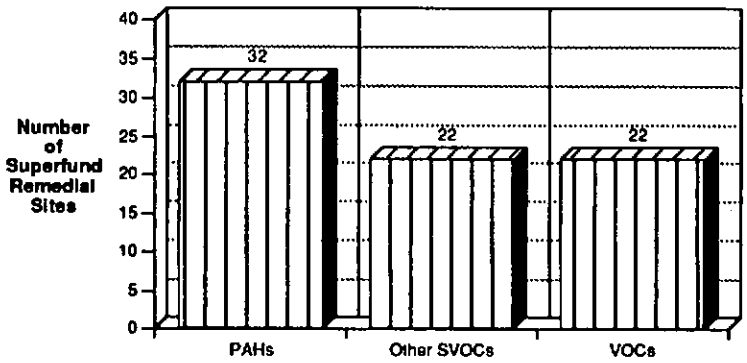
The innovative technologies reported in the following tables treat hazardous wastes in very different ways. The following paragraphs and figures define the technologies as they are used in this document and provide summary statistics of the contaminants treated with the technologies.

EX SITU BIOREMEDIATION uses microorganisms to degrade organic contaminants on excavated soil, sludge, and solids. The microorganisms break down the contaminants by using them as a food source. The end products are typically CO_2 and H_2O. Ex situ bioremediation includes slurry-phase bioremediation, in which the soils are mixed in water to form a slurry; and solid phase bioremediation where the soils are placed in a tank or building and tilled with water and nutrients. Variations of the latter are called land farming or composting.

With IN SITU BIOREMEDIATION nutrients, an oxygen source, and sometimes microbes are pumped into the soil or aquifer under pressure through wells or spread on the surface for infiltration to the contaminated material.

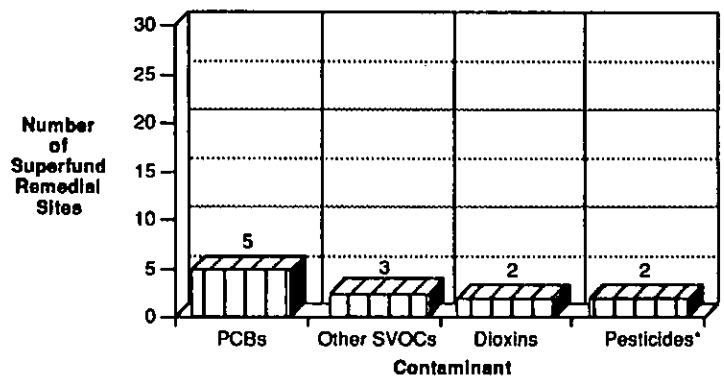
Based on the data contained in this status report, BIOREMEDIATION is being used to treat polynuclear aromatic hydrocarbons most frequently in the Superfund program. Figure 9 shows the classes of contaminants treated with bioremediation and the frequency with which they are treated.

FIGURE 9
BIOREMEDIATION: TARGET CONTAMINANTS THROUGH FISCAL YEAR 1991



Note: At some sites, treatment is for more than one contaminant. Treatment may be planned, ongoing, or completed.

FIGURE 10
DECHLORINATION: TARGET CONTAMINANTS THROUGH FISCAL YEAR 1991



Note: At some sites, treatment is for more than one contaminant. Treatment may be planned, ongoing, or completed.

* *Includes herbicides*

In CHEMICAL TREATMENT the contaminants are converted to less hazardous compounds through chemical reactions. Chemical treatment has been used five times in the Superfund program, usually to reduce a contaminant (hexavalent chromium to the trivalent form) or oxidize a contaminant (cyanide, for example). Neutralization is considered to be an available technology and is not included in this report.

DECHLORINATION results in the removal or replacement of chlorine atoms bonded to hazardous compounds. Figure 10 shows the classes of contaminants for which EPA has selected dechlorination.

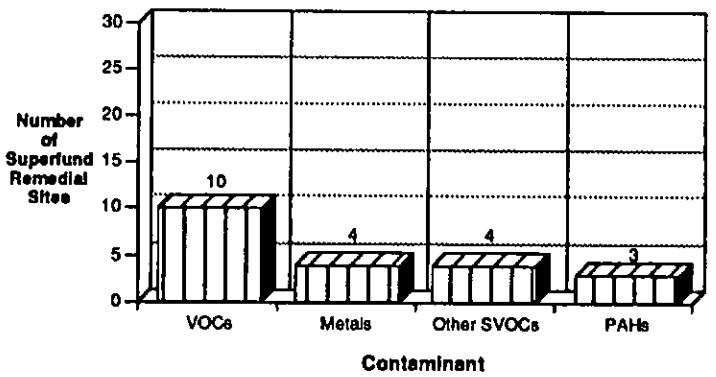
For IN SITU FLUSHING, large volumes of water, at times supplemented with treatment compounds, are introduced to the soil, waste or ground water to flush hazardous contaminants from a site. This technology is predicated on the assumption that the injected water can be effectively isolated within the aquifer and recovered. Figure 11 gives the classes of contaminants for which EPA has selected in situ flushing and the number of times it has selected to treat them.

IN SITU VITRIFICATION treats contaminated soil in place at temperatures of approximately 3000°F (1600°C). Metals are encapsulated in the glass like structure of the melted silicate compounds. Organics may be treated by combustion. Figure 12 describes the frequency and classes of contaminants for which EPA has selected vitrification.

SOIL WASHING is used for two purposes. First, the mechanical action and water (sometimes with additives) physically remove the contaminants from the soil particles. Second, the agitation of the soil particles allows the smaller diameter, more highly contaminated fines to separate from the larger soil particles, thus reducing the volume of material for subsequent treatment. Figure 13 shows the classes of contaminants found at sites where EPA has selected soil washing.

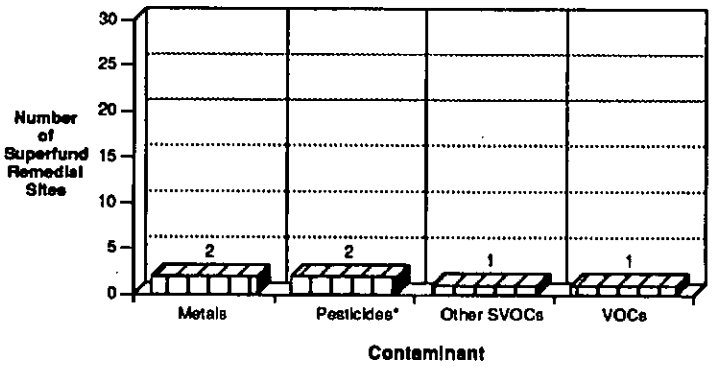
SOLVENT EXTRACTION operates on the principle that organic contaminants can be preferentially solubilized and removed from the waste in the correct solvent. The solvent to be used will vary depending on the waste to be treated. Figure 14 describes the classes of contaminants for which solvent extraction is selected most often.

FIGURE 11
IN SITU FLUSHING: TARGET CONTAMINANTS THROUGH FISCAL YEAR 1991



Note: At some sites, treatment is for more than one contaminant. Treatment may be planned, ongoing, or completed.

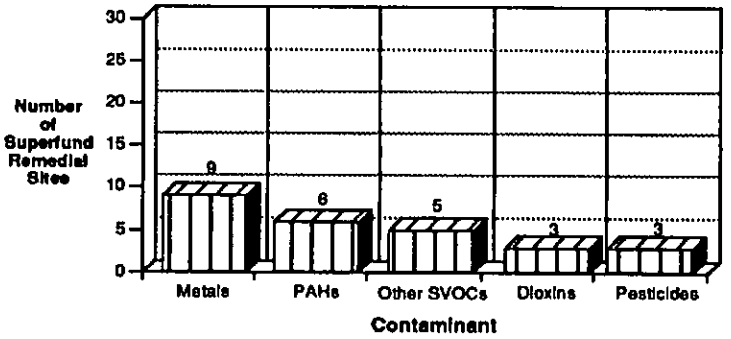
FIGURE 12
IN SITU VITRIFICATION: TARGET CONTAMINANTS THROUGH FISCAL YEAR 1991



Note: At some sites, treatment is for more than one contaminant. Treatment may be planned, ongoing, or completed.

* *Includes herbicides.*

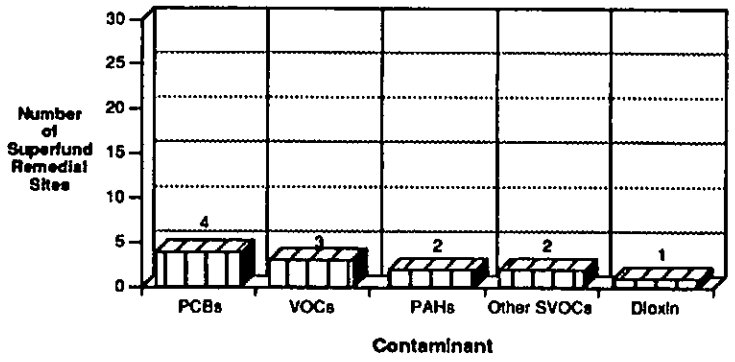
FIGURE 13
SOIL WASHING: TARGET CONTAMINANTS THROUGH FISCAL YEAR 1991



Note: At some sites, treatment is for more than one contaminant. Treatment may be planned, ongoing, or completed.

* *Includes herbicides.*

FIGURE 14
SOLVENT EXTRACTION: TARGET CONTAMINANTS THROUGH FISCAL YEAR 1991



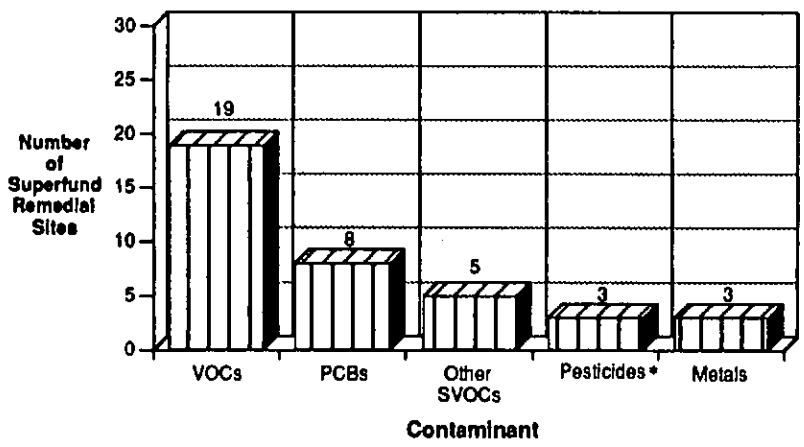
Note: At some sites, treatment is for more than one contaminant. Treatment may be planned, ongoing, or completed.

For THERMAL DESORPTION, the waste is heated in a controlled environment to cause organic compounds to volatilize from the waste. The operating temperature for thermal desorption is less than 1000°F (550°C). The volatilized contaminants will usually require further control or treatment. Figure 15 lists the contaminants most frequently treated with thermal desorption in the Superfund program.

SOIL VAPOR EXTRACTION removes volatile organic constituents from the soil in place through the use of vapor extraction wells, sometimes combined with air injection wells, to strip and flush the contaminants into the air stream for further treatment. Vacuum extraction has been selected with increasing frequency for sites with volatile organic compounds (VOCs). Figure 16 shows the classes of VOCs for which soil vapor extraction is selected.

OTHER TECHNOLOGIES, a new category in this report, includes air sparging and the contained recovery of oily wastes (CROW) technologies. Air sparging involves injecting gas into the aquifer to attach to volatile contaminants as it percolates up through the ground water and is captured with a vapor extraction system. The CROW process displaces oily wastes with steam and hot water. The contaminated oils and ground water sweep up into a more permeable area and are pumped out of the aquifer.

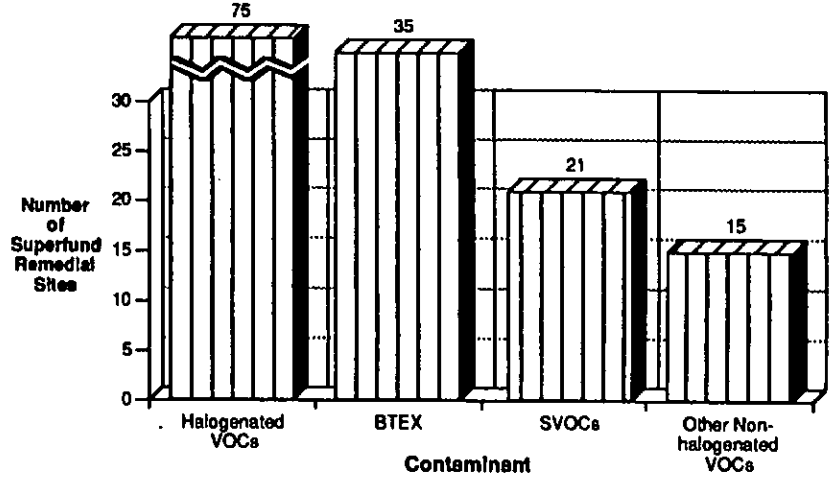
FIGURE 15
THERMAL DESORPTION: TARGET CONTAMINANTS THROUGH FISCAL YEAR 1991



Note: At some sites, treatment is for more than one contaminant. Treatment may be planned, ongoing, or completed.

* *Includes herbicides.*

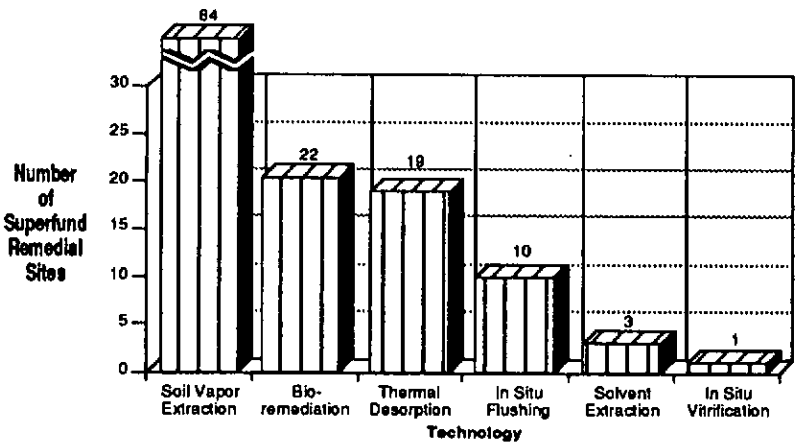
FIGURE 16
SOIL VAPOR EXTRACTION: TARGET CONTAMINANTS THROUGH FISCAL YEAR 1991



Note: At some sites, treatment is for more than one contaminant. Treatment may be planned, ongoing, or completed.

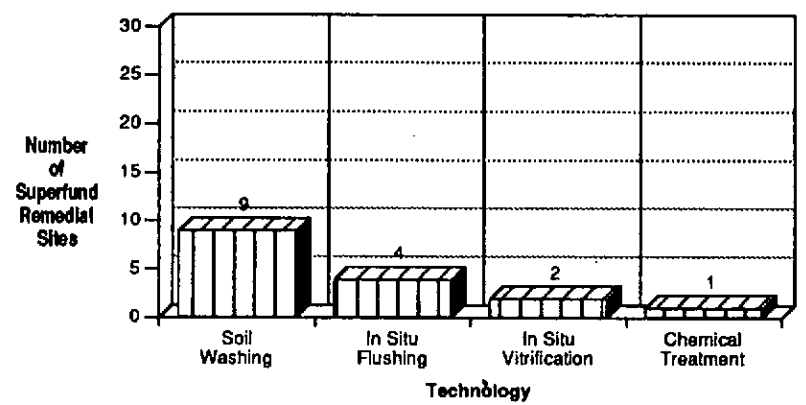
Analyzing the data contained in this status report further, Figures 17, 18, 19, and 20 show the most frequently selected technologies for VOCs, metals, PAHs, and PCBs, respectively.

FIGURE 17
INNOVATIVE TREATMENT FOR VOCS THROUGH FISCAL YEAR 1991



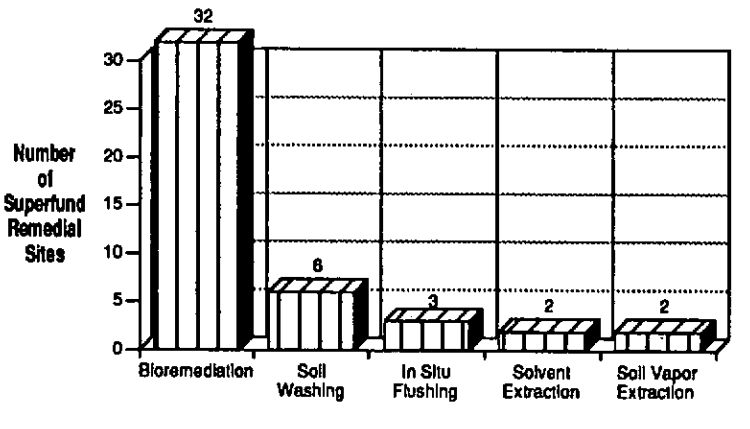
Note: More than one treatment technology may be used at some sites.

FIGURE 18
INNOVATIVE TREATMENT FOR HEAVY METALS THROUGH FISCAL YEAR 1991



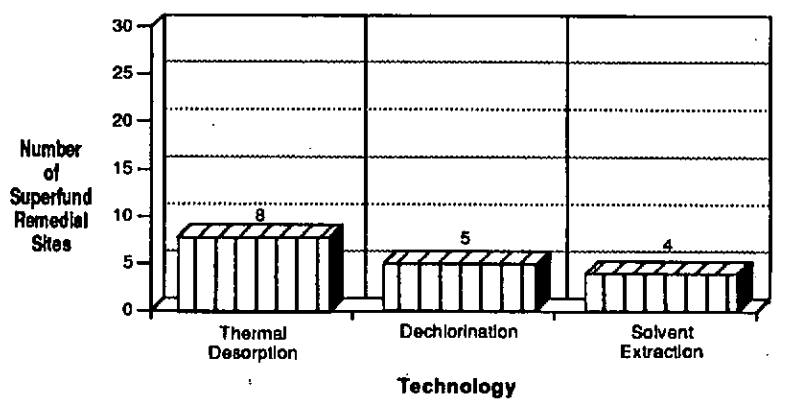
Note: More than one treatment technology may be used at some sites.

FIGURE 19
INNOVATIVE TREATMENT FOR PAHS THROUGH FISCAL YEAR 1991



Note: More than one treatment technology may be used at some sites.

FIGURE 20
INNOVATIVE TREATMENT FOR PCBS THROUGH FISCAL YEAR 1991



Note: More than one treatment technology may be used at some sites.

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 21). In the next several years, though, many projects now in design should become operational.

FIGURE 21
REMEDIAL ACTIONS: PROJECT STATUS OF INNOVATIVE TREATMENT TECHNOLOGIES AS OF FEBRUARY 1992*

Technology	Predesign/ In Design	Design Complete/ Being Installed/ Operational	Project Completed	Total
Soil Vapor Extraction	65	18	1	84
Thermal Desorption	21	4	3	28
Ex Situ Bioremediation	17	7	1	25
In Situ Bioremediation #	15	4	1	20
Soil Washing	15	1	0	16
In Situ Flushing	11	5	0	16
Dechlorination	6	1	1	8
Solvent Extraction	5	1	0	6
In Situ Vitrification	3	0	0	3
Other Innovative Treatment	3	0	0	3
Chemical Treatment	0	0	1	1
TOTAL	**161 (76%)**	**41 (20%)**	**8 (4%)**	**210**

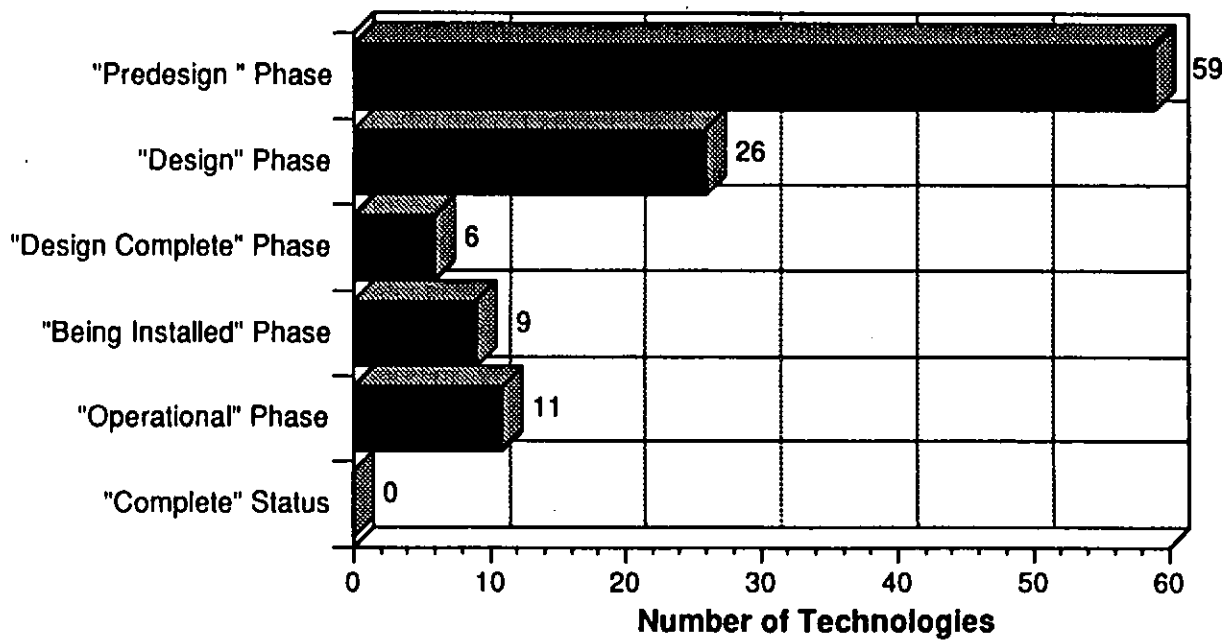
* *Data derived from 1982 – 1991 Records of Decision (RODs) and anticipated design and construction activities.*

\# *Includes in situ groundwater treatment.*

Figure 22 shows the number of projects which either entered the remedial pipeline in FY91 or progressed to a new phase (for example, design, installation, operation) since August of 1991. Of the 210 projects using innovative treatment technologies 27% are new in FY 91 and 25% have moved on to a new phase in the past six months.

FIGURE 22
PROGRESS IN THE REMEDIAL PIPELINE

Innovative Treatment Technology Projects Beginning New Project Phase Between August 1991 and February 1992

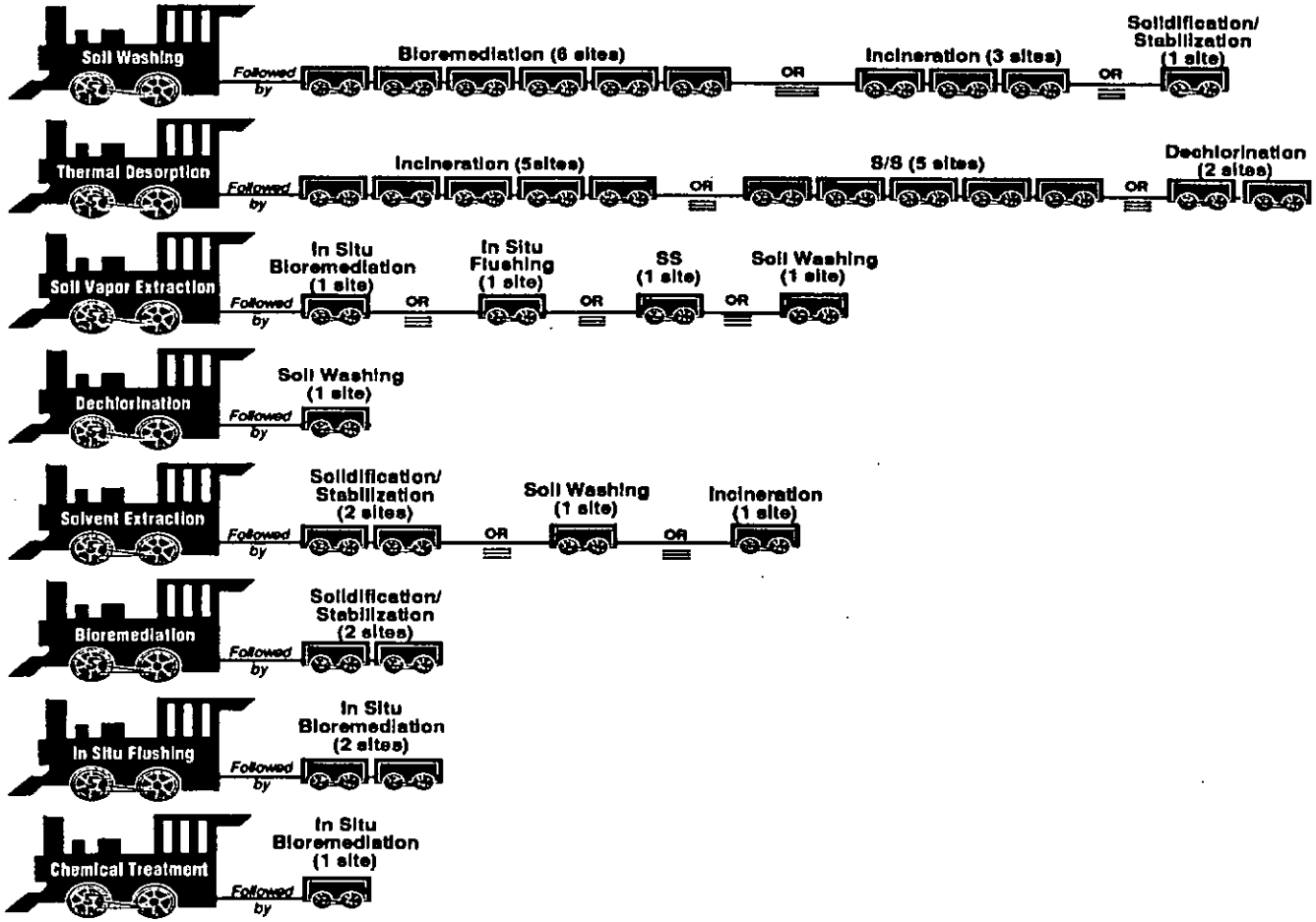


Note: Total number of innovative technologies is 210.
** Entered pipeline in Fiscal Year 1991.*

Treatment Trains

Innovative treatment technologies in this report may be used with established or other innovative treatment technologies in treatment "trains." Technologies may be combined to reduce the volume of material requiring subsequent treatment, to prevent the emission of volatile contaminants during excavation and mixing, or to address multiple contaminants within the same medium. Figure 23 presents the data on treatment trains contained within this report. Appendix B lists the sites where these treatment trains are being used.

FIGURE 23
TREATMENT TRAINS OF INNOVATIVE TREATMENT TECHNOLOGIES SELECTED FOR REMEDIAL/REMOVAL SITES



Volume Analysis

In addition to analyzing the data collected on the 210 applications of innovative treatment technology for remedial sites based on contaminants, EPA analyzed the data based on the volume of soil treated. This volume analysis provides an indication of the scale of the projects involved. Figure 24 shows a summary of this analysis.

FIGURE 24
QUANTITIES OF SOIL TO BE TREATED BY INNOVATIVE TECHNOLOGIES

Technology	Number of Superfund Sites with Data	Quantity (Cubic Yards)	
		Range	Average
In Situ Flushing	11	5,200 — 650,000	94,000
In Situ Bioremediation	7	5,000 — 250,000	89,000
Soil Vapor Extraction	55	70 — 360,000	56,000
Soil Washing	16	1,800 — 200,000	43,900
Ex Situ Bioremediation	17	1,000 — 100,000	29,000
Solvent Extraction	6	2,000 — 67,000	26,000
Dechlorination	5	800 — 50,000	23,000
Thermal Desorption	27	1,600 — 124,000	21,400
In Situ Vitrification	3	3,600 — 5,000	4,400

Summary of Updates to Last Report

Each edition of this report has added new information on the applications of innovative technologies at Superfund sites as well as updating the status of innovative projects. The information added, deleted, or changed in each edition is described below to allow projects to be tracked from edition to edition.

New in April 1992 report:

Innovative treatment technologies selected in FY 91 RODs

Summary information on the performance of innovative treatment technologies for completed projects.

Summary information on the use of innovative and established technologies in treatment trains

Deleted in April 1992 report:

Crystal Chemical, TX—In situ vitrification
U.S. Aviex, MI—In situ flushing
Goose Farm, NJ—In situ flushing
Marathon Battery, NJ—Enhanced volatilization
Coleman Evans Wood Preserving, FL—Soil washing and ex situ bioremediation
Solvent Service, CA—In situ bioremediation

Changes in April 1992 report:

Anderson Development, MI was listed as a Thermal Desorption project rather than a vitrification project.

Sangamo/Crab Orchard National Wildlife Refuge, IL is no longer to be treated with in situ vitrification. Instead, the wastes will be incinerated and it is listed in Appendix A with the other incineration projects.

GE Wiring Services, PR was listed under thermal desorption rather than soil washing or chemical extraction.

New in September 1991 report:

Innovative treatment technologies selected in FY 90 RODs

Innovative treatment technologies used in removal actions

Remedial sites where established treatment technologies (for example, incineration, solidification/stabilization) have been selected

Expanded site/technology tables

Deleted in September 1991 report:

Leetown Pesticide, PA—Bioremediation
Northwest Transformer, WA—In situ vitrification
Harvey Knott, DE—In situ soil flushing

Changed in September 1991 report:

SMS Instruments, NY (Deer Park) was listed under vacuum extraction instead of thermal desorption.

Dechlorination was classified separately from chemical treatment. (September 1991)

Bioremediation was divided into ex situ and in situ bioremediation. (September 1991)

Hardage/Criner, OK: The vacuum extraction remedy selected by EPA was not included in the court judgement.

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.

Table 4 presents information on the completed Superfund projects which have used innovative treatment technologies. It summarizes the performance information and operating data from the projects.

Lastly, Appendix A includes a list of NPL sites for which established technologies have been selected for source control in RODs and Appendix B provides information on the sites using treatment trains.

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. Nine 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

April 1992

TECHNOLOGY	SITE NAME	STATE
REGION 1		
Soil Vapor Extraction	Kellogg-Deering Well Field	CT
Bioremediation (Ex Situ)	Iron Horse Park	MA
Dechlorination	Re-Solve*	MA
Soil Vapor Extraction	Groveland Wells	MA
Soil Vapor Extraction	Silresim	MA
Soil Vapor Extraction	Wells G&H	MA
Solvent Extraction	Norwood PCBs	MA
Thermal Desorption	Cannon Engineering/Bridgewater	MA
Thermal Desorption	Re-Solve*	MA
Solvent Extraction	O'Connor	ME
Solvent Extraction	Pinette's Salvage Yard	ME
Thermal Desorption	McKin	ME
Thermal Desorption	Union Chemical Co., OU 1	ME
Air Sparging	South Municipal Water Supply Wells	NH
Soil Vapor Extraction	Mottolo Supply	NH
Soil Vapor Extraction	South Municipal Water Supply Wells	NH
Soil Vapor Extraction	Tinkham Garage	NH
Thermal Desorption	Ottati & Goss	NH
Soil Vapor Extraction	Stamina Mills	RI
REGION 2		
Bioremediation (In Situ gw)	FAA Technical Center*	NJ
Bioremediation (In Situ)	Swope Oil & Chem Co., OU 2*	NJ
Dechlorination	Myers Property*	NJ
In Situ Flushing	Lipari Landfill	NJ
In Situ Flushing	Naval Air Engineering Center, OU 1	NJ
In Situ Flushing	Naval Air Engineering Center, OU 2	NJ
In Situ Flushing	Naval Air Engineering Center, OU 4	NJ
In Situ Flushing	Vineland Chemical, OU 1 and OU 2*	NJ
Soil Vapor Extraction	A O Polymer, Soil treatment phase	NJ
Soil Vapor Extraction	FAA Technical Center*	NJ
Soil Vapor Extraction	Garden State Cleaners	NJ
Soil Vapor Extraction	South Jersey Clothing	NJ
Soil Vapor Extraction	Swope Oil & Chem Co., OU 2*	NJ
Soil Washing	Ewan Property*	NJ
Soil Washing	King of Prussia	NJ
Soil Washing	Myers Property*	NJ
Soil Washing	Vineland Chemical, OU 1 and OU 2*	NJ
Solvent Extraction	Ewan Property*	NJ
Thermal Desorption	Caldwell Trucking	NJ
Thermal Desorption	Metaltec/Aerosystems, OU 1	NJ
Thermal Desorption	Reich Farms	NJ
Thermal Desorption	Waldick Aerospace Devices	NJ
Bioremediation (Ex Situ)	General Motors/Central Foundry	NY
Bioremediation (In Situ)	Applied Environmental Services	NY
Dechlorination	Signo Trading/Mt. Vernon (Removal)	NY

TECHNOLOGY	SITE NAME	STATE
REGION 2 (continued)		
Bioremediation (In Situ gw)	Applied Environmental Services	NY
Dechlorination	Wide Beach Development	NY
In Situ Flushing	Byron Barrel & Drum	NY
Soil Vapor Extraction	Applied Environmental Services	NY
Soil Vapor Extraction	Circuitron Corporation, OU 1	NY
Soil Vapor Extraction	Genzale Plating Company, OU 1	NY
Soil Vapor Extraction	Mattiace Petrochemicals Company	NY
Soil Vapor Extraction	SMS Instruments (Deer Park)	NY
Soil Vapor Extraction	Solvent Savers*	NY
Soil Vapor Extraction	Vestal Water Supply 1-1	NY
Thermal Desorption	American Thermostat	NY
Thermal Desorption	Claremont Polychemical - Soil	NY
Thermal Desorption	Fulton Terminals, Soil Treatment	NY
Thermal Desorption	Sarney Farm	NY
Thermal Desorption	Solvent Savers*	NY
Thermal Desorption	GE Wiring Devices	PR
Soil Vapor Extraction	Upjohn Manufacturing Co.	PR
REGION 3		
Bioremediation (Ex Situ)	Whitmoyer Laboratories, OU 3	PA
Crow Technology	Brodhead Creek, OU 1	PA
Soil Vapor Extraction	Bendix	PA
Soil Vapor Extraction	Cryochem, OU 3	PA
Soil Vapor Extraction	Henderson Road	PA
Soil Vapor Extraction	Lord-Shope Landfill	PA
Soil Vapor Extraction	Tyson's Dump	PA
Thermal Desorption	U.S.A. Letterkenny SE Area, OU 1	PA
Bioremediation (Ex Situ)	L.A. Clarke & Sons, Lagoon Sludge	VA
Bioremediation (In Situ)	L. A. Clarke & Sons, OU 1 (Soil)*	VA
Chemical Treatment	Avtex Fibers (Removal)	VA
Dechlorination	Saunders Supply Co, OU 1	VA
In Situ Flushing	L. A. Clarke & Sons, OU 1 (Soil)*	VA
In Situ Flushing	U.S. Titanium	VA
Soil Vapor Extraction	Arrowhead Associates/Scovill,	VA
Thermal Desorption	Saunders Supply Co, OU 1	VA
Bioremediation (Ex Situ)	Ordnance Works Disposal	WV
REGION 4		
In Situ Flushing	Ciba-Geigy Corp	AL
Thermal Desorption	Ciba-Geigy Corp	AL
Bioremediation (Ex Situ)	American Creosote Works*	FL
Bioremediation (Ex Situ)	Brown Wood Preserving	FL
Bioremediation (Ex Situ)	Cabot Carbon/Koppers*	FL
Bioremediation (Ex Situ)	Dubose Oil Products	FL

* An asterisk indicates that more than one innovative treatment technology will be used for the site.

TECHNOLOGY	SITE NAME	STATE
REGION 4 (continued)		
Bioremediation (In Situ gw)	Cabot Carbon/Koppers*	FL
Bioremediation (In Situ)	Cabot Carbon/Koppers*	FL
Soil Washing	American Creosote Works*	FL
Soil Washing	Cabot Carbon/Koppers*	FL
Soil Vapor Extraction	Robins AFB, Landfill and Sludge	GA
Solvent Extraction	General Refining (Removal)	GA
Dechlorination	Smith's Farm Brooks	KY
Bioremediation (Ex Situ)	Southeastern Wood Preserving (Removal)*	MS
Soil Washing	Southeastern Wood Preserving (Removal)*	MS
Bioremediation (Ex Situ)	Cape Fear Wood Preserving*	NC
Bioremediation (Ex Situ)	Charles Macon Lagoon*	NC
In Situ Flushing	JADCO-Hughes	NC
Soil Washing	Cape Fear Wood Preserving*	NC
Solvent Extraction	Carolina Transformers	NC
Soil Vapor Extraction	Charles Macon Lagoon, OU 1*	NC
Soil Vapor Extraction	JADCO-Hughes	NC
Thermal Desorption	Aberdeen Pesticide Dumps, OU 4	NC
Chemical Treatment	Palmetto Wood Preserving	SC
Soil Vapor Extraction	Hinson Chemical (Removal)	SC
Soil Vapor Extraction	Medley Farm, OU 1	SC
Soil Vapor Extraction	SCRDI Bluff Road	SC
Thermal Desorption	Sangamo/Twelve Mile/Hartwell PCB	SC
Thermal Desorption	Wamchem	SC
Dechlorination	Arlington Blending & Packaging	TN
Thermal Desorption	Arlington Blending & Packaging	TN
REGION 5		
Bioremediation (Ex Situ)	Galesburg/Koppers	IL
Thermal Desorption	Acme Solvent Reclaiming, Inc.*	IL
Thermal Desorption	Outboard Marine/Waukegan Harbor	IL
Soil Vapor Extraction	Acme Solvent Reclaiming, Inc.*	IL
Bioremediation (In Situ)	Seymour Recycling*	IN
Bioremediation (In Situ gw)	Seymour Recycling	IN
In Situ Flushing	Ninth Avenue Dump	IN
Soil Vapor Extraction	Enviro. Conservation and Chemical	IN
Soil Vapor Extraction	Fisher Calo Chem	IN
Soil Vapor Extraction	MIDCO I	IN
Soil Vapor Extraction	Main Street Well Field	IN
Soil Vapor Extraction	Seymour Recycling*	IN
Soil Vapor Extraction	Wayne Waste Reclamation	IN
Bioremediation (Ex Situ)	Cliff/Dow Dump*	MI
Bioremediation (In Situ gw)	Cliff/Dow Dump*	MI
Chemical Treatment	PBM Enterprises (Removal)	MI

TECHNOLOGY	SITE NAME	STATE
REGION 5 (continued)		
In Situ Flushing	Rasmussen Dump	MI
In Situ Vitrification	Ionia City Landfill	MI
In Situ Vitrification	Parsons Chemical (Removal)	MI
Soil Vapor Extraction	Chem Central	MI
Soil Vapor Extraction	Kysor Industrial	MI
Soil Vapor Extraction	Springfield Township Dump	MI
Soil Vapor Extraction	Sturgis Municipal Well Field	MI
Soil Vapor Extraction	ThermoChem, Inc. OU 1	MI
Soil Vapor Extraction	Verona Well Field (Thomas Solvent)	MI
Soil Vapor Extraction	Verona Well Field, OU 2	MI
Thermal Desorption	Anderson Development (Amendment)	MI
Thermal Desorption	Carter Industries	MI
Bioremediation (Ex Situ)	Burlington Northern Railroad Tie Treating Plant	MN
Bioremediation (Ex Situ)	Joslyn Manufacturing and Supply	MN
Soil Vapor Extraction	Long Prairie GW Contamination	MN
Thermal Desorption	University of Minnesota	MN
Bioremediation (In Situ)	Allied Chem & Ironton Coke, OU 2	OH
Soil Vapor Extraction	Miami County Incinerator	OH
Soil Vapor Extraction	Pristine (Amendment)	OH
Soil Vapor Extraction	Zanesville Well Field*	OH
Soil Washing	United Scrap Lead/SIA	OH
Soil Washing	Zanesville Well Field*	OH
Bioremediation (Ex Situ)	Moss-American*	WI
Bioremediation (In Situ)	Onalaska Municipal Landfill	WI
Soil Vapor Extraction	Hagen Farm	WI
Soil Vapor Extraction	Wausau Groundwater Contamination	WI
Soil Washing	Moss-American*	WI
REGION 6		
Soil Washing	Arkwood	AR
Bioremediation (Ex Situ)	Old Inger Oil Refinery	LA
Bioremediation (In Situ)	Atchison/Santa Fe/Clovis	NM
Dechlorination	Fruitland Drum (Removal)	NM
Soil Vapor Extraction	South Valley	NM
Dechlorination	Tenth Street Dump/Junkyard	OK
Soil Vapor Extraction	Tinker AFB (Soldier Creek Bldg.)	OK
Solvent Extraction	Traband Warehouse (Removal)	OK
Bioremediation (Ex Situ)	North Cavalcade Street	TX
Bioremediation (Ex Situ)	Sheridan Disposal Services	TX
Bioremediation (In Situ)	French Limited	TX
Dechlorination	Sol Lynn/Industrial Transformers	TX
In Situ Flushing	South Cavalcade Street*	TX
Soil Vapor Extraction	Petro-Chemical Systems, Inc.	TX

* An asterisk indicates that more than one innovative treatment technology will be used for the site.

TECHNOLOGY	SITE NAME	STATE
REGION 6 (continued)		
Soil Washing	Koppers/Texarkana	TX
Soil Washing	South Cavalcade Street*	TX
Solvent Extraction	United Creosoting	TX
Air Sparging	Petro-Chemical Systems, Inc.	TX
REGION 7		
Bioremediation (In Situ gw)	People's Natural Gas	IA
Bioremediation (Ex Situ)	Vogel Paint & Wax	IA
Bioremediation (In Situ)	Fairfield Coal and Gas	IA
Bioremediation (Ex Situ)	Scott Lumber (Removal)	MO
Dechlorination	Crown Plating (Removal)	MO
In Situ Flushing	Lee Chemical	MO
Soil Vapor Extraction	Hastings GW Contamination (Col. Ave.)	NE
Soil Vapor Extraction	Hastings GW Contamination (Far Marco)	NE
Soil Vapor Extraction	Hastings GW Contamination, Well #3	NE
Soil Vapor Extraction	Lindsay Manufacturing	NE
Soil Vapor Extraction	Waverly Groundwater Contamination	NE
REGION 8		
In Situ Vitrification	Rocky Mountain Arsenal OU 16	CO
Soil Vapor Extraction	Chemical Sales Company, OU 1 (RCRA)	CO
Soil Vapor Extraction	Martin Marietta (Denver Aerospace)* (RCRA)	CO
Soil Vapor Extraction	Rocky Mountain Arsenal, OU 18	CO
Soil Vapor Extraction	Sand Creek Industrial, OU 1	CO
Soil Washing	Sand Creek Industrial, OU 5	CO
Thermal Desorption	Martin Marietta (Denver Aerospace)* (RCRA)	CO
Bioremediation (In Situ gw)	Burlington Northern (Somers Plant)*	MT
Bioremediation (In Situ gw)	Libby Ground Water Contamination*	MT
Bioremediation (Ex Situ)	Burlington Northern (Somers Plant)*	MT
Bioremediation (Ex Situ)	Libby Ground Water Contamination*	MT
Bioremediation (Ex Situ)	Wasatch Chemical*	UT
In Situ Vitrification	Wasatch Chemical*	UT

TECHNOLOGY	SITE NAME	STATE
REGION 9		
Bioremediation (In Situ)	Gila River Indian Reservation* (Removal)	AZ
Chemical Treatment	Gila River Indian Reservation* (Removal)	AZ
Chemical Treatment	Stanford Pesticide #1	AZ
Soil Vapor Extraction	Indian Bend Wash, South Area, OU 1	AZ
Soil Vapor Extraction	Mesa GW Contamination (RCRA)	AZ
Soil Vapor Extraction	Motorola 52nd Street	AZ
Soil Vapor Extraction	Phoenix-Goodyear Airport Area	AZ
Bioremediation (Ex Situ)	J.H. Baxter	CA
Bioremediation (Ex Situ)	Koppers Company, Inc. (Oroville)*	CA
Bioremediation (In Situ gw)	Castle, AFB, OU 1	CA
Bioremediation (In Situ)	Koppers Company, Inc. (Oroville)*	CA
Bioremediation (In Situ)	Roseville Drums (Removal)	CA
Soil Vapor Extraction	Fairchild Semiconductor (San Jose)	CA
Soil Vapor Extraction	Fairchild Semiconductor/MTV-I	CA
Soil Vapor Extraction	Fairchild Semiconductor/MTV-II	CA
Soil Vapor Extraction	IBM (San Jose)	CA
Soil Vapor Extraction	Intel, Mountain View	CA
Soil Vapor Extraction	Intersil/Siemens	CA
Soil Vapor Extraction	Monolithic Memories	CA
Soil Vapor Extraction	National Semiconductor (ADM)	CA
Soil Vapor Extraction	Raytheon, Mountain View	CA
Soil Vapor Extraction	Signetics (AMD)	CA
Soil Vapor Extraction	Solvent Service* (RCRA)	CA
Soil Vapor Extraction	Spectra Physics, OU 1	CA
Soil Vapor Extraction	Teledyne Semiconductors	CA
Soil Vapor Extraction	Van Waters & Rogers	CA
Soil Vapor Extraction	Watkins-Johnson	CA
Soil Washing	FMC (Fresno)	CA
Soil Washing	Koppers Company, Inc. (Oroville)*	CA
Bioremediation (In Situ)	Poly-Carb (Removal)*	NV
In Situ Flushing	Poly-Carb (Removal)*	NV
REGION 10		
In Situ Flushing	Union Pacific Railroad Sludge	ID
In Situ Flushing	United Chrome Products	OR
Soil Vapor Extraction	Commencement Bay/S. Tacoma Channel	WA

* An asterisk indicates that more than one innovative treatment technology will be used for the site.

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 **predesign**. 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

April 1992

REGION	BIOREMEDIATION (EX SITU)	STATUS
01	Iron Horse Park, MA	O
02	General Motors/Central Foundry Division, OU 1, NY	D
03	Whitmoyer Laboratories, OU 3, PA	D
03	L.A. Clarke & Sons, Lagoon Sludge OU, VA	PD
03	Ordnance Works Disposal, WV	PD
04	American Creosote Works, FL	D
04	Brown Wood Preserving, FL	C
04	Cabot Carbon/Koppers, FL	D
04	Dubose Oil Products, FL	D
04	Southeastern Wood Preserving, MS (Removal)	O
04	Cape Fear Wood Preserving, NC	D/I
04	Charles Macon Lagoon, NC	PD
05	Galesburg/Koppers, IL	D
05	Cliff/Dow Dump, MI	PD
05	Burlington Northern Railroad Tie Treating Plant, MN	O
05	Joslyn Manufacturing and Supply Co., MN	O
05	Moss-American, WI	D
06	Old Inger Oil Refinery, LA	O
06	North Cavalcade Street, TX	D
06	Sheridan Disposal Services, TX	PD
07	Vogel Paint & Wax, IA	I
07	Scott Lumber, MO (Removal)	C
08	Burlington Northern (Somers Plant), MT	D
08	Libby Ground Water Contamination, MT	O
08	Wasatch Chemical, UT	PD
09	J.H. Baxter, CA	D
09	Koppers Company, Inc. (Oroville Plant), CA	D

REGION	BIOREMEDIATION (IN SITU)	STATUS
02	FAA Technical Center, NJ (Ground water)	D/I
02	Swope Oil & Chem Co., OU 2, NJ	PD
02	Applied Environmental Services, OU 1, NY	PD
02	Applied Environmental Services (Ground Water)	PD
03	L. A. Clarke & Sons, OU 1, (Soils), VA	PD
04	Cabot Carbon/Koppers, FL	D
04	Cabot Carbon/Koppers, FL (Ground water)	D
05	Seymour Recycling, IN	C
05	Seymour Recycling, IN (Ground water)	O
05	Cliff/Dow Dump, MI (Ground water)	PD
05	Allied Chem & Ironton Coke, OU 2, OH	PD
05	Onalaska Municipal Landfill, WI	D
06	Atchison/Santa Fe/Clovis, NM	I
06	French Limited, TX	D
07	People's Natural Gas, IA (Ground water)	PD

REGION	BIOREMEDIATION (IN SITU) (continued)	STATUS
07	Fairfield Coal and Gas, IA	D
08	Burlington Northern (Somers Plant), MT (Ground water)	D
08	Libby Ground Water Contamination, MT (Ground water)	O
09	Gila River Indian Reservation, AZ (Removal)	C
09	Castle AFB, CA (Ground water)	D
09	Koppers Company, Inc. (Oroville Plant), CA	D
09	Roseville Drums, CA (Removal)	C
09	Poly-Carb, NV (Removal)	C

REGION	CHEMICAL TREATMENT	STATUS
03	Avtex Fibers, VA (Removal)	C
04	Palmetto Wood Preserving, SC	C
05	PBM Enterprises (Van Dusen Airport Service), MI (Removal)	C
09	Gila River Indian Reservation, AZ (Removal)	C
09	Stanford Pesticide #1, AZ (Removal)	C

REGION	DECHLORINATION	STATUS
01	Re-Solve, MA	PD
02	Myers Property, NJ	PD
02	Signo Trading/Mt. Vernon, NY (Removal)	C
02	Wide Beach Development, NY	C
03	Saunders Supply Company, OU 1	PD
04	Smith's Farm Brooks, KY	D
04	Arlington Blending & Packaging, TN	PD
06	Fruitland Drum, NM (Removal)	I
06	Tenth Street Dump/Junkyard, OK	D
06	Sol Lynn/Industrial Transformers, TX	D/I
07	Crown Plating, MO (Removal)	C

REGION	IN SITU FLUSHING	STATUS
02	Lipari Landfill, NJ	O
02	Naval Air Engineering Center, OU 1, NJ	O
02	Naval Air Engineering Center, OU 2, NJ	I
02	Naval Air Engineering Center, OU 4, NJ	I
02	Vineland Chemical, OU 1 and OU 2, NJ	D
02	Byron Barrel & Drum, NY	PD
03	L. A. Clarke & Sons, OU 1 (Soils), VA	PD
03	U.S. Titanium, VA	PD
04	Ciba-Geigy (MacIntosh Plant), AL	PD

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

April 1992

REGION	IN SITU FLUSHING (continued)	STATUS
04	JADCO-Hughes, NC	D
05	Ninth Avenue Dump, IN	D
05	Rasmussen Dump, MI	D
06	South Cavalcade Street, TX	D
07	Lee Chemical, MO	PD
09	Poly-Carb, NV (Removal)	C
10	Union Pacific Railroad Sludge Pit, ID	PD
10	United Chrome Products, OR	O

REGION	IN SITU VITRIFICATION	STATUS
05	Ionia City Landfill, MI	D
05	Parsons Chemical (ETM Enterprise), MI (Removal)	D/I
08	Rocky Mountain Arsenal, OU 16, CO	D
08	Wasatch Chemical, UT	PD

REGION	SOIL VAPOR EXTRACTION	STATUS
01	Kellogg-Deering Well Field, CT	D
01	Groveland Wells, MA	D
01	Silresim, MA	PD
01	Wells G&H, MA	PD
01	Mottolo Supply, NH	PD
01	South Municipal Water Supply Well, NH	D
01	Tinkham Garage, NH	D
01	Stamina Mills, RI	PD
02	A O Polymer, Soil treatment phase, NJ	PD
02	FAA Technical Center, NJ	D/I
02	Garden State Cleaners, NJ	PD
02	South Jersey Clothing, NJ	PD
02	Swope Oil & Chem Co., OU 2, NJ	PD
02	Applied Environmental Services, OU 1, NY	PD
02	Circuitron Corporation, OU 1, NY	PD
02	Genzale Plating Company, OU 1, NY	D
02	Mattiace Petrochemicals Company, OU 1, NY	PD
02	SMS Instruments (Deer Park), NY	I
02	Solvent Savers, NJ	PD
02	Vestal Water Supply 1-1, NY	PD
02	Upjohn Manufacturing Co., PR	C
03	Bendix, PA	PD
03	Cryochem, OU 3, PA	D
03	Henderson Road, PA	O
03	Lord-Shope Landfill, PA	D
03	Tyson's Dump, PA	O
03	Arrowhead Associates/Scovill, OU 1, VA	PD

REGION	SOIL VAPOR EXTRACTION (continued)	STATUS
04	Robbins AFB, Landfill and Sludge Lagoon, OU 1, GA	PD
04	Charles Macon Lagoon, OU 1, NC	PD
04	JADCO-Hughes, NC	D
04	Hinson Chemical, SC (Removal)	C
04	Medley Farm, OU 1, SC	PD
04	SCRDI Bluff Road, SC	D
05	Acme Solvent Reclaiming, Inc., OU 2, IL	PD
05	Enviro. Conservation and Chemical (Amendment), IN	PD
05	Fisher Calo Chem, IN	D
05	MIDCO I, IN	PD
05	Main Street Well Field, IN	PD
05	Seymour Recycling, IN	I
05	Wayne Waste Reclamation, IN	PD
05	Chem Central, MI	PD
05	Kysor Industrial, MI	D
05	Springfield Township Dump, MI	PD
05	Sturgis Municipal Well Field, MI	PD
05	ThermoChem, Inc., OU 1, MI	PD
05	Verona Well Field (Thomas Solvent/Raymond Road), MI	O
05	Verona Well Field, OU 2, MI	PD
05	Long Prairie Groundwater Contamination, MN	D/I
05	Miami County Incinerator, OH	PD
05	Pristine (Amendment), OH	D
05	Zanesville Well Field, OH	PD
05	Hagen Farm, WI	D
05	Wausau Groundwater Contamination, WI	D
06	South Valley, NM	I
06	Tinker AFB (Soldier Creek Bldg. 3001), OK	D
06	Petro-Chemical Systems, Inc., OU 2, TX	PD
07	Hastings GW Contamination (Colorado Ave), NE	D
07	Hastings GW Contamination (Far-Mar Co.), NE	D
07	Hastings GW Contamination, Well No. 3, NE	I
07	Lindsay Manufacturing, NE	PD
07	Waverly Groundwater Contamination, NE	O
08	Chemical Sales Company, OU 1, CO	D
08	Martin Marietta (Denver Aerospace), CO	PD
08	Rocky Mountain Arsenal, OU 18, CO	D
08	Sand Creek Industrial, OU 1, CO	D
09	Indian Bend Wash, South Area, OU 1, AZ	D
09	Mesa Ground Water Contamination, AZ	PD
09	Motorola 52nd Street, AZ	D
09	Phoenix-Goodyear Airport Area (North & South Fac), AZ	D
09	Fairchild Semiconductor (San Jose), CA	O
09	Fairchild Semiconductor/MTV-I, CA	D
09	Fairchild Semiconductor/MTV-II, CA	D
09	IBM (San Jose), CA	O
09	Intel, Mountain View, CA	D

REGION	SOIL VAPOR EXTRACTION (continued)	STATUS
09	Intersil/Siemens, CA	O
09	Monolithic Memories, CA	PD
09	National Semiconductor and Advanced Micro Device, CA	PD
09	Raytheon, Mountain View, CA	D
09	Signetics (AMD), CA	O
09	Solvent Service, CA	O
09	Spectra Physics, OU 1, CA	I
09	Teledyne Semiconductors, CA	I
09	Van Waters and Rogers, CA	PD
09	Watkins-Johnson, CA	D
10	Commencement Bay/S. Tacoma Channel/Well 12A, WA,	I

REGION	SOIL WASHING	STATUS
02	Ewan Property, NJ	PD
02	King of Prussia, NJ	D
02	Myers Property, NJ	PD
02	Vineland Chemical, OU 1 and OU 2, NJ	D
04	American Creosote Works, FL	D
04	Cabot Carbon/Koppers, FL	D
04	Southeastern Wood Preserving, MS (Removal)	O
04	Cape Fear Wood Preserving, NC	D/I
05	United Scrap Lead/SIA, OH	D
05	Zanesville Well Field, OH	PD
05	Moss-American, WI	D
06	Arkwood, AR	PD
06	Koppers/Texarkana, TX	PD
06	South Cavalcade Street, TX	D
08	Sand Creek Industrial, OU 5, CO	D
09	FMC (Fresno), CA	PD
09	Koppers Company, Inc. (Oroville Plant), CA	D

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

REGION	THERMAL DESORPTION	STATUS
01	Cannon Engineering/Bridgewater, MA	C
01	Re-Solve, MA	PD
01	McKin, ME	
01	Union Chemical Co., OU 1, ME	D
01	Ottati & Goss, NH	C
02	Caldwell Trucking, NJ	D
02	Metaltec/Aerosystems, OU 1 - Soil Treatment, NJ	D/I
02	Reich Farms, NJ	D
02	Waldick Aerospace Devices, NJ	D/I
02	American Thermostat, NY	D
02	Claremont Polychemical - Soil Remedy, NY	D
02	Fulton Terminals, Soil Treatment, NY	D
02	Sarney Farm, NY	D
02	Solvent Savers, NY	PD
02	GE Wiring Devices, PR	D
03	U.S.A. Letterkenny SE Area, OU 1, PA	PD
03	Saunders Supply Co, OU 1, VA	PD
04	Ciba-Geigy (MacIntosh Plant), AL	PD
04	Aberdeen Pesticide Dumps, OU 4, NC	PD
04	Sangamo/Twelve Mile/Hartwell PCB, SC	PD
04	Wamchem, SC	D
04	Arlington Blending & Packaging Co., OU 1, TN	PD
05	Acme Solvent Reclaiming, Inc., OU 2, IL	PD
05	Outboard Marine/Waukegan Harbor, OU 3, IL	O
05	Anderson Development (ROD Amendment), MI	O
05	Carter Industries, MI	PD
05	University of Minnesota, MN	D
08	Martin Marietta (Denver Aerospace), CO	PD

REGION	OTHER TECHNOLOGIES	STATUS
01	South Municipal Water Supply Well, NH	D
03	Brodhead Creek, OU 1, PA	PD
06	Petro-Chemical Systems, Inc., OU 2, TX	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 conducting 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.

One purpose of this column is to identify opportunities to vendors to become involved in the next phase of the projects. Whenever possible, the season and year that the current phase will end is given. This is identified as the "completion planned" date.

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.

Bioremediation (Ex Situ)

Region	Site Name, State (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 and railyard waste	Sludge 25,000	VOCs, PAHs	Operational; Completion planned Summer 1995	PRP lead/Federal oversight; ENSR Consulting	Don McElroy 617-223-5571 FTS-833-1571
2	General Motors/Central Foundry Division, OU1, NY (12/17/90)	Slurry phase	Machine shops Engine casting facility	Soil (100,000 cy), Sludge (91,000 cy from lagoon), Sediments (62,000 cy)	PCBs	In design; Design completion planned Summer 1994	PRP lead/Federal oversight	Lisa Carson 212-264-6857 FTS-264-6857
3	Whitmoyer Laboratories, OU3, PA (12/31/90)	Bioremediation (Ex Situ (to be used with iron-based fixation)	Other organic chemical manufacturing	Soil (5,600 cy, combined), Sediments	VOCs (TCE), SVOCs (Aniline)	In design; Design completion planned Winter 1994	PRP lead/Federal oversight	Chris Corbett 215-597-6906 FTS-597-6906
3	L.A. Clarke & Sons, Lagoon Sludge OU, VA (03/31/88)	Slurry phase in tanks	Wood preserving	Sludge (quantity unknown)	PAHs (Creosote)	Predesign; PD completion planned Spring 1993	PRP lead/Federal oversight	Gene Wingert 215-597-1727 FTS-597-1727
3	Ordnance Works Disposal, WV (09/29/89)	Land treatment	Chemical manufacturing	Soil (13,500 cy)	PAHs (Carcinogenic)	Predesign; PD completion planned Summer 1993	PRP lead/Federal oversight	Drew Lausch 215-597-1286 FTS-597-1286
4	American Creosote Works,* FL (09/28/89) See also Soil Washing	Slurry phase (Preceded by soil washing)	Wood preserving	Soil (fines from washing 36,500 cy)	SVOCs (PCP), Dioxins, PAHs (Creosote)	In design; Design completion planned Summer 1992. The design will be a performance spec and is expected to be available for bid during this summer	Federal lead/Fund financed	Madolyn Streng 404-347-2643 FTS-257-2643 Charles Logan (FL) 904-488-0190 Kelsey Helton (FL) 904-488-0190
4	Brown Wood Preserving, FL (04/08/88)	Land treatment	Wood preserving, Drum storage/ disposal	Soil (7,500 cy)	PAHs (Creosote)	Completed (see Table 4)	PRP lead/Federal oversight; Remediation Technologies, Inc.	Martha Berry 404-347-2643 FTS-257-2643
4	Cabot Carbon/Koppers, FL (09/27/90) See also In Situ Bioremediation, Soil Washing	Slurry phase (Bioremediation of fines following soil washing)	Wood preserving; Pine tar and turpentine manufacturing	Soil (fines from washing; approximately 6,400 cy)	SVOCs (PCP, Bis (2-ethyl-hexyl)phthalate, Dimethylphenol, DNT), PAHs	In design; Design completion planned Spring 1994	PRP lead/Federal oversight	Martha Berry 404-347-2643 FTS-347-2643

Status as of February 1992.

* Indicates that a treatability study has been completed.

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

Bioremediation (Ex Situ)
(continued)

Region	Site Name, State (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status #	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
4	Dubose Oil Products, FL (03/29/90)	Solid phase (Windrowing with aeration and irrigation in a barn)	Petroleum refining and reuse	Soil (15,000 cy)	SVOCs (PCP), PAHs	In design; Design completion planned Winter 1992; Pilot- scale work to begin in Summer 1992; This will be Phase 1 of RA	PRP lead/Federal oversight	Mike McKibben 404-347-2643 FTS-257-2643 Joe Wheatley (FL) 904-488-0190
4	Southeastern Wood Preserving, MS Emergency Response Action Memo signed 09/30/90 See also Soil Washing	Slurry phase (preceded by soil washing)	Wood preserving	Soil (fines from 8,000 cy of soil)	SVOCs (PCP), PAHs (Creosote)	Operational; Completion planned Summer 1993	Federal lead/Fund financed; OHM Remediation Services Corp	Don Rieger 404-347-3931 FTS-257-3931
4	Cape Fear Wood Preserving,* NC (06/30/89) See also Soil Washing	Slurry phase (preceded by soil washing)	Wood preserving	Soil (2,000 cy of fines from 20,000 cy of soil)	VOCs, PAHs	Design completed but not installed; Construction contract being procured; Construction will begin this summer	State lead/Fund financed	Jon Bornholm 404-347-7791 FTS-257-7791
4	Charles Macon Lagoon, NC (09/30/91)	Ex Situ Bioremediation (Type to be determined)	Petroleum refining and reuse	Soil (1,000 cy)	PAHs (Benzo(a)-anthracene, Benzo(a)pyrene)	Predesign; PD completion planned Fall 1992	PRP lead/Federal oversight	Jack Butler 919-733-2801
5	Galesburg/Koppers, IL (06/30/89)	Land treatment	Wood preserving	Soil (15,200 cy)	SVOCs (PCP, Creosote, Phenols), PAHs	In design; Design completion planned Fall 1993	PRP lead/Federal oversight; Remediation Technologies, Inc.	Brad Bradley 312-886-4742 FTS-886-4742 Steve Davis 217-785-3913
5	Cliff/Dow Dump, MI (09/27/89) See also Bioremediation (In Situ)	Bioremediation (Ex Situ) (Type to be determined)	Waste disposal for charcoal manufacturing plant	Soil (9,200 cy)	VOCs (TCE, BTEX), SVOCs (Phenol, Naphthalene)	Predesign; PD completion planned 1992; Design to be completed in Winter 1993;	PRP lead/Federal oversight	Lida Tan 312-886-1842 FTS-886-1842
5	Burlington Northern Railroad Tie Treating Plant,* MN (06/04/86)	Land treatment	Wood preserving	Soil (9,500 cy), Sludge (9,600 cy)	SVOCs (Phenols), PAHs	Operational; Completion planned 1994	PRP lead/State-Federal oversight; Remediation Technologies, Inc.	Tony Rutter 312-886-8961 FTS-886-8961 Fred Jenness (MN) 612-297-8470 Richard Truax (RETEC) 303-493-3700

Status as of February 1992.

* Indicates that a treatability study has been completed.

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

Bioremediation (Ex Situ)

(continued)

Region	Site Name, State (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status #	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
5	Joslyn Manufacturing and Supply Co., MN (Project began in 1988)	Land treatment (Unlined treatment unit with irrigation and tilling)	Wood preserving	Soil (75,000 cy)	SVOCs (PCP), PAHs	Operational; Completion planned Fall 1992; Operations began in 8/89	PRP lead/State oversight; ECOVA Corporation	Kevin Turner 312-886-4444 FTS-886-4444 Steve Schoff (MN) 612-296-7827
5	Moss-American,* WI (09/27/90) See also Soil Washing	Slurry phase (preceded by soil washing)	Wood preserving	Soil (80,000 cy of fines), Sediments (5,200 cy)	PAHs	In design; Design completion planned 1994	PRP lead/Federal oversight; Weston, Inc.	Betty Lavis 312-886-4784 FTS-886-4784
6	Old Inger Oil Refinery,* LA (09/25/84)	Land treatment	Petroleum refining and reuse	Soil (120,000 cy, combined), Sludge	VOCs (Benzene, Ethylbenzene), PAHs (Petroleum Hydrocarbons)	Operational; Completion planned Spring 1997	State lead/Fund financed; Westinghouse Haztech (installation); Operation to be awarded Spring 1992	Paul Sieminski 214-655-6710 FTS-255-6710 Mike Hahn (LA) 504-765-0487
6	North Cavalcade Street,* TX (06/28/88)	Land treatment	Wood preserving	Soil (22,300 cy)	VOCs (BTEX), PAHs (Creosote)	In design; Design completion planned Fall 1992	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	Industrial landfill	Sludge (3,000 cy of oils and sludge), Solids (40,000 cy of soils and sludgelike material)	VOCs (Benzene, Toluene), SVOCs (Phenols), PCBs	Predesign; PD completion planned Summer 1992	PRP lead/State oversight	Ruth Israeli 214-655-6735 FTS-255-6735
7	Vogel Paint & Wax,* IA (09/25/89)	Land treatment	Paint/ink formation	Soil (10,000 cy)	VOCs (Methyl Ethyl Ketone, BTX)	Being installed; Installation completion planned Spring 1992; One cell has been constructed.	PRP lead/State oversight; Geotech Engineering and Testing Services, Inc.	Steve Jones 913-551-7755 FTS-276-7755 Bob Drustrup (IA) 515-281-8900

Status as of February 1992.

* Indicates that a treatability study has been completed.

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

Bioremediation (Ex Situ)

(continued)

Region	Site Name, State (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status #	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
7	Scott Lumber, MO Emergency Response (Action Memo signed 07/10/87)	Land treatment	Wood preserving	Soil (16,000 cy)	SVOCs (Phenols), PAHs (Benzo-(a)-pyrene)	Completed; Operational 11/87 to Fall 1991	Federal lead/Fund financed; Remediation Technologies, Inc.	Bruce Morrison 913-551-5014 FTS-276-5014
8	Burlington Northern (Somers Plant),* MT (09/27/89) See also Bioremediation (In Situ)	Land treatment	Wood preserving	Soil (12,000 cy)	PAHs (Creosote)	In design; Design completion planned Fall 1992	PRP lead/Federal oversight; Remediation Technologies, Inc.	Jim Harris 406-449-5414 FTS-585-5414
8	Libby Ground Water Contamination,* MT (12/30/88) See also Bioremediation In Situ	Land treatment using two 1-acre cells; soil is excavated and mixed	Wood preserving	Soil (45,000 cy)	VOCs (Benzene), SVOCs (PCP), PAHs (Creosote)	Operational; Completion planned 1999	PRP lead/Federal oversight	Jim Harris 406-449-5414 FTS-585-5414 Bert Bledsoe (RSKERL) 405-332-2313 FTS-743-2313
8	Wasatch Chemical,* UT (03/29/91) See also In Situ Vitrification	Land treatment on an asphalt pad	Pesticide manufacturing/ use/storage, Other organic chemical manufacturing, Other inorganic chemical manufacturing	Soil (1,100 cy)	VOCs (Toluene, Xylene)	Predesign; PD completion planned Spring 1992	PRP lead/Federal oversight	Bert Garcia 303-293-1526 FTS-330-1526
9	J.H. Baxter,* CA (09/27/90)	Land treatment (bioremediation to be followed by fixation for metals)	Wood preserving	Soil (quantity unknown)	Dioxins, PAHs	In design; Design completion planned Summer 1993	PRP lead/Federal oversight	Mary Masters 415-744-2370 FTS-4840
9	Koppers Company, Inc. (Oroville Plant), CA (04/04/90) See also Bioremediation (In situ), Soil Washing	Slurry phase (preceded by soil washing)	Wood preserving	Soil (fines from 200,000 cy to be soil washed)	SVOCs (Polychlorinated phenols), Pesticides, Dioxins	In design; Design completion planned Spring 1993; This project is being considered as part of the soil washing project	PRP lead/Federal oversight	Fred Schauffler 415-744-2365 FTS-484-2365

Status as of February 1992.

* 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, (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 (09/26/89) See also Soil Vapor Extraction	In situ bioremediation	Jet fuel tank farm	gw (extraction wells-30 to 40 ft deep)	VOCs	Design complete; Going to bid in April for RA contract award in late summer	Federal facility, FAA Lead	Carla Struble 212-264-4595 FTS-264-4595 Keith Buch (FAA) 609-484-6644
2	Swope Oil & Chem Co., OU2, NJ (09/27/91) See also Soil Vapor Extraction	In situ soil bioventing with vacuum extraction	Chemical reclamation	Soil (2 acres to 80 ft deep)	SVOCs (Naphthalene, DEHP, 2-ethylhexyl-phalate)	Predesign; PD completion planned 1992	Still in negotiation	Joseph Gowers 212-264-5386 FTS-264-5386
2	Applied Environmental Services, OU1, NY (06/24/91) See also Soil Vapor Extractions)	In situ saturated soil	Petroleum refining and reuse	Soil (quantity unknown)	VOCs (TEX), SVOCs (Naphthalene, Bis(2-ethylhexyl) phthalate, Benzo(b)Fluoran-thene	Predesign, PD completion planned 1992	PRP lead/State oversight	Andrew Anglish (NY) 518-457-5637
2	Applied Environmental Services, (Ground Water), NY (06/24/91)	In situ ground water, treated gw to be reinjected w/nutrients and H_2O_2	Petroleum refining and reuse	gw	VOCs (TEX)	Predesign, PD completion planned 1992	PRP lead/State oversight	Andrew Anglish (NY) 518-457-5637
3	LA Clarke & Sons, OU 1 (Soils),* VA (03/31/88) See also In Situ Flushing	In situ bioremediation follows creosote recovery and in situ flushing	Wood preserving	Soil (15,000 cy, maximum depth 8 - 10 ft)	VOCs (Benzene), PAHs (Creosote, Carcinogenic)	Predesign; PD completion planned Summer 1993	PRP lead/Federal oversight	Eugene Wingert 215-597-1727 FTS-597-1727
4	Cabot Carbon/Koppers, FL (09/27/90) See also Ex Situ Bioremediation; Soil Washing	In situ soil treatment above/ below gw table by nutrient addition	Wood preserving; Pine tar and turpentine manufacturing	Soil (5,000 cy)	SVOCs (PCP, Bis(2-ethyl hexyl)phthalate, DNT, Dimethylphenol), PAHs	In design; Design completion planned Spring 1994	PRP lead/Federal oversight	Martha Berry 404-347-2643 FTS-257-2643
4	Cabot Carbon/Koppers (Ground water), FL (09/27/90)	In situ ground water treating above/below gw table by nutrient addition	Wood preserving; Pine tar and turpentine manufacturing	gw	SVOCs (PCP, Bis(2-ethylhexyl) phthalate, DNT, dimethylphenol), PAH	In design; Design completion planned Spring 1994	PRP lead/Federal oversight	Martha Berry 404-347-2643 FTS-256-2643
5	Seymour Recycling,* IN (09/30/87) See also Soil Vapor Extraction	In situ soil Nutrients plowed into soil	Chemical waste management and incineration	Soil (approximately 200,000 cy, 12 acres to 10 ft deep)	VOCs (BTEX), SVOCs, PAHs (Petroleum Hydrocarbons)	Completed (see Table 4); Nutrients were plowed into the soil during Summer, 1990	PRP lead/Federal oversight; Geraghty & Miller	Jeff Gore 312-886-6552 FTS-886-6552

Status as of February 1992.

* Indicates that a treatability study has been completed.

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

Bioremediation (In situ)

(continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status #	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
5	Seymour Recycling (Ground water), IN (09/30/87)	In situ gw treatment incidental to soil treatment	Chemical waste management and incineration	gw (under approx. 12 acres)	VOCs, SVOCs, PNAs	Operational; Gw treatment was not designed but appears to be occuring as a result of in situ soil treatment	PRP lead/Federal oversight	Jeff Gore 312-886-6552 FTS-886-6552
5	Cliff/Dow Dump, MI (09/27/89) See also Ex Situ Bioremediation	In situ gw without addition of nutrients, oxygen, or microbes	Waste disposal for charcoal manufacturing plant	gw	VOCs (BTEX), SVOCs (Phenol), PAHs	Predesign; PD completion planned 1992; Design to be completed Winter 1993	PRP lead/Federal oversight	Lida Tan 312-886-1842 FTS-886-1842
5	Allied Chemical & Ironton Coke, OU2,* OH (12/28/90)	In situ bioremediation of lagoon sediments	Coke manufacturing	Sediments (457,000 cy from a lagoon)	PAHs	Predesign; PD completion planned Winter 1993	PRP lead/Federal oversight; IT Corporation	Jim Van der Kloot 312-353-9309 FTS-353-9309
5	Onalaska Municipal Landfill, WI (08/14/90)	In situ soil; Air injection; no nutrient or microbe addition	Municipal landfill	Soil (16,000 cy, 11 - 15 ft deep)	SVOCs (Naphthalene), PAHs	In design; Design completion planned Fall 1992	Federal lead/Fund financed	Kevin Adler 312-886-7078 FTS-886-7078
6	Atchison/Santa Fe/Clovis,* NM (09/23/88)	In situ soil; landfarm sludges and cap	Railyard wastes (diesel spills)	Soil (28,600 cy, combined, to 6 ft deep), Sludge	PAHs (Petroleum Hydrocarbons, Diesel Fuel)	Being installed; Completion planned Spring 1992	PRP lead/State oversight; Radian Corporation	Susan Webster 214-655-6730 FTS-255-6730
6	French Limited, TX (03/24/88)	In situ lagoon bioremediation	Petrochemical	Sludge (70,100 cy combined), Sediments	VOCs, PAHs	In design	PRP lead/Federal oversight	Judith Black 214-655-6735 FTS-255-6735
7	Fairfield Coal and Gas, IA (9/21/90)	In situ sludge; Injection H_2O_2, nutrients & effluent from gw treatment	Coal gasification	Sludge (Coal tars at 22 - 27 ft deep)	VOCs (BTEX), PAHs (Naphthalene)	In design; Design completion planned Summer 1994; Field scale pilot test underway now, complete in January, 1994	PRP lead/Federal oversight	Steve Jones 913-551-7755 FTS-276-7755
7	People's Natural Gas, IA (9/16/91)	In situ gw	Coal gasification	gw	VOCs (Benzene), PAHs	Predesign; PD completion planned Winter 1992	PRP lead/Federal oversight	Bill Bunn 913-551-7792 FTS-276-7792

Status as of February 1992.

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

Bioremediation (In situ)

(continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status #	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
8	Burlington Northern (Somers Plant),* MT (09/27/89) See also Bioremediation (Ex situ)	In situ gw	Wood preserving	gw (2 areas, 20 ft deep and 30 ft deep)	SVOCs (Phenols), PAHs (Creosote)	In design; Design completion planned Fall 1992	PRP lead/Federal oversight; Remediation Technologies, Inc.	Jim Harris 406-449-5414 FTS-585-5414
8	Libby Ground Water Contamination,* MT (12/30/88) See also Bioremediation (Ex situ)	In situ ground water; Injection of H_2O_2 and Potassium tripolyphosphate	Wood preserving	gw (targeting 40 - 80 ft deep)	VOCs (Benzene), SVOCs (PCP), PAHs (Creosote)	Operational, Completion planned 2001; RA started September 1991	PRP lead/Federal oversight; Woodward-Clyde	Jim Harris 406-449-5414 FTS-585-5414 Bert Bledsoe (RSKERL) 405-332-2313 FTS-743-2313
9	Gila River Indian Reservation, AZ Emergency Response (Action Memo signed 07/31/84); See also Chemical Treatment	In situ soil; preceded by chemical treatment	Drum storage / disposal; Airfield with buried drums	Soil (3,200 cy)	Pesticides (Toxaphene, Ethyl and Methyl Parathion)	Completed; Operational 6/85 - 10/85 (see Table 4)	Federal lead/ Fund financed	Richard Martin 414-744-2288 FTS-484-2288
9	Castle Air Force Base, OU 1, CA (09/30/91)	In situ ground water, treated gw to be reinjected with nutrients and H_2O_2	Federal facility	gw	VOCs (TCE, PCE, DCE, DCA, Carbon tetrachloride, Benzene)	In design	Federal facility, U.S. Air Force lead	Michael Work 415-744-2392 FTS-484-2392
9	Koppers Company, Inc. (Oroville Plant), CA (04/04/90) See also Soil Washing; Bioremediation (Ex Situ)	In situ soil; surface application of nutrients & electron donors, recirculate	Wood preserving	Soil (110,000 cy, to a depth of 10 ft)	SVOCs (Polychlorinated phenols), Pesticides, Dioxins	In design; Design completion planned Spring 1993	PRP lead/Federal oversight	Fred Schauffler 415-744-2365 FTS-484-2365
9	Roseville Drums, CA Emergency Response (Action Memo signed 03/03/88)	In situ soil	Midnight dump on dirt road	Soil (14 cy)	VOCs, SVOCs (Dichlorobenzene, Phenols)	Completed; Operational 2/88 to 11/88 (see Table 4)	Federal lead/Fund Financed	Brad Shipley 415-744-2287 FTS-484-2287
9	Poly-Carb, NV Emergency Response (Action Memo signed 05/14/87); See also In Situ Flushing	In situ soil, nutrients plowed into soil	Commercial waste management	Soil (1,500 cy)	SVOCs (Phenols), PAHs (Cresol)	Completed; Operational from 7/87 to 8/88 (see Table 4)	Federal lead/Fund financed; Reidel Environmental Services	Bob Mandel 415-744-2290 FTS-484-2290

Status as of February 1992.

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

TABLE 3
DETAILED SITE INFORMATION BY TREATMENT TECHNOLOGY

April 1992

Chemical Treatment

Region	Site Name, State, (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 (Action Memo signed 11/14/89)	Chemical treatment	Rayon manufacturing facility waste-water treatment	Sludge (39,000 gallons)	Carbon Disulfide	Completed in 8/91 (see Table 4)	Federal lead/Fund financed; OH Materials	Vincent Zenone 215-597-3038 FTS-597-3038
4	Palmetto Wood Preserving,* SC (09/30/87)	Reduction of Cr(6) to Cr(3) using Na metaphosphate	Wood preserving	Soil (12,700 cy)	Metals (Chromium, Arsenic, Copper)	Completed; Operational 9/88 to 2/89 (see Table 4)	Federal lead/Fund financed; Roy F. Weston	Al Cherry 404-342-7791 FTS-257-7791
5	PBM Enterprises (Van Dusen Airport Service), MI Emergency Response (Action Memo signed (04/10/88)	Oxidation with Sodium Hypochlorite	Silver Recovery Facility	Solids (Cyanide-tainted x-ray film chips)	Organic Cyanides	Completed; Operational 5/85 to 10/85 (see Table 4)	Federal lead/Fund financed; American Environmental Service, Inc.	Ross Powers 312-378-7661 FTS-378-7661
9	Gila River Indian Reservation, AZ Emergency Response (Action Memo signed 07/31/84) See also Bioremediation (In situ)	In situ	Drum storage / disposal Airfield with buried drums	Soil (3,200 cy)	Pesticides (Toxaphene, Ethyl and Methyl Parathion)	Completed; Operational 4/85 to 10/85 (see Table 4)	Federal lead/Fund financed	Richard Martin 414-744-2288 FTS-484-2288
9	Stanford Pesticide #1, AZ Emergency Response (Action Memo signed 04/20/87)	In situ	Pesticide manufacturing / use / storageFarm Equipment Storage	Soil (200)	Pesticides (Methyl Parathion)	Completed; Operational 7/87 to 9/87 (see Table 4)	Federal lead/Fund financed; Crosby and Overton	Dan Shane 415-744-2286 FTS-484-2286

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Dechlorination

Region	Site Name, State, (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) See also Thermal Desorption	Dechlorination of residuals from thermal desorption	Chemical reclamation facility	Soil (residuals from 22,500 cy)	PCBs	Predesign; PD completion planned Spring 1992; Treatability study to be completed Spring 1992; Design completion planned Summer 1993	PRP lead/Federal oversight; Chemical Waste Management, Inc.	Lorenzo Thantu 617-223-5500 FTS-883-1500
2	Myers Property, NJ (09/28/90) See also Soil Washing	Dechlorination	Pesticide manufacturing/ use/storage	Soil (50,000 cy combined), Sediments	SVOCs (hexachlorobenzene, Pesticides (DDT, DDE, DDD), Dioxins	Predesign; PD completion planned Summer 1992 as soon as Consent Decree approved	PRP lead/Federal oversight	John Prince 212-264-1213 FTS-264-1213
2	Signo Trading/Mt. Vernon, NY Emergency Response (Action Memo signed 12/19/86)	Dechlorination	Waste Management Facility Warehouse	Sludge (15 gallons)	Dioxins (2,3,7,8-TCDD-Laden Herbicides)	Completed; Operational 10/20/87 (see Table 4)	Federal lead/Fund financed; Galson Research Corp. (subcontractor to OHM)	Charles Fitzsimmons 201-321-6608 FTS-340-6608
2	Wide Beach Development, NY (09/30/85)	Dechlorination with APEG	Contaminated road dust, driveways, ditches	Soil (40,000 cy)	PCBs	Completed; Operational 10/90 to 6/91 (see Table 4)	Federal lead/Fund financed; Soiltech Inc. (subcontractor to Kimmins)	Herb King 212-264-1129 FTS-264-1129
3	Saunders Supply Co, OU1, VA (09/30/91) See also Thermal Desorption	Dechlorination	Wood preserving	Sludge (700 cy)	Dioxins (TCDD equivalents)	Predesign, PD completion planned Spring 1992	Federal lead/Fund financed	Andy Palestini 215-597-1286 FTS-597-1286
4	Smith's Farm Brooks,* KY (09/30/91)	Dechlorination	Drum storage/ disposal	Soil (16,000 cy)	PCBs, PAHs (Carcinogenic)	In design; Design completion planned Spring 1992	PRP lead/Federal oversight	Tony DeAngelo 404-347-7791 FTS-257-7791
4	Arlington Blending & Packaging Co., OU1*, TN (06/28/91) See also Thermal Desorption	Dechlorination of residuals from thermal desorption	Pesticide manufacturing/ use/storage, Other organic chemical manufacturing	Liquid (Residuals from thermal desorption)	VOCs (DCE), SVOCs (PCP), Pesticides (Chlordane, heptaclor)	Predesign, PD completion planned Winter 1992	PRP lead/Federal oversight	Derek Matory 404-347-7791 FTS-257-7791
6	Fruitland Drum, NM Emergency Response (Action Memo signed 09/08/90)	Dechlorination with BCD	Operation/ maintenance facility, site not on NPL	Liquids (3 drums of waste product, 150 gallons)	VOCs, Pesticides, Dioxins (2,4,5,T), PAHs	In planning stage, schedule uncertain	Federal lead/Fund financed	Craig Carlton 214-655-2270 FTS-255-2270

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Dechlorination
(continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status #	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
6	Tenth Street Dump/Junkyard,* OK (09/27/90)	Dechlorination	Salvage and industrial waste dump	Soil (10,000 cy)	PCBs	In design; Remedy is being reevaluated due to results of RD, there is too much debris	Federal lead/Fund financed	Noel Bennett 214-655-6715 FTS-255-6715
6	Sol Lynn/Industrial Transformers,* TX (03/25/88)	Dechlorination with APEG	Transformer and solvent recycler	Soil (800 cy), Sludge ((oil) 400 gallons)	PCBs	Operational; Remedy one quarter done but being rethought as the technology is not effective for this waste, soil has a lot of clay	PRP lead/Federal oversight; Galson Research (sub-contractor to ENSR Consulting)	John Meyer 214-655-6735 FTS-255-6735
7	Crown Plating, MO Emergency Response (Action Memo signed 08/29/89)	Dechlorination	Electroplating	Liquid (5 gallons)	Pesticides (Silvex; 2,4,5 TP)	Completed; Operational 10/89 to 12/89 (see Table 4)	Federal lead/Fund financed	Mark Roberts 913-236-3881 FTS-757-3881

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In Situ Flushing

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status #	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
2	Lipari Landfill,* NJ (09/30/85)	Soil flushing Flushing of area within the slurry wall, including soil and wastes	Industrial landfill, Municipal landfill	Soil (650,000 cy, 16 acres to 15 ft deep)	VOCs (Bis-2-chloro-ethylether, DCA, dichloromethane), SVOCs (Phenol), Metals (Chromium, Lead, Nickel, Mercury)	Operational; Completion planned 1999	State lead/Fund financed; Bechtel Environmental, Inc.	Fred Cataneo 212-264-9542 FTS-264-9542
2	Naval Air Engineering Center, OU1, NJ (02/04/91)	Soil Flushing (reinject treated gw through trenches (winter) & spray irrigation (summer) with capture downgradient)	Federal Facility	Soil (approximately 2 acres, to 4 feet deep)	VOCs	Operational, Completion planned Summer 1995. Reinjection will continue for 3 years and be evaluated.	Federal facility U.S. Navy lead; Moretrench Environmental	Jeff Gratz 212-264-6667 FTS-264-6667
2	Naval Air Engineering Center, OU2, NJ (02/04/91)	Soil Flushing (reinject treated gw through trenches (winter) & spray irrigation (summer) with capture downgradient)	Federal Facility	Soil (2 acres, to 4 feet deep)	VOCs	Being installed, to be finished Fall 1992. This technology will be applied for three years and evaluated.	Federal facility U.S. Navy lead; Moretrench Environmental	Jeff Gratz 212-264-6667 FTS-264-6667
2	Naval Air Engineering Center, OU4, NJ (02/04/91)	Soil Flushing (reinject treated gw through trenches (winter) & spray irrigation (summer) with capture downgradient)	Federal Facility	Soil (2 acres, up to 4 feet deep)	VOCs	Being installed, to be finished Fall 1992. This technology will be applied for three years and evaluated.	Federal facility U.S. Navy lead; Moretrench Environmental	Jeff Gratz 212-264-6667 FTS-264-6667
2	Vineland Chemical, OU1 and OU2, NJ (09/29/89) See also Soil Washing	Soil flushing Flushing lagoons using treated gw	Pesticide manufacturing/ use/storage	Soil (126,000 cy, to 15 ft in sandy soil)	Metals (Arsenic)	In design; Design completion planned Spring 1993	Federal lead/Fund financed	Matthew Westgate 212-264-3406 FTS-264-3406 Steve Hadel (USACE-Kansas City) 816-426-5221 FTS-867-5221

Status as of February 1992.

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TABLE 3
DETAILED SITE INFORMATION BY TREATMENT TECHNOLOGY

April 1992

In Situ Flushing

(continued)

Region	Site Name, State, (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)	Soil flushing	Drum storage/ disposal	Soil (5,200 cy)	VOCs (TCE, DCE, TCA), SVOCs (Methyl Ethyl Ketone), Metals (Chromium, Lead)	Predesign; PD completion planned Spring 1992	PRP lead/Federal oversight	Eduardo Gonzales 212-264-5714 FTS-264-5714
3	L.A. Clarke & Sons, OU1 (Soils),* VA (03/31/88) See also, Bioremediation In Situ	Soil flushing with surfactants, after creosote recovery and before in situ bioremediation	Wood preserving	Soil (15,000 cy, maximum depth 8 - 10 ft)	VOCs (Benzene), PAHs (Creosote, Carcinogenic)	Predesign; PD completion planned Fall 1992	PRP lead/Federal oversight	Eugene Wingert 215-597-1727 FTS-597-1727
3	U.S. Titanium, VA (11/21/89)	Dissolution of wastes (EPA is considering excavation and ex situ dissolution of wastes)	Titanium oxide production from ore digested with sulfuric acid	Soil (16,000 cy, to 25 ft deep), Solids (16,000 cy ferrous sulfate)	Inorganics (Ferrous Sulfate)	Predesign; PD completion planned Summer 1992	PRP lead/State oversight	Darius Ostrausuas 215-597-1727 FTS-597-1727 Tim Longe (VA) 804-225-3258
4	Ciba-Geigy Corp. (MacIntosh Plant), AL (09/30/91) See also Thermal Desorption	Soil flushing (to be evaluated in treatability study)	Pesticide manufacturing/ use/storage	Soil (as needed, greater than 20 ft deep)	Pesticides	Predesign	PRP lead/Federal oversight	Charles Kane 404-347-2643 FTS-257-2643
4	JADCO-Hughes, NC (09/27/90) See also Soil Vapor Extraction	Soil flushing (preceded by vacuum extraction from same ports)	Plastics manufacturing, Chemical manufacturing, Drum storage/ disposal, Solvent recycling	Soil (6,000 cy)	VOCs (TCE, Vinyl chloride, Carbon tet., Chloroform, BTX), SVOCs (Dichlorobenzene, Trichlorobenzene)	In design; Design completion planned Fall 1992; The horizontal wells used for SVE will become ports for flushing	PRP lead/Federal oversight	Barbara Benoy 404-347-7791 FTS-257-7791 Bruce Nicholson (NC) 919-733-2801
5	Ninth Avenue Dump, IN (06/30/89)	Soil flushing	Industrial landfill	Soil (64,000 cy, maximum depth 30 ft)	VOCs (TCE, BTEX)	In design; Design completion planned Winter 1993	PRP lead/Federal oversight; Fluor-Daniel	Bernard Schorle 312-886-4746 FTS-353-6417
5	Rasmussen Dump, MI (03/28/91)	Soil flushing (flushing part of reinjection of treated gw)	Industrial landfill; Paint/ink formation	Soil (quantity unknown, gw table at 50 ft)	VOCs (Vinyl chloride, Benzene)	In design; Design completion planned 1994	State lead/FUND financed	Ken Glatz 312-886-1434 FTS-886-1434

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In Situ Flushing
(continued)

Region	Site Name, State, (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) See also Soil Washing	Soil flushing with the same surfactants used for the soils treated with soil washing	Wood preserving	Soil (20,000 cy)	SVOCs (Benzo(a)pyrene, Benzo(a)anthracene, Chrysene), PAHs	In design; Design completion planned Summer 1994	PRP lead/Federal oversight	Mark Fite 214-655-6715 FTS-255-6715
7	Lee Chemical, MO (03/21/91)	Soil flushing	Solvent manufacturer/ packing	Soil (from 10 to 20 ft deep)	VOCs (TCE, DCE, PCE, TCA)	Predesign; PD completion planned Spring 1992	PRP lead/State oversight	Gene Gunn 913-551-7776 FTS-276-7776 Jim Kavanaugh (MO) 314-751-4029
9	Poly-Carb, NV Emergency Response Action Memo signed (05/14/87) See also, Bioremediation Ex Situ	Soil flushing followed by in situ bioremediation	Commercial waste management	Soil (1,500 cy)	SVOCs (Phenols), PAHs (Cresol)	Completed; Operational 7/87 to 8/88 (see Table 4)	Federal lead/Fund financed; Reidel Environmental Services	Bob Mandel 415-744-2290 FTS-484-2290
10	Union Pacific Railroad Sludge Pit, ID (09/10/91)	Soil flushing	Railroad operations, cleaning, and fueling	Soil (quantity unknown)	PAHs (Petroleum Hydrocarbons)	Predesign; PD completion planned Spring 1993	PRP lead/Federal oversight	Anne Williamson 206-553-2739 FTS-399-2739
10	United Chrome Products,* OR (09/12/86)	Soil flushing	Chrome plating facility	Soil (quantity not available)	Metals (Chromium)	Operational; Operations began Summer 1988	Federal lead/Fund financed; CH2MHill and subcontractors	Loren McPhillips 206-553-4903 FTS-399-4903

Status as of February 1992.

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

In Situ Vitrification

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status #	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
5	Ionia City Landfill,* MI (09/29/89)	In situ vitrification	Municipal landfill	Soil with debris (5,000 cy, to 15 ft deep)	VOCs (Methylene chloride, TCA, Styrene, Toluene), Metals (Lead)	In design; Design completion planned Summer 1994	PRP lead/Federal oversight	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)	Pesticides, Dioxins, Metals (Mercury)	Design completed but not installed, Completion planned Summer 1993; Waste has been staged; Treatment postponed temporarily	Federal lead/Fund financed; Geosafe Corp.	Len Zentack 312-886-4246 FTS-886-4246
8	Rocky Mountain Arsenal, OU 16, CO (02/26/90)	In situ vitrification	Federal facility	Soil (4,600 cy, to 10 ft deep), Sludge (5,800 cy, to 10 ft deep)	Pesticides, Metals (Arsenic, Mercury)	In design; Design completion planned 1993; On hold pending reentry of vendor into the market	Federal facility U.S. Army lead	Connally Mears 303-293-1528 FTS-330-1528
8	Wasatch Chemical,* UT (03/29/91) See also, Bioremediation Ex Situ	In situ vitrification	Pesticide manufacturing/ use/storage, Chemical manufacturing,	Soil (3,600 cy combined, to 5 ft deep), Sludge, Solids (drain pipes, etc.)	SVOCs (Hexachlorobenzene, PCP), Pesticides, Dioxins	Predesign; PD completion planned Summer 1992	PRP lead/Federal oversight	Bert Garcia 303-293-1526 FTS-330-1526

Status as of February 1992.

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

Soil Vapor Extraction

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status #	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
1	Kellogg-Deering Well Field, CT (09/29/89)	Soil vapor extraction	Solvent recovery facility, Industry cluster	Soil (quantity not available)	VOCs (TCE, PCE, DCE, TCA, DCA, Vinyl Chloride, BTEX)	In design; Design completion planned Winter 1993	PRP lead/Federal oversight; GZA Geoenvironmental	Leslie McVickar 617-573-9689 FTS-833-1689
1	Groveland Wells,* MA (09/30/88)	Soil vapor extraction	Manufacturing	Soil (19,000 cy to 25 - 30 ft deep)	VOCs (TCE, Methylene Chloride, DCE)	In design; Design completion planned Fall 1992	PRP lead/Federal oversight; Terra Vac, Inc.	Bob Leger 617-573-5734 FTS-883-1734
1	Silresim,* MA (09/19/91)	Soil vapor extraction	Chemical waste reclamation	Soil (137 cy)	VOCs (TCE, TCA, Carbon Tetrachloride, Chloroform, Styrene)	Predesign; PD completion planned Summer 1992	Still in negotiations	Leslie McVickar 617-573-9689 FTS-833-1689
1	Wells G&H, MA (09/14/89)	Soil vapor extraction with air flushing	Inorganic/ organic pigments, Drum storage/ disposal	Soil (7,400 cy, to 3 ft deep)	VOCs (PCE, TCE)	Predesign; PD completion planned Summer 1992	PRP lead/Federal oversight	Barbara Newman 617-573-5736 FTS-833-1736
1	Mottolo Supply, NH (03/29/91)	Soil vapor extraction with horizontal wells	Uncontrolled waste site	Soil (3,400 cy)	VOCs (TCE, TCA, Vinyl Chloride, DCA, DCE, Toluene, Ethylbenzene)	Predesign; PD completion planned Spring 1992	Still in negotiation	Roger Duwart 617-573-9628 617-833-1628
1	South Municipal Water Supply Well,* NH (09/27/89) See also Other Technologies	Soil vapor extraction (with air sparging of gw)	Solvent recovery facility, Ball bearing manufacturing	Soil (7,500 cy)	VOCs (PCE, TCA, TCE)	In design; Design completion planned Summer 1992	PRP lead/Federal oversight	Roger Duwart 617-573-9628 FTS-833-1628
1	Tinkham Garage,* NH (09/30/86)	Soil vapor extraction	Industrial landfill, Drum storage/ disposal	Soil (9,000 cy)	VOCs (Chloroform, DCE, Vinyl Chloride, Benzene)	In design; Design completion planned Spring 1992	PRP lead/Federal oversight; Terra Vac, Inc.	Diana King 617-573-9676 FTS-833-1676
1	Stamina Mills, RI (09/28/90)	Soil vapor extraction	Textile manufacturing	Soil (6,000 cy, to 12 ft deep)	VOCs (DCE, TCE)	Predesign; PD completion planned Fall 1993	PRP lead/Federal oversight	Neil Handler 617-573-9636 FTS-833-1636
2	A O Polymer, Soil Treatment Phase, NJ (06/28/91)	Soil vapor extraction (vapors to carbon adsorption)	Polymer manufacturing	Soil (7,500 cy, to 30 ft deep)	VOCs (TCE, TCA, Trichlorofluoromethane, Toluene, Ethylbenzene), SVOCs (Naphthalene, 4-Methylphenol)	Predesign; PD completion planned Summer 1992	Still in negotiation	Rich Puvogel 212-264-9836 FTS-264-9836

Status as of February 1992.

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Soil Vapor Extraction

(continued)

Region	Site Name, State, (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 (09/26/89) See also Bioremediation In Situ	Soil vapor extraction	Jet fuel tank farm	Soil (2 acres, 10 to 12 ft deep)	VOCs, SVOCs (Chlorophenol, Phenol), PAHs	Design complete, going to bid in April w/contract award in late summer	Federal Facility FFA Lead	Carla Struble 212-264-4595 FTS-264-4595 Keith Buch (FAA) 609-484-6644
2	Garden State Cleaners, NJ (09/26/91)	Soil vapor extraction	Dry cleaners	Soil (200 cy, to 25 ft deep)	VOCs (PCE)	In design; Design completion planned Spring 1993	Federal lead/Fund financed; USACE project	Sharon Acheson 212-264-1217 FTS-264-1217
2	South Jersey Clothing, NY (09/26/91)	Soil vapor extraction	Dry cleaners, clothing manufacturer	Soil (1,400 cy, to 25 ft deep)	VOCs (TCE)	In design; Design completion planned Spring 1993	Federal lead/Fund financed; USACE project	Sharon Acheson 212-264-1216 FTS-264-1217
2	Swope Oil & Chem Co., OU2, NJ (09/27/91) See also Bioremediation In Situ	Soil vapor extraction with bioventing	Chemical reclamation	Soil (2 acres, to a depth of 80 ft)	VOCs (TCE, PCE, Toluene, Ethylbenzene, Xylene)	Predesign; PD completion planned 1992	Still in negotiation	Joseph Gowers 212-264-5386 FTS-264-5386
2	Applied Environmental Services, OU1, NY (06/24/91) See also Bioremediation (In Situ)	Soil vapor extraction	Petroleum reuse	Soil (quantity unknown)	VOCs, SVOCs	Predesign; PD completion planned 1992	PRP lead/State oversight	Andrew Anglish (NY) 518-457-5637
2	Circuitron Corporation, OU1, NY (03/29/91)	Soil vapor extraction	Electroplating	Soil (800 sq ft to a depth of 30 ft)	VOCs (TCA, PCE, TCE, DCA)	Predesign; PD completion planned Summer 1992	Federal lead/Fund financed	Miko Fayon 212-264-4706 FTS-264-4706
2	Genzale Plating Company, OU1, NY (03/29/91)	Soil vapor extraction (precedes excavation for solidification)	Electroplating	Soil (275 cy, to a depth of 30 ft)	VOCs (TCE, TCA)	In design; Design completion planned Fall 1992	Federal lead/Fund financed	Janet Cappelli 212-264-8679 FTS-264-8679
2	Mattiace Petrochemicals Company, OU1, NY (06/27/91)	Soil vapor extraction	Solvent recycling Organic chemicals blending	Soil (17,000 cy, to 40 ft deep)	VOCs (PCE, TCE, Benzene, Xylene)	Predesign; PD completion planned Spring 1992	Federal lead/Fund financed	Edward Als 212-264-0522 FTS-264-0522

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Soil Vapor Extraction

(continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status #	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
2	SMS Instruments (Deer Park), NY (09/29/89)	Soil vapor extraction with vapors to catalytic combustor	Military aircraft component overhauler	Soil (1,250 cy to 25 ft deep)	VOCs (TCE, Dichlorobenzene)	Being installed; Completion planned Spring 1992	Federal lead/Fund financed; Four Seasons	Miko Fayon 212-264-4706 FTS-264-4706
2	Solvent Savers, NY (09/30/90) See also Thermal Desorption	Soil vapor extraction	Solvent and chemical reclamation facility	Soil (to 40 ft deep)	VOCs (DCE, TCE)	Predesign; PD completion planned Summer 1992	PRP lead/Federal oversight	Lisa Wong 212-264-0276 FTS-264-0276
2	Vestal Water Supply 1-1, NY (09/27/90)	Soil vapor extraction	2 acres within industrial park	Soil (both areas = 25,000 cy, to 28 ft deep)	VOCs (DCA, TCA, TCE, DCE)	Predesign; PD completion planned Spring 1992	Area 2 - Fund lead; Area 4 - PRP lead	Ed Als 212-264-0522 FTS-264-0522
2	Upjohn Manufacturing Co., PR (09/30/88)	Soil vapor extraction	Industrial facility, chemical leak	Soil (quantity not available)	VOCs (Carbon Tetrachloride, Acetonitrile)	Completed Operational 1984-1988 (see Table 4)	PRP lead/Federal oversight; Terra Vac	Alison Hess 212-264-6040 FTS-264-6040
3	Bendix, PA (09/30/88)	Soil vapor extraction with air flushing	Aircraft instrumentation manufacturing	Soil (33,000 cy, to 10 ft deep)	VOCs (PCE, TCE, Vinyl Chloride)	Predesign; PD completion planned Summer 1992	PRP lead/Federal oversight	Humane Zia 215-597-0913 FTS-597-0913
3	Cryochem, OU3, PA (09/30/91)	Soil vapor extraction	Machine shops	Soil (70 cy, up to 4 ft deep)	VOCs (TCA, TCE, PCE, DCA)	In design; Design completion planned Winter 1992	Federal lead/Fund financed	Lisa Nichols 215-597-3216 FTS-597-3216
3	Henderson Road,* PA (06/30/88)	Soil vapor extraction with air flushing (treating unsaturated soil and bedrock)	Injection well	Soil (20,000 sq ft, to 100 ft deep)	VOCs (DCA, TCA, Toluene)	Operational; completion date unknown	PRP lead/Federal oversight; RT Environmental System	Michael Towle 215-597-8309 FTS-597-8309
3	Lord-Shope Landfill,* PA (06/29/90)	Soil vapor extraction (method to be determined in design)	Industrial landfill	Soil (270,000 cy, to 30 ft deep)	VOCs (PCE, TCE, Vinyl Chloride, Alcohols, n-Butanol), SVOCs (Ketones)	In design; Design completion planned Winter 1993	PRP lead/Federal oversight	Jim Feeney 215-597-8257 FTS-597-8257
3	Tyson's Dump,* PA (03/31/88)	Soil vapor extraction with air flushing (system has been modified during operations)	Industrial landfill	Soil (30,000 cy with some DNAPL, to 30 ft deep)	VOCs (Benzene, Toluene, Xylene), SVOCs (Trichloropropane)	Operational; completion date unknown	PRP lead/Federal oversight; Terra Vac	Eugene Dennis 215-597-8555 FTS-597-8555

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Soil Vapor Extraction
(continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status #	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
3	Arrowhead Associates/Scovill, OU1, VA (09/30/91)	Soil vapor extraction with air flushing	Electroplating	Soil (1,000 cy, depth unknown)	VOCs (TCE, PCE)	Predesign; PD completion planned Fall 1992	PRP lead/Federal oversight	Phil Rotstein 215-597-9023 FTS-597-9023
4	Robins AFB, Landfill and Sludge Lagoon, OU1, GA (06/28/91)	Soil vapor extraction	Federal facility, Sludge from an industrial wastewater treatment plant	Soil (15,000 cy, combined, to 8 ft deep), Sludge	VOCs (TCE, PCE, Vinyl Chloride, Carbon Tetrachloride)	Predesign; PD completion planned Summer 1992	Federal Facility, U.S. Air Force lead	Roseanne Rudd 404-347-7791 FTS-257-7791
4	Charles Macon Lagoon, OU1, NC (09/30/91)	Soil vapor extraction w/air flushing	Petroleum refining and reuse	Soil (1,300 cy) Sludge	VOCs (PCE)	Predesign; PD completion planned Fall, 1992	PRP lead/Federal Oversight	Jack Butler 919-733-2801
4	JADCO-Hughes, NC (09/27/90) See also In Situ Flushing	Soil vapor extraction with horizontal wells (followed by in situ flushing with same ports)	Plastics manufacturing, Other organic chemical manufacturing, Other inorganic chemical manufacturing, Drum storage/ disposal	Soil (6,000 cy)	VOCs (Carbon tet., Chloroform, Vinyl Chloride, TCE, BTX), SVOCs (Dichlorobenzene, Trichlorobenzene)	In design; Design completion planned Fall 1992	PRP lead/Federal oversight	Barbara Benoy 404-347-7791 FTS-257-7791 Bruce Nicholson (NC) 919-733-2801
4	Hinson Chemical, SC Emergency Response (Action Memo signed 11/28/88)	Soil vapor extraction with air flushing	Solvent recycling	Soil (60,000 cy, to 50 ft deep)	VOCs (DCA, TCE, PCE, MEK, Benzene, Toluene)	Completed (see Table 4)	Federal lead/Fund financed, OHM Corp.	Fred Stroud 404-347-3931 FTS-257-4464
4	Medley Farm, OU1, SC (05/29/91)	Soil vapor extraction	Other organic chemical manufacturing, Rubber manufacturing, Drum storage/ disposal	Soil (50,000 cy, maximum depth 60 ft)	VOCs (DCA, DCE, TCA, Benzene, Toluene), SVOCs (Phthalates)	Predesign; The design is planned for completion in Summer 1993.	PRP lead/Federal oversight	Ralph Howard 404-347-7791 FTS-257-7791 Richard Haynes (SC) 803-734-5487

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Soil Vapor Extraction

(continued)

Region	Site Name, State, (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)	Soil vapor extraction	Drum storage/ disposal, Solvent recovery facility	Soil (45,000 cy, to 12 ft deep)	VOCs (TCA, TCE, PCA, PCE, DCA, DCE, BTEX), SVOCs (Chlorobenzene, Methyl Ethyl Ketone)	In design; Design completion planned Fall 1992	PRP lead/Federal oversight	Steve Sandler 404-347-7791 FTS-257-7791
5	Acme Solvent Reclaiming, Inc., OU2, IL (12/31/90) See also Thermal Desorption	Soil vapor extraction with air flushing	Industrial landfill, solvent recycling	Soil (quantity unknown)	VOCs (DCA, TCA, DCE, TCE, PCE, Vinyl Chloride, Benzene)	Predesign; PD completion planned Fall 1993	PRP lead/Federal oversight; Geo Syntec	Dennis Dalga 312-886-5116 FTS-886-5116
5	Enviro. Conservation and Chemical (ROD Amendment), IN (06/07/91)	Soil vapor extraction with air flushing	Industrial landfill, solvent recyling	Soil (quantity unknown)	VOCs (Toluene, Ethylbenzene, Xylene), SVOCs (Dichlorobenzene, Phenol), Organics (BNAs)	Predesign	PRP lead/Federal oversight	Karen Vendl 312-886-4739 FTS-886-4739
5	Fisher Calo Chem, IN (08/07/90)	Soil vapor extraction	Solvent recycling	Soil (29,500 cy)	VOCs (PCE, DCA, TCA)	In design; Design completion planned Fall 1993	Federal lead/Fund financed	Brad Bradley 312-886-4742 FTS-886-4742
5	MIDCO I, IN (06/30/89)	Soil vapor extraction	Industrial landfill	Soil (10,000 cy, 4 - 8 feet deep)	VOCs (TCE, Dichloromethane, Butanone, BTX), SVOCs (Chlorobenzene, Phenols), PAHs	Predesign; PRPs have agreed to conduct design; Consent Decree will be finalized in April 1992.	PRP lead/Federal oversight	Richard Boice 312-886-4740 FTS-886-4740
5	Main Street Well Field, IN (03/29/91)	Soil vapor extraction with air flushing	Water supply contamination from many sources	Soil (22,000 cy, to 10 ft deep)	VOCs (TCE)	Predesign; PD completion planned Fall 1992; Consent Decree is expected in Fall 1992	PRP lead/Federal oversight	Cindy Nolan 312-886-0400 FTS-886-0400
5	Seymour Recycling,* IN (09/30/87) See also Bioremediation In Situ	Soil vapor extraction (No need for emissions treatment)	Chemical waste management and incineration	Soil (approximately 200,000 cy, 12 acres to 10 ft deep)	VOCs (TCA, Carbon tet., PCE, TCE, Vinyl Chloride, Benzene)	Operation to begin in April 1992; Completion planned Spring 1994;	PRP lead/Federal oversight; Canonie Engineering (installation), Geraghty & Miller (operation)	Jeff Gore 312-886-6552 FTS-886-6552

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TABLE 3
DETAILED SITE INFORMATION BY TREATMENT TECHNOLOGY

April 1992

Soil Vapor Extraction
(continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status #	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
5	Wayne Waste Reclamation, IN (03/30/90)	Soil vapor extraction with air flushing	Municipal landfills, Oil reclamation	Soil (300,000 cy, 10 acres to 20 ft deep)	VOCs (TCE, DCE, Vinyl Chloride, BTEX)	Predesign; PD completion planned Spring 1992	PRP lead/Federal oversight	Tinka Hyde 312-886-9296 FTS-886-9296
5	Chem Central, MI (09/30/91)	Soil vapor extraction	Chemical packaging and distribution	Soil (6,200 cy to 8 ft deep)	VOCs (DCE, TCE, TCA, BTEX), SVOCs (Naphthalene, 2-Methyl Naphthalene)	Predesign; PD completion planned Summer 1994	PRP lead/Federal oversight	Mike McAteer 312-886-4663 FTS-886-4663
5	Kysor Industrial,* MI (09/29/89)	Soil vapor extraction	Machine shops, Truck parts manufacturing	Soil (13,200 cy)	VOCs (TCE, Xylene, Toluene, Ethylbenzene)	In design; Design completion planned Summer 1993	PRP lead/Federal oversight	Mary L. Gustafson 312-886-6144 FTS-886-6144
5	Springfield Township Dump, MI (09/29/90)	Soil vapor extraction with air flushing	Industrial landfill	Soil (100,000 cy)	VOCs (TCE, TCA, Butanone, Toluene), SVOCs (Chlorobenzene)	Predesign; PD completion planned Fall 1992	PRP lead/Federal oversight	Mary Lou Martin 312-353-6284 FTS-353-6284
5	Sturgis Municipal Well Field, MI (09/30/91)	Soil vapor extraction with air flushing	Municipal Water Supply	Soil (area and depth unknown, < 200 ft deep)	VOCs (TCE, PCE, TCA)	Predesign; PD completion planned 1993	Federal lead/Fund financed	Terese Van Donsel 312-353-6564 FTS-353-6564
5	ThermoChem, Inc. OU1, MI (09/30/91)	Soil vapor extraction with air flushing (may include biological enhancement)	Solvent recycling	Soil (50,000 cy, 17 ft - 32 ft deep)	VOCs (PCE, TCE, Ethylbenzene, Xylene)	Predesign; A schedule is not included because EPA is negotiating with PRPs	In negotiations	Jae Lee 312-886-4749 FTS-886-4749
5	Verona Well Field (Thomas Solvent/Raymond Road),* MI (08/12/85)	Soil vapor extraction (attempted nitrogen sparging)	Solvent recycling	Soil (35,000 cy, 1/2 acre to 18 ft deep)	VOCs (Dichloromethane, Chloroform, Carbon Tet., DCA, TCA, BTEX, Vinyl Chloride), SVOCs (Napthalene)	Operational; Completion planned Spring 1992; Tried nitrogen sparging to improve removal above gw; It increased removal but at a very high cost	Federal lead/Fund financed; Terra Vac, Inc. (subcontractor to CH2M Hill)	Margaret Guerriero 312-886-0399 FTS-886-0399
5	Verona Well Field, OU2, MI (06/28/91)	Soil vapor extraction (air flushing is being considered)	Machine shops, Solvent recycling	Soil (30,000 cy)	VOCs (PCE, TCA, Toluene)	Predesign; PD completion planned Spring 1993.	Federal lead/Fund financed	Margaret Guerriero 312-886-0399 FTS-886-0399

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Soil Vapor Extraction
(continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status #	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
5	Long Prairie Groundwater Contamination, MN (06/27/88)	Soil vapor extraction followed by GAC for off gases	Dry cleaners	Soil (3,600 cy, to 15 ft deep)	VOCs (DCE, PCE, TCE, Vinyl Chloride)	Design completed but not installed; Cleanup contract scheduled for award shortly	State lead/Fund financed	Jan Bartlett 312-886-5438 FTS-886-5438 Cindy Kahrmann (MN) 612-296-7775
5	Miami County Incinerator, OH (06/30/89)	Soil vapor extraction with air flushing	Municipal landfills, Surface impoundment	Soil (98,000 cy, combined), Solids	VOCs (TCE, PCE, Toluene)	Predesign	PRP lead/Federal oversight	Anthony Rutter 312-886-8961 FTS-886-8961
5	Pristine (Amendment), OH (03/30/90)	Soil vapor extraction with horizontal wells	Industrial landfill, Drum storage/ disposal	Soil (quantity unknown, 4 - 12 ft deep)	VOCs (Chloroform, DCA, PCE, TCE, Benzene), SVOCs (Phenol)	In design; Design completion planned Summer 1993	PRP lead/Federal oversight; Hydrogeo-Chem	Thomas Alcamo 312-886-7278 FTS-886-7278
5	Zanesville Well Field, OH (09/30/91) See also Soil Washing	Soil vapor extraction with horizontal wells	Municipal Water Supply, Auto parts manufacturing	Soil (36,000 cy)	VOCs (TCE, DCE)	Predesign; PD completion planned Fall 1992; EPA is negotiating with the PRP; Consent Decree expected in Fall 1992	PRP lead/Federal oversight	Dave Wilson 312-886-1476 FTS-886-1476
5	Hagen Farm, WI (09/17/90)	Soil vapor extraction	Industrial and municipal waste disposal	Soil (24,000 cy, to 18 ft deep)	VOCs (Vinyl Chloride, Butanone, Tetrahydrofuran, BTEX)	In design; Design completion planned Winter 1992; Pilot test scheduled for February 1992	PRP lead/Federal oversight	Jae Lee 312-886-4749 FTS-886-4749 Don DiGiulio (RSKERL) 405-332-8800 FTS-743-2011
5	Wausau Groundwater Contamination, WI (09/29/89)	Soil vapor extraction	Machine shops, Bulk chemical distribution	Soil (1,300 cy)	VOCs (TCE, DCE, PCE)	In design; Design completion planned Summer 1992	PRP lead/Federal oversight; Hydrogeo-Chem (subcontractor to Conestoga-Rovers & Associates)	Margaret Guerriero 312-886-0399 FTS-886-0399
6	South Valley, NM (09/30/88)	Soil vapor extraction	Aircraft engine manufacturing	Soil (to 20 ft deep)	VOCs (PCE, TCE, DCE, TCA)	Being installed; Installation to be completed Summer 1992	PRP lead/Federal oversight	Bill Luthers 214-655-6735 FTS-255-6735

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Soil Vapor Extraction
(continued)

Region	Site Name, State, (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)	Soil vapor extraction	Maintenance facility for aircraft	Soil (quantity not available)	VOCs (BTEX)	In design; Design completion planned Fall 1992	Federal Facility, Air Force lead	Susan Webster 214-655-6730 FTS-255-6730 Capt. Dan Welch (USAF) 405-734-3058
6	Petro-Chemical Systems, Inc., OU2, TX (09/06/91) See also Other Technologies	Soil vapor extraction with air flushing and air sparging (gw)	Petroleum refining and reuse	Soil (300,000 cy, to 30 ft deep)	VOCs (BTEX), SVOCs (Naphthalene), Metals (Lead)	Predesign, PD completion planned Fall 1992	PRP lead/Federal oversight	Chris Villareal 214-655-6735 FTS-255-6735
7	Hastings GW Contamination (Colorado Ave),* NE (09/28/88)	Soil vapor extraction (considering heat enhancement)	Industrial metal finishing/ cleaning	Soil (42,700 cy)	VOCs (PCE, TCE, DCE, TCA)	In design; Design completion planned Fall 1992	PRP lead/Federal oversight	Darrel Sommerhauser 913-551-7711 FTS-276-7711 Richard Schlenker (NE) 402-471-3388
7	Hastings GW Contamination (Far-Mar Co.),* NE (09/30/88)	Soil vapor extraction	Former grain storage area (fumigants)	Soil (targeting layers at 35 ft and 110 ft)	VOCs (Carbon Tetrachloride, Ethylene Dibromide)	In design; Design completion planned Fall 1992; EPA is negotiating the Consent Decree for remedial action	PRP lead/Federal oversight	Susan Hoff 913-551-7786 FTS-276-7786
7	Hastings GW Contamination, Well No. 3,* NE (09/26/89)	Soil vapor extraction	Former grain storage area (fumigants)	Soil (approximately 130,000 cy; 100 ft radius, up to 110 ft deep)	VOCs (Carbon Tetrachloride, Chloroform)	Being installed; Installation to be completed Summer 1992	Federal lead/Fund financed; Morrison Knudsen	Diane Easley 913-551-7797 FTS-276-7797 Steve Roe (Morrison Knudsen) 303-793-5054
7	Lindsay Manufacturing, NE (09/28/90)	Soil vapor extraction	Electroplating galvanized pipes for irrigation systems	Soil (targeting soil 25 - 40 ft deep)	VOCs (DCA, DCE, TCE, PCE)	Predesign; PD completion planned Summer 1992; Consent Decree not yet finalized; schedule is not yet set	PRP lead/Federal oversight	Cecelia Tapia 913-551-7733 FTS-276-7733

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Soil Vapor Extraction

(continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status #	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
7	Waverly Groundwater Contamination, NE (09/26/90)	Soil vapor extraction	Grain storage area (fumigants)	Soil (approximately 200,000 cy; 5 acres, 20 to 30 ft deep)	VOCs (Carbon Tetrachloride, Chloroform)	Operational; Completion planned 2001; Project began in February 1988	Federal facility USDA lead	Gene Gunn 913-551-7776 FTS-276-7776 Jim Hallett (USDA) 202-690-0715 Mary Hansen (Argonne National Lab) 708-972-4938
8	Chemical Sales Company, OU1,* CO (06/27/91)	Soil vapor extraction with air flushing (will recirculate treated emissions)	Chemical sales and distribution, spillage at tank farm	Soil (360,000 cy, to 35 ft deep)	VOCs (PCE, TCE)	In design; Design completion planned Spring 1993	PRP lead/Federal oversight	Jim Berkley 303-293-1817 FTS-330-1817
8	Martin Marietta (Denver Aerospace), CO (09/24/90) See also Thermal Desorption	Soil vapor extraction	Aerospace equipment manufacturer - Bulk storage facility and industrial landfill	Soil (less than 1 acre, depth unknown)	VOCs (TCE)	Predesign; PD completion planned Winter 1992	State lead under RCRA	George Dancik 303-293-1506 FTS-330-1506 Susan Chaki 303-331-4832
8	Rocky Mountain Arsenal, (OU18), CO (02/26/90)	Soil vapor extraction	Federal facility	Soil (4,000 cy at 20 ft and 45 ft)	VOCs (TCE)	In design; Design completion planned Fall 1992; Report from pilot study due March, 1992.	U.S. Army (PRP) lead	Connally Mears 303-293-1528 FTS-330-1528
8	Sand Creek Industrial (OU1),* CO (09/29/89)	Soil vapor extraction	Pesticide manufacturing/ use/storage, Refinery	Soil (>100,000)	VOCs (TCE, PCE, Methylene Chloride, Chloroform	In design; Design completion planned fall, 1993	Federal lead/Fund financed; URS	Erna Acheson 303-294-1719 FTS-330-1719
9	Indian Bend Wash, South Area, OU1, AZ (09/12/91)	Soil vapor extraction may vary technology at different facilities within area	Dry cleaners, Electroplating, Industrial landfill, Municipal landfills	Soil (maximum depth - 90 ft)	VOCs (PCE, TCE, TCA)	Predesign	Mixed funding; PRP lead/Federal oversight	Jeff Dhont 415-744-2363 FTS-484-2363

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Soil Vapor Extraction

(continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status #	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
9	Mesa Ground Water Contamination, AZ (09/30/91)	Vacuum Extraction		Soil	VOCs	Predesign	Remedy to be part of RCRA corrective action	Hillary Lauer 415-744-2369 FTS-484-2369
9	Motorola 52nd Street, AZ (09/30/88)	Soil vapor extraction	Manufacturing facility	Soil (60 ft radius to 25 ft depth)	VOCs (TCA, TCE, PCE, Carbon Tetrachloride, Ethylbenzene)	In design	PRP lead/State oversight; Dames and Moore	Mike Montgomery 415-744-2394 FTS-484-2394 Jackie Maye (AZ) 602-257-6899
9	Phoenix-Goodyear Airport Area (North & South Fac), AZ (09/26/89)	Soil vapor extraction	Defense-related manufacturing	Soil (North 1,200 cy, South 270,000 cy, 60 ft deep)	VOCs (TCE, TCA,, Methyl ethyl ketone)	In design; Design completion planned Fall 1992	PRP lead/Federal oversight	Craig Cooper 415-744-2370 FTS-484-2370
9	Fairchild Semiconductor (San Jose),* CA (03/20/89)	Soil vapor extraction	Semiconductor manufacture	Soil (3,400 cy)	VOCs (TCA, Acetone, DCE, PCE, Xylene)	Operational	PRP lead/State oversight; Canonie Engineering	Helen McKinley 415-744-2236 FTS-484-2236 Steve Morse (CA) 415-464-0304
9	Fairchild Semiconductor/MTV-I,* CA (06/09/89)	Soil vapor extraction	Semiconductor manufacture and metal finisher	Soil (quantity not available)	VOCs (TCE, PCE, Vinyl Chloride, DCA, DCE, Freon), SVOCs (Phenol)	In design; Design completion planned 1993	PRP lead/Federal oversight	Pattie Collins 415-744-2229 FTS-484-2229
9	Fairchild Semiconductor/MTV-II,* CA (06/30/89)	Soil vapor extraction	Semiconductor manufacturing Metal Finishing Facility	Soil (quantity not available)	VOCs (TCE, PCE, Vinyl Chloride, DCA, DCE, Freon), SVOCs (Phenol)	In design; Design completion planned 1993	PRP lead/Federal oversight	Pattie Collins 415-744-2229 FTS-484-2229
9	IBM (San Jose),* CA (12/15/88)	Soil vapor extraction	Computer manufacture	Soil (24,000)	VOCs (Xylenes, Acetone, Freon, Isopropyl Alcohol, TCA)	Operational;	PRP lead/State oversight; Terra Vac	Helen McKinley 415-744-2236 FTS-484-2236 Steve Morse (CA) 415-464-0304

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Soil Vapor Extraction

(continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status #	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
9	Intel, Mountain View,* CA (06/09/89)	Soil vapor extraction	Semiconductor manufacturing Metal Refinishing Facility Aircraft Maintenance	Soil (quantity not available)	VOCs (TCE, PCE, Vinyl Chloride, DCA, DCE, Freon), SVOCs (Phenol)	In design; Design completion planned 1993	PRP lead/Federal oversight	Pattie Collins 415-744-2229 FTS-484-2229
9	Intersil/Siemens, CA (09/27/90)	Soil vapor extraction	Semiconductor manufacturing	Soil (quantity not available)	VOCs	Operational	State lead/Fund financed; Levine-Fricke	Marie Lacey 415-744-2234 FTS-484-2234 Steve Morse (CA) 415-464-0304
9	Monolithic Memories, CA (09/11/91)	Soil vapor extraction		Soil	VOCs	Predesign		Helen McKinley 415-744-2236 FTS-484-2236
9	National Semiconductor and Advanced Micro Device, CA (09/11/91)	Soil vapor extraction	Semiconductor manufacturing	Soil	VOCs (PCE, DCE, Toluene, Xylene, Ethylbenzene), SVOCs	Predesign		Helen McKinley 415-744-2236 FTS-484-2236
9	Raytheon, Mountain View,* CA (06/09/89)	Soil vapor extraction	Semiconductor manufacturing, Metal Refinishing aircraft maintenance	Soil (quantity not available)	VOCs (TCE, PCE, Vinyl Chloride, DCA, DCE, Freon), SVOCs (Phenol)	In design; Design completion planned 1993	PRP lead/Federal oversight	Pattie Collins 415-744-2229 FTS-484-2229
9	Signetics (Advanced Micro Devices), CA (09/11/91)	Soil vapor extraction	Semiconductor manufacturing	Soil (Quantity unknown)	VOCs (TCE, DCE, DCA, TCA)	Operational; Although the ROD was signed in FY 91, the PRP has operated the remedy for several years	PRP lead/State oversight; M-Con Associates	Joe Healy 415-744-2231 FTS-484-2231 Ron Jervasom (CA) 510-464-0688
9	Solvent Service, CA (09/27/90)	With heat enhancement	Solvent recycling	Soil	VOCs (TCA, Acetone, Ethylbenzene, Xylene), SVOCs (Dichlorobenzene)	Operational	State lead under RCRA	Steve Morse (CA) 415-464-0304

Status as of February 1992.

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

Soil Vapor Extraction
(continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status #	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
9	Spectra Physics, OU1, CA (03/22/91)	Soil vapor extraction With horizontal wells	Semiconductor manufacturing, Laser manufacturing	Soil (quantity not available)	VOCs (TCE)	Being installed; Completion planned winter 1997	PRP lead/State oversight	Sean Hogan 415-744-2233 FTS-484-2233
9	Teledyne Semiconductors, CA (03/22/91)	Soil vapor extraction with horizontal wells	Semiconductor manufacturing and lasor components	Soil (quantity not available)	VOCs (TCE)	Being installed; Completion planned Winter 1997	PRP lead/State oversight; Levine-Fricke	Sean Hogan 415-744-2233 FTS-484-2233
9	Van Waters and Rogers, CA (09/30/91)	Soil vapor extraction		Soil (quantity unknown)		Predesign	PRP lead/State oversight	Marie Lacey 415-744-2234 FTS-484-2234
9	Watkins-Johnson,* CA (06/29/90)	Soil vapor extraction	Semiconductor manufacturing	Soil (quantity not available)	VOCs (DCE, TCA, TCE)	In design; Completion planned Spring 1993	PRP lead/Federal oversight	Elizabeth Kelcher 415-744-2361 FTS-484-2361
10	Commencement Bay/S. Tacoma Channel/Well 12A,* WA (06/01/87)	Soil vapor extraction with air flushing	Solvent recycling	Soil (100,000 cy to 35 ft deep)	VOCs (PCE, TCE, TCA)	Being installed; Completion planned Summer 1992	Federal lead/Fund financed; AWD Technologies, Inc.	Kevin Rochlin 206-553-2106 FTS-399-2106

Status as of February 1992.

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

Soil Washing

Region	Site Name, State, (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) See also Solvent Extraction	Soil washing with water only (preceded by solvent extraction)	Industrial waste dumping	Soil (22,000 cy)	Metals (Chromium, Lead, Copper, Barium)	Predesign; Stalled by negotiations and access problems	Still in negotiation	Craig DeBiase 212-264-5393 FTS-264-5393
2	King of Prussia, NJ (09/28/90)	Soil washing with water with washing agents as additives	Recycling facility	Soil, Sludge, Sediments (20,000 cy, combined)	Metals (Chromium, Copper, Silver)	In design; Design completion planned Summer 1993	PRP lead/Federal oversight	Gary Adamkiewicz 212-264-7592 FTS-264-7592
2	Myers Property, NJ (09/28/90) See also Dechlorination	Soil washing preceded by dechlorination, may be followed by s/s	Pesticide manufacturing/ use/storage	Soil, Sludge, Sediments (50,000 cy, combined)	Metals (Aluminum, Cadmium, Chromium, Silver, Sodium)	Predesign; PD completion planned Summer 1992 when CD is approved	PRP lead/Federal oversight	John Prince 212-264-1213 FTS-264-1213
2	Vineland Chemical, OU1 and OU2, NJ (09/29/89) See also In Situ Flushing	Soil washing	Pesticide manufacturing/ use/storage	Soil (62,000 cy of sandy soil)	Metals (Arsenic)	In design; Design completion planned Spring 1993	Federal lead/Fund financed	Matthew Westgate 212-264-3406 FTS-264-3406 Steve Hadel (USACE - Kansas City) 816-426-5221 FTS-897-5221
4	American Creosote Works,* FL (09/28/89) See also, Bioremediation Ex Situ	Soil washing with water with surfactants as additives (followed by slurry-phase bioremediation for fines)	Wood preserving	Soil (36,500 cy)	SVOCs (PCP), Dioxins, PAHs (Creosote)	In design; Design completion planned Summer 1992; The design will be a performance spec	Federal lead/Fund financed	Madolyn Streng 404-347-2643 FTS-257-2643 Charles Logan FL 904-488-0190 Kelsey Helton 904-488-0190
4	Cabot Carbon/Koppers, FL (09/27/90) See also, Bioremediation, Ex Situ, Bioremediation In Situ	Soil washing (followed by bioremediation of fines)	Wood preserving; Pine tar and turpentine manufacturing	Soil (6,400 cy)	SVOCs (PCP, Bis(2-ethylhexyl) phthalate, DNT, Dimethylphenol), PAHs, Metals (Arsenic, Chromium)	In design; Design completion planned Spring 1994	PRP lead/Federal oversight	Martha Berry 404-347-2643 FTS-257-2643
4	Southeastern Wood Preserving, MS Emergency Response (Action Memo signed 09/30/90) See also, Bioremediation Ex Situ	Soil washing (separation of sands followed by bioremediation of fines)	Wood preserving	Solids (8,000 cy of soils, sludges, and kiln ash)	SVOCs (PCP), PAHs (Creosote)	Operational; Completion planned Summer 1993	Federal lead/Fund financed; OHM Remediation Services Corp.	Don Rigger 404-347-3931 FTS-257-3931

Status as of February 1992.

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Soil Washing

(continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status #	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
4	Cape Fear Wood Preserving,* NC (06/30/89) See also, Bioremediation Ex Situ	Water with sodium hydroxide or hydrochloric acid to adjust pH as an additive (followed by slurry phase bio and (possible) s/s for metals)	Wood preserving	Soil (20,000 cy)	VOCs (Benzene), PAHs (Creosote), Metals (Copper, Chromium, Arsenic)	Design completed but not installed; Currently procuring construction contractor, Will begin construction this summer	Federal lead/Fund financed	Jon Bornholm 404-347-7791 FTS-257-7791
5	United Scrap Lead/SIA, OH (09/30/88)	Acid washing	Battery recycling/ disposal	Soil (109,000 cy, combined), Solids (55,000 cy of battery casing chips), Sediments	Metals (Lead)	In design; Design completion planned Spring 1993	Federal lead/Fund financed	Anita Boseman 312-886-6941 FTS-886-6941
5	Zanesville Well Field, OH (09/30/91) See also Soil Vapor Extraction	Soil washing (preceded by vacuum extraction)	Municipal water supply; Auto parts manufacturing	Soil (1,800 cy)	Metals (Lead, Mercury)	Predesign; PD completion planned Fall 1992; Consent Decree is expected in Fall 1992	PRP lead/Federal oversight	Dave Wilson 312-886-1476 FTS-886-1476
5	Moss-American,* WI (09/27/90) See also, Bioremediation Ex Situ	Soil washing (followed by slurry phase bioremdiation of fines)	Wood preserving	Soil (80,000 cy)	PAHs	In design; Design completion planned 1994	PRP lead/Federal oversight; Weston, Inc.	Betty Lavis 312-886-4784 FTS-886-4784
6	Arkwood, AR (09/28/90)	Soil washing (incineration of residuals)	Wood preserving	Soil (20,400 cy)	SVOCs (PCP), Dioxins	Predesign	PRP lead/Federal oversight	Rick Erhart 214-655-6582 FTS-255-6582
6	Koppers/Texarkana,* TX (09/23/88)	Water with a surfactant as an additive (waste water to be treated and discharged)	Wood preserving	Soil (19,400 cy)	PAHs (Benzo(a)pyrene)	Predesign; Soil Washing project is on hold, EPA is considering relocation of the community	PRP lead/Federal oversight	Ursula Lennox 214-655-6735 FTS-255-6735
6	South Cavalcade Street,* TX (09/26/88) See also In Situ Flushing	Water with surfactants as an additive (followed by incineration of residuals)	Wood preserving	Soil (11,000 cy)	SVOCs (Benzo(a)pyrene, Benzo(a)anthracene , Chrysene), PAHs	In design; Design completion planned Summer 1994	PRP lead/Federal oversight	Mark Fite 214-655-6715 FTS-255-6715

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Soil Washing
(continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status #	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
8	Sand Creek Industrial OU5,* CO (09/28/90)	Soil washing (followed by incineration of contaminated residuals)	Pesticide manufacturing/ use/storage	Soil (14,000 cy)	Pesticides, Metals (Arsenic)	In design; Design completion planned Summer 1992	Federal lead/Fund financed	Erna Acheson 303-294-1971 FTS-330-1971
9	FMC (Fresno)*, CA (06/28/91)	Soil washing followed by solidification/ stabilization	Pesticide manufacturing/ use/storage	Soil (30,000 cy)	Pesticides (DDT, EDB, Toxaphene, Chlordane)	Predesign, Design completion planned Fall 1992	PRP lead/State oversight	Tom Dunkelman 415-744-2395 FTS-744-2395
9	Koppers Company, Inc. (Oroville Plant), CA (04/04/90) See also, Bioremediation In Situ	Soil washing (method to be determined)	Wood preserving	Soil (200,000 cy)	SVOCs (Polychlorinated Phenols), Pesticides, Dioxins	In design; Design completion planned Spring 1993	PRP lead/Federal oversight	Fred Schauffler 415-744-2365 FTS-484-2365

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Solvent Extraction

Region	Site Name, State, (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), Sediments (3,000 cy)	VOCs (TCE), SVOCs (Trichlorobenzene), PCBs, PAHs	Predesign; PD completion planned Fall 1993	Federal lead/Fund financed	Jane Downing 617-573-5708 FTS-833-1708
1	O'Connor,* ME (09/27/89)	Solvent extraction (may be followed by S/S for lead)	Salvage and electrical transformer recycling	Soil (23,500 cy, combined), Sediments	PCBs, PAHs, Metals (Lead)	In design; PD completion planned Spring 1993	PRP lead/Federal oversight	Ross Gilleland 617-573-5766 FTS-833-1566
1	Pinette's Salvage Yard,* ME (05/30/89)	Solvent extraction	Salvage and vehicle repair	Soil (2,000 cy)	SVOCs (Chlorobenzene, Dichlorobenzene, Trichlorobenzene), PCBs	Design completed but not installed; Installation to begin Fall 1992	Federal lead/Fund financed	Ross Gilleland 617-573-5766 FTS-833-1566
2	Ewan Property,* NJ (09/29/89) See also Soil Washing	Solvent extraction (followed by soil washing to treat the inorganics)	Industrial waste dumping	Soil (22,000 cy)	VOCs (PCE, TCE, TCA, Methylene chloride, BTX)	Predesign; Stalled by negotiations and access problems	Still in negotiation	Craig DeBlase 212-264-5393 FTS-264-5393
4	General Refining,* GA Emergency Response (Action Memo signed 08/13/85)	Solvent extraction (oil used as fuel, solids treated with s/s)	Waste oil recycling facility	Sludge (2,700 cy), Solids (700 cy), Liquids (6,600 gallons waste oil)	PCBs, Metals (Arsenic, Copper, Lead)	Completed; Operational 8/86 - 2/87 (see Table 4)	Federal lead/Fund financed; Resource Conservation Co.	Shane Hitchcock 404-347-3136 FTS-257-3136
4	Carolina Transformer, NC (08/29/91)	Solvent extraction (may be followed by s/s)	Transformer repair	Soil (15,000 cy)	PCBs	Predesign; PD completion planned Fall, 1992	Federal lead/Fund financed	Michael Townsend 404-347-7791 FTS-257-7791
6	Traband Warehouse, OK Emergency Response (Action Memo signed 01/01/88)	Solvent extraction	Storage management complex	Solids	PCBs	Completed; Operational 2/89 (see Table 4)	Federal lead/Fund financed; Terra-Clean	Pat Hammack 214-655-2270 FTS-255-2270
6	United Creosoting,* TX (09/29/89)	Solvent extraction (critical fluid extraction, followed by offsite incineration of fluids)	Wood preserving	Soil (with "tar mats," combined volume 67,000 cy)	VOCs, Dioxins	In design; Design completion planned Fall 1992	State lead/Fund financed	Deborah Griswold 214-655-6715 FTS-255-6715 LaReine Pound (TX) 512-467-7897

Status as of February 1992.

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Thermal Desorption

Region	Site Name, State, (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 (vapors captured w/APC)	Chemical waste storage and incineration facility	Soil (11,000 cy)	VOCs (TCE, Vinyl Chloride, Benzene, Toluene)	1Completed Operational 5/90 to 10/90 (see Table 4)	PRP lead/Federal oversight; Canonie Engineering	Richard Goehlert 617-573-5742 FTS-833-5742
1	Re-Solve,* MA (09/24/87) See also Dechlorination	Thermal aeration (followed by dechlorination of the residuals)	Chemical reclamation facility	Soil (22,500 cy)	PCBs	Predesign; Treatability study completion planned Spring 1992; Design completion planned 1993	PRP lead/Federal oversight; Chemical Waste Management, Inc.	Lorenzo Thantu 617-223-5500 FTS-883-5500
1	McKin,* ME (07/22/85)	Thermal aeration (vapors captured on carbon)	Industrial landfill	Soil (11,500 cy)	VOCs (TCE, BTX)	Completed Operational 7/86 to 2/87 (see Table 4)	PRP lead/Federal oversight; Canonie Engineering	Sheila Eckman 617-573-5784 FTS-833-1784
1	Union Chemical Co., OU1, ME (12/27/90)	Low temperature thermal treatment	Solvent recycling; Paint stripping	Soil (10,000 cy)	VOCs (TCE, DCE, PCE, Xylene)	In design	PRP lead/Federal oversight	Mike Jasinski 617-573-5786 FTS-833-1786
1	Ottati & Goss, NH (01/16/87)	Thermal aeration	Drum storage/ disposal	Soil (16,000 cy)	VOCs (TCE, PCE, DCA, Benzene)	Completed Operational 6/89 to 9/89 (see Table 4)	PRP lead/Federal oversight; Canonie Engineering	Stephen Calder 617-573-9626 FTS-833-1626
2	Caldwell Trucking,* NJ (09/25/86)	Low temperature thermal treatment	Unpermitted septic waste facility	Soil (37,000 cy)	VOCs (TCE, PCE, TCA)	In design; Design completion planned Spring 1992; Going to bid in June 1992	Federal lead/Fund financed	Ed Finnerty 212-264-3555 FTS-264-3555
2	Metaltec/Aerosystems, OU1 - Soil Treatment, NJ (06/30/86)	Low temperature thermal treatment (carbon adsorption of vapors)	Metal manufacturing	Soil (9,000 cy)	VOCs (TCE)	Design completed but not installed; Installation to begin Summer 1992	Federal lead/Fund financed	Ron Rusin 212-264-1873 FTS-264-1873 Natalie Tillman (USACE) 816-426-5805
2	Reich Farms, NJ (09/30/88)	Thermal desorption (vapors will be captured on carbon)	Uncontrolled waste disposal	Soil (1,120 cy)	VOCs (TCE, PCE, TCA), SVOCs	Predesign; PD completion planned Fall 1992; The design will begin after treatability studies and be completed in Winter 1993	PRP lead/Federal oversight	Gary Adamkiewicz 212-264-7592 FTS-264-7592

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Thermal Desorption
(continued)

Region	Site Name, State, (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 (Offsite s/s and disposal of residuals)	Manufacture/ electroplating of plane parts	Soil (2,000 cy)	VOCs (TCE, PCE)	Design completed; Bidding underway; RA contract award scheduled for May 1992	Federal lead/Fund financed	William McFarland (USACE Technical) 816-426-5805 Susan Anderson (USACE Contracts) 816-426-7424
2	American Thermostat, NY (06/29/90)	Low temperature thermal treatment	Thermostat Manufacturing	Soil (15,000 cy), Sediments (300 cy)	VOCs (PCE, TCE, DCE)	In design; Design completion planned Spring 1992	Federal lead/Fund financed	Christos Tsiamis 212-264-5713 FTS-264-5713
2	Claremont Polychemical, NY (09/28/90)	Low temperature thermal treatment	Paint/ink formation	Soil (1,600 cy)	VOCs (PCE)	In design; Design completion planned Fall 1993	State lead/Fund financed; USACE	Carlos R. Ramos 212-264-5636 FTS-264-5636
2	Fulton Terminals, Soil Treatment, NY (09/29/89)	Low temperature thermal treatment	Former hazardous waste storage facility	Soil (4,000 cy)	VOCs (TCE, DCE, Benzene, Xylene)	In design; Design completion planned Summer 1993	PRP lead/Federal oversight	Christos Tsiamis 212-264-5713 FTS-264-5713
2	Sarney Farm, NY (09/27/90)	Thermal desorption (followed by onsite incineration of organics)	Industrial landfill, Municipal landfill	Soil (2,000 - 8,000 cy)	VOCs (Chloroform, TCE, PCE, Toluene), SVOCs (Phthalates)	In design; Design completion planned Winter 1992	Federal lead/Fund financed	Kevin Willis 212-264-8777 FTS-264-8777
2	Solvent Savers, NY (09/30/90) See also Soil Vapor Extraction	Thermal desorption	Solvent recovery/ chemical reclamation facility	Soil (60,000 cy)	VOCs (DCE, TCE), PCBs	Predesign; PD completion planned Summer 1992	PRP lead/Federal oversight	Lisa Wong 212-264-0276 FTS-264-0276
2	GE Wiring Devices, PR (09/30/88)	Thermal desorption (possible prewash of debris with surfactants)	Wiring services facility	Soil (5,500 cy, combined), Solids (debris)	Metals (Mercury)	In design	PRP lead/Federal oversight	Caroline Kwan 212-264-0151 FTS-264-0151
3	U.S.A. Letterkenny SE Area, OU1, PA (06/28/91)	Low temperature thermal treatment (may need s/s for metals after thermal desorption)	Munitions manufacturing/ storage, Drum storage/ disposal	Soil (8,000 cy)	VOCs (TCE, Ethylbenzene, Xylene)	Predesign; PD completion planned Spring 1992	Federal facility U.S. Army lead	Dennis Orenshaw 215-597-7858 FTS-597-7858 Peg Geiseking (Letterkenny) 717-267-8483

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Thermal Desorption

(continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status *	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
3	Saunders Supply Co, OU1, VA (09/30/91)	Low temperature thermal treatment (with carbon capture of air)	Wood preserving	Soil (25,000 cy),	SVOCs (PCP), Metals (Arsenic)	Predesign; PD completion planned Spring 1992	Federal lead/Fund financed	Andy Palestini 215-597-1286 FTS-597-1286
4	Ciba-Geigy Corp. (MacIntosh Plant), AL (09/30/91) See also In Situ Flushing	Thermal Desorption (To be evaluated during the treatability study)	Pesticide manufacturing/ use/storage	Soil (quantity unknown)	Pesticides	Predesign	PRP lead/Fedreal oversight	Charles Kane 404-347-2643 FTS-257-2643
4	Aberdeen Pesticide Dumps, OU4, NC (09/30/91)	Thermal desorption	Pesticide manufacturing/ use/storage, Plastics manufacturing	Soil (124,000 cy)	Pesticides (DDT, Toxaphene, Benzene Hexachloride)	Predesign; PD completion planned Summer 1992	PRP lead/Federal oversight	Kay Crane 404-347-7791 FTS-257-7791 Jack Butler 919-733-2801
4	Sangamo/Twelve-Mile/ Hartwell PCB, OU 1, SC (12/19/90)	Thermal desorption Organic vapors will be captured on carbon	Tranformer manufacturer	Soil (100,000 cy)	VOCs, PCBs	Predesign; PD completion planned Spring 1993. A treatability study will begin when CD is lodged and be complete 240 days later.	PRP lead/Federal oversight	Bart Reedy 404-347-7791 FTS-257-7791
4	Wamchem,* SC (06/30/88)	Thermal aeration (vapors captured on carbon)	Former dye manufacturing plant	Soil (2,000 cy)	VOCs (Benzene, Toluene, Xylene)	In design; Design completion planned Winter 1992; 60% design expected shortly	PRP lead/Federal oversight	Bart Reedy 404-347-7791 FTS-257-7791
4	Arlington Blending & Packaging Co., OU1,* TN (06/28/91) See also Dechlorination	Thermal desorption (the residuals will be dechlorinated)	Pesticide manufacturing/ use/storage, Other organic chemical manufacturing	Soil (24,000 cy)	VOCs (DCE), SVOCs (PCP), Pesticides (Chlordane, Heptachlor), Metals (Arsenic)	Predesign; PD completion planned Winter 1992	PRP lead/Federal oversight	Derek Matory 404-347-7791 FTS-257-7791
5	Acme Solvent Reclaiming, Inc., OU2, IL (12/31/90) See also Soil Vapor Extraction	Low temperature thermal treatment (followed by s/s for lead)	Industrial landfill, solvent recycling	Soil (6,000 cy combined), Sludge	VOCs (TCA, DCE, DCA, TCE, PCE, Vinyl Chloride, 4-Methyl 2 Pentanone, Benzene), SVOCs (Naphthalene), PCBs	Predesign; PD completion planned Fall 1993	PRP lead/Federal oversight	Dennis Dalga 312-886-5116 FTS-886-5116

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Thermal Desorption
(continued)

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
5	Outboard Marine/Waukegan Harbor OU3),* IL (03/31/89)	Low temperature thermal treatment (followed by offsite incineration of organics)	Marine products manufacturing	Soil (16,000 cy, combined), Natural Sediments	PCBs	Operational; Completion planned Summer 1992	PRP lead/Federal oversight; Canonie Engineering	Cindy Nolan 312-886-0400 FTS-886-0400
5	Anderson Development (ROD Amendment), MI (09/30/91)	Low temperature thermal treatment	Other organic chemical manufacturing	Soil (3,000 cy combined), Sludge	Organics (MBOCAs (4' Methylene Bis-dichloroaniline)	Operational; Completion planned Spring 1992; Treatment began Jan. 5, 1992; In pilot test, MBOCAs reduced from 2,800 ppm in sludges to 1.6 ppm	PRP lead/Federal oversight; Weston Services, Inc.	Jim Hahnenberg 312-353-4213 FTS-353-4213
5	Carter Industries,* MI (09/18/91)	Low temperature thermal treatment (followed by s/s of solids and incineration of PCB oil)	Scrap metal salvager	Soil (46,000 cy combined), Solids (debris)	PCBs	Predesign; A schedule has not been set because EPA is negotiating with the PRPs	PRP lead/Federal oversight	John Peterson 312-353-1264 FTS-353-1264
5	University of Minnesota, MN (06/11/90)	Thermal desorption (fume incineration of PCB vapors)	University wastes	Soil (6,300 cy), Solids (160 cy of debris)	PCBs	In design; Design completion planned Spring 1992; The RA contract will allow incineration or thermal desorption, provided criteria are met	PRP lead/State oversight	Darrell Owens 312-886-7089 FTS-886-7089 David Douglas (MN) 612-296-7818
8	Martin Marietta (Denver Aerospace), CO (09/24/90) See also Soil Vapor Extraction	Low temperature thermal treatment (followed by incineration of vapors and s/s of soils)	Aerospace equipment manufacturer - bulk storage facility and industrial landfill	Soil (2,300 cy)	VOCs (TCE), PCBs	Predesign; PD completion planned Winter 1992	State lead under RCRA	George Dancik 303-293-1506 FTS-330-1506 Susan Chaki (CO) 303-331-4832

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Other Technologies

Region	Site Name, State, (ROD Date)	Specific Technology	Site Description	Media (Quantity)	Key Contaminants Treated	Status #	Lead Agency and Treatment Contractor (if available)	Contacts/ Phone
1	South Municipal Water Supply Well*, NH (09/27/89) See also Soil Vapor Extraction	Air sparging of ground water	Solvent recovery facility Ball Bearing Manufacturing	gw	VOCs, (PCE, TCA, TCE)	In design; Design completion planned Summer 1992	PRP lead/Federal oversight	Roger Duwart 617-573-9628 FTS-833-1628
3	Brodhead Creek, OU1, PA (03/29/91)	CROW technology using hot water injection to mobilize coal tar	Coal gasification	Soil (200 cy up to 40 ft deep)	PAHs	Predesign; PD completion planned Summer 1992	PRP lead/Federal oversight; Remediation Technologies	John Banks 215-597-8555 FTS-597-8555
6	Petro-Chemical Systems, Inc., OU2, TX (09/06/91) See also Soil Vapor Extraction	Air sparging of ground water	Petroleum refining and reuse	gw (to 30 ft deep)	VOCs (BTEX), SVOCs (Naphthalene), Metals (Lead)	Predesign; PD completion planned Fall 1992	PRP lead/Federal oversight	Chris Villareal 214-655-6735 FTS-255-6735

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TABLE 4

SUMMARY INFORMATION ON COMPLETED PROJECTS

Table 4 provides detailed information on the performance and operating parameters for applications of innovative treatment technologies that have been completed. It is intended to supplement, not replace, the information included in Table 3.

TABLE 4

COMPLETED PROJECTS

April 1992

Region	Site Name, State, Dates of Operation	Technology/ Vendor	Media Treated (Quantity)	Key Contaminants Treated	Operating Parameters	Materials Handling Required	Residuals Management	Comments
1	Cannon Engineering/Bridgewater, MA 5/90 to 10/90	Thermal soil aeration/ Canonie Environmental Services Corp., Porter, IN	Soil (11,300 tons)	Criteria: 0.1 ppm - TCE, DCE, PCE 0.2 ppm - Toluene, Xylene 0.5 ppm - Vinyl Chloride SVOCs - 3ppm (total) Input 500 - 3,000 ppm (Total VOCs) Output - <0.025 ppm (Total VOCs)	Continuous operation 40 tons/hr 450 - 500° F Moisture content before treatment - 5% - 25% moisture Additives - dry soil (to reduce moisture content)	Excavation Screening Mixing Dewatering	Residuals from air pollution control - treated on site, disposed of off site Wastewater - treated on site, disposed of off site	The waste feed size limitation for the equipment, 1.875 inches, was an important consideration. More information is available in the RA report available from Region 1.
1	McKin, ME 7/86 - 2/87	Thermal Desorption/ Canonie Env. Services Corp., Porter, IN	Soil (11,500 cy)	VOCs Criteria: .1 ppm TCE Input: up to 1,000 ppm TCE Output: .1 ppm	Continuous operation 6-8 minutes retention time 300°F	Excavation	Soils - Solidified and disposed onsite Vapors - Air carbon capture	
1	Ottati & Goss, NH 6/89 - 9/89	Thermal Desorption/ Canonie Engineering	Soil (6,000 cy)	TCE, PCE, DCA, Benzene Criteria: 1 ppm - Total VOCs and <100 ppb - Each individual VOC Output: <1ppm - Total VOCs	Batch process	Excavation Screening	Carbon from air pollution control unit regenerated offsite	For more information on this project, see the close out report available from Region 1.
2	Wide Beach Development, NY 9/90 to 9/91	APEG dechlorination / Soil Tech Denver, CO	Soil (40,000 cy)	Criteria: PCB - <10 ppm (1 composite sample/day) Input - 10 to 100 ppm PCB Output - 2 ppm PCB	Continuous process 8 tons/hour 200° - 580°C (450° - 1100°F) Ambient pH and moisture Additives - Alkaline polyethylene glocol (APEG)	Excavation Screening Staging	Treated soil - disposed of on site	If on-site disposal is planned, perform tests of the treated material appropriate to intended use. For further information on this dechlorination project, see the Demonstration Test Report produced by Region 2, EPA.

Region	Site Name, State, Dates of Operation	Technology/ Vendor	Media Treated (Quantity)	Key Contaminants Treated	Operating Parameters	Materials Handling Required	Residuals Management	Comments
2	Upjohn Manufacturing Company, PR 1/83 to 3/88	Vacuum extraction Terra Vac Corp.	Soil (16,000 sq ft to approximately 100 ft deep)	Criteria: Initially: Undefined, end point of treatment was subject to long debate. Final criteria: Carbon Tetrachloride (in exhaust stacks) - nondetectable for three consecutive months Initial concentrations - 70 mg/L (carbon tetrachloride to air) Final concentrations - nondetect (<0.002 mg/L)	Ambient conditions		Discharge of soil vapors through 30-ft stack	For further information on this application, see the Applications Analysis Report for the Terra Vac In situ Vacuum Extraction System (EPA/540/A5-89/003).
2	Signo Trading International, Inc., NY 10/20/87 - 10/21/87 (Removal)	KPEG dechlorination Galson Remediation, Syracuse, NY	Sludge (15 gallons)	Dioxin Input - 135 ppb Output - 1 ppb	Temperature: 150°C Time: Overnight	None	Incineration of residuals (without dioxin contamination) at treatment, storage, and disposal facility	

Region	Site Name, State, Dates of Operation	Technology/ Vendor	Media Treated (Quantity)	Key Contaminants Treated	Operating Parameters	Materials Handling Required	Residuals Management	Comments
3	Avtex Fibers, VA 4/90 - 8/91 (Removal)	Chemical Treatment (oxidation using NaClO) OH Materials, Findlay, OH (ERCS Contractor)	Sludge/water from storage unit (2 million gallons)	Carbon Disulfide Criteria: ≤10 ppm - Carbon Disulfide in the effluent Input: 50-200,000 ppm Carbon disulfide Output: ≤10 ppm Carbon disulfide	Batch operation average retention time - 1 hour pH - 10 Additives: Sodium hypochloride. The retention time and reagent feed rates increased with increasing concentration of sludge in the contaminated water.	Pumping	Salts from the reaction were removed with flocculation and clarification at existing treatment plant, pH adjustment	Carbon disulfide is unstable and will be found with other contaminants in aqueous waste stream. For additional information on this project, see the Removal Close Out Report available from EPA - Region III or OH Materials.
4	Brown Wood Preserving, FL 10/88 to 12/91	Land Treatment/ Remediation Technologies, Seattle, Washington	Soil/pond sediment (7,500 cy)	Criteria: 100 ppm total carcinogenic PAHs as sampled on 8 subplots on each lift Input - 800 to 2,000 ppm total creosote contaminants Output - 10 to 80 ppm total carcinogenic indicators	Retention time - 3 to 6 months Additives - water and nutrients	Excavation Screening Tilling	Treated material vegetated with grass (no cap)	Further information on this project is available from the Remedial Action Close Out Report. The vendor, RETEC, is expected to prepare a paper.

Region	Site Name, State, Dates of Operation	Technology/ Vendor	Media Treated (Quantity)	Key Contaminants Treated	Operating Parameters	Materials Handling Required	Residuals Management	Comments
4	Palmetto Wood Preserving, SC 9/28/88 to 2/8/89	Chemical treatment and soil washing Reduction of hexavalent chromium to trivalent chromium En-site (ERCS contractor) Atlanta, GA	Soil (13,000 cy)	Health-based criteria - Actual concentrations unknown Input: Arsenic - 2 to 6,200 ppm Chromium - 4 to 6,200 ppm Output: Arsenic - less than 1 ppm Chromium - 627 ppm	Soil - Batch process Treatment for aqueous waste from soil washing - 25 gallons per minute pH - 2 to 9	Neutralization Mixing Dewatering	Soil - solidified and replaced on site Wastewater - permitted discharge to the sewer line Sludges - off site disposal	(1) Used sodium meta-phosphate to lower pH to 2.0 and wash the Chromium from the soil, (2) separated the soil and solution, (3) solidified the soils, and (4) used the ferrous ion method of reduction to precipitate the chromium from solution in trivalent form. This treatment system is unique in the method of generating ferrous ion for the reducing step. The waste stream passed through an electrolytic cell containing consumable steel electrodes where the ferrous ions were electrically introduced into the waste stream.
4	General Refining Company, GA August-October, 1986 January-February, 1987 (Removal)	Solvent extraction/ Resource Conservation Technology Company, Bellevue, WA	Sludge (3,448 tons)	Input: PCB - 5.0 ppm Lead - 10,000 ppm Output: PCB - insignificant Lead - concentrated in solids	Continuous operation Time: 2 hours pH: 10 Temp: 20°C Rate: 27 tons/day Moisture content - 60% Additives: Sodium hydroxide Triethylamine	Excavation Screening Neutralization Size Reduction Mixing	Oil - used as fuel for kiln Water - treated, discharged off site Solids - solidified and disposed of on site	The oil recovered from the extractions process could not be sold because of an elevated metals content. The solvent could not be recovered due to leaks in system seals. The unit required a relatively uniform material so materials handling of the sludges proved difficult in the beginning of the project. The lead-bearing solids produced by the dryer also required special handling. Finally, detergents in the sludge hindered oil/water separation.

Region	Site Name, State, Dates of Operation	Technology/ Vendor	Media Treated (Quantity)	Key Contaminants Treated	Operating Parameters	Materials Handling Required	Residuals Management	Comments
4	Hinson Chemical, SC 12/88 - 3/92 (Removal)	Soil Vapor Extraction/ OH Materials Atlanta, GA	Soil (60,000 cy, up to 50 ft deep)	Benzene, TCE, PCE, DCA, MEK At completion: <10 ppm Total VOCs (In all samples); average <1 ppm Total VOCs	In situ; continuous operation (except for occasional shut downs to allow soil gas to reach equilibrium in the pore spaces)		Air emissions captured on vapor phase carbon No cap needed	
5	Seymour Recycling, IN Summer - 1990 August-October, 1986 January-February, 1987	In situ soil bioremediation ABB Environmental Services	Soil (12 acres to 10 ft deep, approximately 43,500 cy)	54 contaminants present, including TCE, TCA, and Carbon Tetrachloride No standards or criteria for this OU in ROD	Additives - nitrogen, phosphorus, potassium, sulfur (200,000 gallons of nutrients added)	Tilling	Capping in place	The soil became saturated quickly during this project, creating surface pools. The specially designed tractor got stuck.
5	PBM Enterprises, MI 3/25/85 - 10/28/85 (Removal)	Neutralization with hypochlorite process Mid-American Environmental Service, Riverdale, IL	Film chips (464 tons or 1,280 cy)	Cyanide Input: 200 ppm Output: 20 ppm	Time: 2-3 hours Additives: sodium hydroxide	Agitation	Rinse water, runoff and waste hypochlorite - treated off site Treated chips - landfilled (Subtitle D)	
6	Traband Warehouse PCBs, OK (Removal)	Solvent Extraction/ Terra Kleen	Solids	PCBs				

Region	Site Name, State, Dates of Operation	Technology/ Vendor	Media Treated (Quantity)	Key Contaminants Treated	Operating Parameters	Materials Handling Required	Residuals Management	Comments
7	Crown Plating, MO 10/1/89 to 12/31/89 (Removal)	Dechlorination using the KPEG process No vendor, work done by EPA	Liquid (5 gallons)	Criteria: Dioxin - <1 ppb Input: Silvex - 10,000 ppm Dioxin equivalents - 24.18 ppb Output: Silvex - 32 ppb Dioxin equivalents - 0.068 ppb	Batch operation Retention time - 36 hours (including time of equipment breakdown) Temperature - 72°C pH - 13 Moisture content - 100%		Built an on-site vacuum for emissions control Contaminated residual oil - incinerated off-site	
7	Scott Lumber, MO 8/87 - Fall, 91 (Removal)	Land Treatment	Soil (16,000 cy)	Criteria: 500 ppm - Total PAH 14 ppm - Benzo(a)pyrene Output: 160 ppm Total PAH 12 ppm Benzo(a)pyrene	Additives: Water phosphorous	Tilling	None	

Region	Site Name, State, Dates of Operation	Technology/ Vendor	Media Treated (Quantity)	Key Contaminants Treated	Operating Parameters	Materials Handling Required	Residuals Management	Comments
9	Gila River Indian Reservation, AZ 3/28/85 - 6/24/85 (Removal)	In situ chemical treatment (followed by anaerobic bio-remediation) No technology vendor ERCs	Soil (3,220 cy)	Input: Toxaphene - 1,470 ppm Ethyl parathion - 86 ppm Methyl parathion - 24 ppm Output: Toxaphene - 470 ppm Ethyl parathion - 56 ppm Methyl parathion - 3 ppm	pH: 10.2 to 11.8 Moisture: Wet Additives to soil: sodium hydroxide, water		Bioremediation	
9	Gila River Indian Reservation, AZ 6/24/85 - 10/23/85 (Removal)	In situ anaerobic biological treatment (preceded by chemical treatment) No technology vendor	Soil (3,220 cy)	Toxaphene Input: 470 ppm Output: 180 ppm	pH: 8.3 to 9.8 Additives to soil: sulfuric acid, manure, sludge	Tilling	Capped in place	The biological treatment would have been more successful if the neutralization after the chemical treatment had been more complete. The tearing of the plastic sheets covering the soils allowed air in and prevented anaerobic activity.
9	Roseville Drums, CA 2/12/88 - 11/9/88 (Removal)	In situ Bioremediation	Soil (14 cy)	Input: Dichlorobenzene - 4,000 ppm Phenol - 12,000 ppm Output: Dichlorobenzene - 140 ppm Phenol - 6 ppm	Additives to soil: manure, water	Tilling		

Region	Site Name, State, Dates of Operation	Technology/ Vendor	Media Treated (Quantity)	Key Contaminants Treated	Operating Parameters	Materials Handling Required	Residuals Management	Comments
9	Stanford Pesticide Site #1, AZ 3/20/87 - 11/4/87 (Removal)	Chemical treatment - alkaline hydrolisis No technology vendor	Soil (200 cy)	Methyl parathion Input: 24.2 ppm Output: 0.05 ppm	pH: 9.0 Moisture: wet Additives to soil: soda ash, water, activated carbon	Tilling (in situ, 3 times per week)		
9	Poly-Carb, Inc., NV 7/22/87 - 8/16/88 (Removal)	Land treatment and soil flushing	Soil (1,500 cy)	Input: Phenol 1,020 ppm O-cresol - 100 ppm m- and p-cresol - 409 ppm Output: Phenol - 1 ppm O-cresol - 1 ppm m- and p-Cresol - 0.92 ppm	Additives: water	· Excavation · Placement in double-lined pit · Irrigation · Tilling	Leachate collection and treatment with granular activated carbon	This treatment used both bioremediation and soil flushing in one step.

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; that is, the older the ROD, the more likely that design and construction have begun.

On-Site Incineration

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	Lipari 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

Residuals to be treated with solidification/stablization.

On-Site Incineration (continued)

FY	REGION	SITE NAME	STATE
89	05	Big D Campground	OH
89	05	Laskin/Poplar Oil	OH
90	01	New Bedford*	MA
90	02	Sarney Farm	NY
90	03	M.W. Manufacturing*	PA
90	05	Sangamo/Crab Orchard National Wildlife Refuge	IL
90	05	Fisher Calo	IN
90	05	Bofors Nobel	MI
90	05	Springfield Township Dump*	MI
90	05	Pristine (Amendment)	OH
90	05	University of Minnesota	MN
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
91	03	Whitmoyer Labs, Inc. OU3	PA
91	03	Eastern Diversified Metals	PA
91	04	Ciba Geigy Corp.	AL
91	05	Allied Chem & Ironton Coke	OH

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

Off-Site Incineration (continued)

FY	REGION	SITE NAME	STATE
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	Douglassville Disposal	PA
88	03	Fike Chemical	WV
88	05	Belvidere Municipal Landfill #1	IL
88	06	S. Calvacade St.	TX
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	Outboard Marine/Waukegan Harbor	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	Arkwood	AR
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
91	01	Union Chemical	ME
91	02	Curcio Scrap Metal	NJ
91	02	Swope Oil	NJ
91	02	Waldick Aerospace Devices, Inc.	NJ

* Residuals to be treated with solidification/stabilization.

Off-Site Incineration (continued)

FY	REGION	SITE NAME	STATE
91	02	Circuitron	NY
91	02	Mattiace Petrochemical	NY
91	03	Brodhead Creek	PA
91	03	Eastern Diversified Metals	PA
91	03	Dixie Cavern County Landfill	VA
91	04	Aberdeen Pesticide Dumps (Amendment)	NC
91	04	Wrigley Charcoal	TN
91	05	Acme Solvent Reclaiming Inc.	IL
91	05	Main Street Wellfield	IN
91	05	Thermo Chem	MI
91	05	Carter Industries	MI
91	05	Summit National Liquid Disposal Service (Amendment)	OH
91	06	Petrochemical (Turtle-Bayou)	TX
91	07	Peoples Natural Gas	IA
91	07	Ellisville Area Site	MO
91	07	Ellisville Area (Amendment)	MO
91	07	Kem-Pest Laboratories	MO
91	08	Broderick Wood Products	CO
91	08	Hill AFB	UT
91	09	Advanced Micro Devices Inc.	CA
91	10	Commencement Bay - Nearshore/ Tideflats	WA
91	10	Northwest Transformer - Mission Pole	WA

Solidification/Stabilization

FY	REGION	SITE NAME	STATE
82	03	Bruin Lagoon	PA
84	06	Bioecology Systems	TX
85	04	General Refining	GA
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
86	05	Burrows Sanitation	MI
86	05	Forest Waste Products	MI
87	01	Davis Liquid Waste	RI
87	02	Chemical Control	NJ
87	02	Myers Property	NJ
87	02	Waldick Aerospace	NJ
87	04	Gold Coast	FL
87	04	Geiger/C&M Oil	SC
87	04	Independent Nail	SC

Solidification/Stabilization (continued)

FY	REGION	SITE NAME	STATE
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	DeRewal 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	Smith Farm Brooks	KY
89	04	Cape Fear Wood Preserving	NC
89	04	Celanese	NC
89	04	Amnicola Dump	TN
89	05	MIDCO I	IN
89	05	MIDCO II	IN

Solidification/Stabilization (continued)

FY	REGION	SITE NAME	STATE
89	05	Auto Ion Chemicals	MI
89	06	Pesses Chemical	TX
89	06	Sheridan Disposal Services	TX
89	07	Vogel Paint & Wax	IA
89	09	Koppers (Oroville Plant)	CA
89	09	Purity Oil Sales	CA
90	01	New Bedford	MA
90	02	Roebling Steel	NJ
90	03	M.W. Manufacturing	PA
90	03	C&R Battery	VA
90	03	Greenwood Chemical	VA
90	04	62nd Street Dump	FL
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	Sangamo/Crab Orchard National Wildlife Refuge	IL
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
91	01	Silresin Chemical	MA
91	01	Sullivan's Ledge	MA
91	01	Union Chemical	MA
91	02	Asbestos Dump	NJ
91	02	Nascolite Corp.	NJ
91	02	NL Industries	NJ
91	02	Roebling Steel	NJ
91	02	Waldick Aerospace Services Inc.	NJ
91	02	White Chemical Corp.	NJ
91	03	Halby Chemical	DE

Solidification/Stabilization (continued)

FY	REGION	SITE NAME	STATE
91	03	Mid-Atlantic Wood Preservers	MD
91	03	Eastern Diversified Metals	PA
91	03	Hebelka Auto Salvage Yard	PA
91	03	Whitmoyer Lab (OU3)	PA
91	03	Whitmoyer Lab (OU2)	PA
91	03	U.S.A. Letterkenny SE	PA
91	03	First Piedmont Quarry 719	VA
91	03	Saunders Supply	VA
91	04	Interstate Lead Co.	AL
91	04	USAF Robins Air Force Base	GA
91	04	Maxey Flats Nuclear Disposal	KY
91	04	Golden Strip Septic Tank	SC
91	04	Aberdeen Pesticide Dump (Amendment)	NC
91	04	Carolina Transformer	NC
91	04	Arlington Blending and Packaging Co.	TN
91	04	Oak Ridge OU3	TN
91	04	Wrigley Charcoal	TN
91	05	Acme Solvents	IL
91	05	Carter Industries	MI
91	06	Cimarron Mining Corp.	NM
91	07	IE Dupont de Nemours & Co., Inc.	IA
91	07	Mid-America Tanning	IA
91	07	Shaw Avenue Dump	IA
91	08	Anaconda Co. Smelter	MT
91	09	FMC (Fresno Plant)	CA
91	09	Valley Wood Preserving	CA

Other

FY	REGION	SITE NAME	STATE	TECHNOLOGY
85	06	Triangle Chemical	TX	Soil Aeration
86	04	Hollingsworth Solderless	FL	Soil Aeration
87	03	West Virginia Ordnance	WV	In situ Flamming
88	03	Bendix Flight System	PA	Soil Aeration
88	07	Arkansas City Dump	KS	Chemical Neutralization
89	09	Fairchild Semiconductor/ MTV-I	CA	Soil Aeration
89	09	Fairchild Semiconductor/ MTV-II	CA	Soil Aeration
89	09	Intel, Mountain View	CA	Soil Aeration
89	09	Raytheon, Mountain View	CA	Soil Aeration
90	04	Howe Valley Landfill	KY	Soil Aeration

APPENDIX B

REMEDIAL/REMOVAL SITES USING TREATMENT TRAINS WITH INNOVATIVE TECHNOLOGIES

Appendix B lists the sites where innovative treatment technologies are used with established or other innovative treatment technologies in treatment "trains." Technologies may be combined to reduce the volume of material requiring subsequent treatment, to prevent the emission of volatile contaminants during excavation and mixing, or to address multiple contaminants within the same medium.

REMEDIAL/REMOVAL SITES USING TREATMENT TRAINS WITH INNOVATIVE TECHNOLOGIES

Chemical Treatment Followed by		
In Situ Bioremediation	Gila River Indian Reservation	AZ
Dechlorination Followed by		
Soil Washing	Myers Property	NJ
Ex Situ Bioremediation Followed by		
Solidification/Stabilization	Whitmoyer Laboratories, OU 3	PA
Solidification/Stabilization	J. H. Baxter	CA
In Situ Flushing Followed by		
In Situ Bioremediation	LA Clarke & Sons	VA
In Situ Bioremediation	Polycarb (Removal)	NV
Soil Vapor Extraction Followed by		
In Situ Bioremediation	Swope Oil & Chemical Co.	NJ
In Situ Flushing	JADCO - Hughes	NC
Solidification/Stabilization	Genzale Plating Company, OU 1	NY
Soil Washing	Zanesville Well Field	OH
Soil Washing Followed by		
Bioremediation	American Creosote	FL
Bioremediation	Cabot Carbon/Koppers	FL
Bioremediation	Southeastern Wood Preserving (Removal)	MS
Bioremediation	Cape Fear Wood Preserving	NC
Bioremediation	Moss-American	WI
Bioremediation	Koppers (Oroville)	CA
Incineration	Arkwood	AR
Incineration	South Cavalcade Street	TX
Incineration	Sand Creek OU 5	CO
Solidification/Stabilization	FMC (Fresno)	CA
Solvent Extraction Followed by		
Incineration	United Creosoting	TX
Soil Washing	Ewan Property	NJ
Solidification/Stabilization	O'Connor	ME
Solidification/Stabilization	General Refining (Removal)	GA
Thermal Desorption Followed by		
Dechlorination	Resolve	MA
Dechlorination	Arlington Blending & Packaging Co. OU 1	TN
Incineration of Organic Vapors	Sarney Farm	NY
Incineration of Organic Vapors	Outboard Marine/Waukegan Harbor	IL
Incineration of Organic Vapors	Carter Industries	MI
Incineration of Organic Vapors	University of Minnesota	MN
Incineration of Organic Vapors	Martin Marietta (Denver Aerospace)	CO
Solidification/Stabilization	Waldick Aerospace Devices	NJ
Solidification/Stabilization	USA Letterkenny (SE Area, OU 1)	PA
Solidification/Stabilization	Acme Solvent Reclaiming, Inc. OU 2	IL
Solidification/Stabilization	Carter Industries	MI
Solidification/Stabilization	Martin Marietta (Denver Aerospace)	CO

April 1992

INNOVATIVE TREATMENT TECHNOLOGIES:
SEMI-ANNUAL STATUS REPORT
EPA/540/2-91/001

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