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EPA

Progress Toward Implementing Superfund Fiscal Year 1989

Report to Congress

EPA/540/8-90/017
December 1990

Progress Toward Implementing SUPERFUND

Fiscal Year 1989

REPORT TO CONGRESS

Required by
Section 301(h) of the
Comprehensive Environmental Response, Compensation
and Liability Act (CERCLA) of 1980,
as amended by the Superfund Amendments and
Reauthorizartion Act (SARA) of 1986

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OFFICE OF EMERGENCY AND REMEDIAL RESPONSE
U.S. ENVIRONMENTAL PROTECTION AGENCY
October 1990

Notice

This Report to Congress has been subjected to the United States Environmental Protection Agency's review process and approved for publication as an EPA document. For further information about this Report, contact the Policy and Analysis Staff in the Office of Program Management, Office of Emergency and Remedial Response at 202/382-2182. Individual copies of the Report can be obtained from the Office of Research and Development Publications by writing to: 26 West Martin Luther King Drive, Cincinnati, Ohio 45268, or by calling 513/569-7562.

Foreword

The Environmental Protection Agency (EPA) in fiscal year 1989 accelerated the pace of the Superfund program. More sites entered and progressed through the remedial "pipeline" than in any previous year thereby raising for the first time in the program's history the prospect of a backlog of projects ready to enter the remedial action phase. EPA is pleased to submit this Report documenting the fiscal year's achievements.

Section 301(h) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund), as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, requires the Agency to report annually on response activities and accomplishments and to compare remedial and enforcement projects with those undertaken in previous fiscal years. During fiscal 1989, Superfund or potentially responsible parties (PRPs) funded 157 new remedial investigation/feasibility studies (RI/FS), and 157 new remedial designs (RD) (a program high), filling the Superfund remedial pipeline to capacity at current resource levels and creating the prospect of a backlog of Superfund sites ready to enter the remedial action (RA) phase of the pipeline. Additionally, the Agency published *A Management Review of the Superfund Program* (the 90-Day Study), a comprehensive study of the program that includes recommendations for its improvement.

These two events significantly influenced Superfund program activity and are unifying themes of this Report. The 90-Day Study reinforced the Agency's commitment to using enforcement to compel PRPs to finance cleanup at sites whenever possible. As a result, PRPs started more RI/FSs (87), RDs (94), and RAs (51) than at any point in the program's history. EPA also reached response settlements with PRPs worth approximately $1 billion in the fiscal year, and recovered more money ($66.5 million) from PRPs than ever before. The Agency also met the October statutory deadlines for starting RAs and RI/FSs at 175 and 275 new sites, respectively.

In addition to providing an overall perspective on progress in the past fiscal year, the Report contains information Congress specifically requested in section 301(h)(1), including an abstract of each of the 139 Records of Decision that were signed in fiscal 1989; a report on the status of remedial actions, including enforcement activity, in progress at the end of the fiscal year; and an evaluation of newly developed feasible and achievable treatment technologies.

The Report also includes a description of minority firm participation in Superfund contracts and our efforts to encourage their participation, as required by section 105(f). The Report fulfills the requirement of section 301(h)(1)(E) for an annual update on progress being made on sites subject to review under section 121(c). In addition, this Report satisfies similar reporting requirements of section 121(c). The *EPA Annual Report to Congress: Progress Towards Implementing CERCLA at EPA Facilities as Required by CERCLA section 120(e)(5)* is included as Appendix D. The report of the EPA Inspector General on his findings concerning the reasonableness and accuracy of the information in this Report, as required by section 301(h)(2), is included as Appendix E.

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Acknowledgements

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Executive Summary

The Environmental Protection Agency (EPA) continued in fiscal 1989 its aggressive efforts to clean up the nation's worst hazardous waste sites. More sites entered and progressed through the incremental stages of the Superfund remedial "pipeline" than in any previous fiscal year. In May, EPA announced that it had already met the Superfund Amendments and Reauthorization Act (SARA) October deadline for starting Remedial Investigation/Feasibility Studies (RI/FSs) at 275 new sites. Additionally, the Agency met the statutory mandate to start remedial actions (RAs) at 175 new sites. In all, the Agency started 157 new RI/FSs and 108 new RAs during the fiscal year and the prospect of a backlog of projects ready to enter the RA phase arose for the first time in the program's history. Exhibit ES-1 summarizes fiscal 1989 program accomplishments.

This third Superfund Report to Congress, required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), documents these and other fiscal year accomplishments. In addition, it highlights significant initiatives undertaken during the fiscal year in response to recommendations of the study commissioned by EPA's new Administrator, *A Management Review of the Superfund Program* (the 90-Day Study or the Study).

The 90-Day Study

The 90-Day Study, published in May of 1989, articulates a clear vision for the Superfund program that has received broad acceptance within and outside the Agency. The strategy set forth in the Study directs the Superfund program to attack the worst sites first, removing the sources of immediate threat and then, on a priority basis, addressing the sources of long-term risk. It places emphasis on ensuring that the pipeline is filled to capacity at all times and that the sites in the pipeline are flowing from stage to stage as quickly as possible. In addition, this Agency study sets goals for the Superfund program that include:

- Emphasizing enforcement to induce potentially responsible parties (PRPs) to undertake more cleanups under EPA direction;
- Using permanent remedies where possible and aggressively seeking innovative treatment technologies that reduce the toxicity, mobility, or volume of wastes at Superfund sites;
- Improving efficiency of program operations by employing a "One Program" concept that would allow EPA to match the most appropriate tools available to the environmental problems to be corrected, regardless of whether the project is being financed with Hazardous Substance Superfund (Fund) or enforcement monies;
- Encouraging greater community participation by broadening public outreach programs and allowing the public more involvement in remedy selection;
- Building solid relationships with states, Natural Resource Trustees, and the Agency for Toxic Substances and Disease Registry (ATSDR) to ensure that the Superfund process is working as efficiently as possible; and
- Improving management and administration to ensure the Agency's ability to attract and retain key Superfund personnel.

Exhibit ES-1
Summary of Fiscal 1989 Superfund Program Activities

ENFORCEMENT PROGRAM ACTIVITIES

Settlements for all PRP Response Activities	**218**	($1,033.7 million)[1]
RD/RA Settlements[2]	**71**	($747.6 million)
Unilateral Administrative Orders issued	**102**	
Unilateral Administrative Orders complied with	**67**	($233.8 million)
Cost Recovery Dollars		($66.5 million)

REMEDIAL PROGRAM ACTIVITIES

Sites where work was completed during FY89	**8**
Sites with remedial activities in progress on 9/30/89	**695**
RODs (Records of Decision) Signed	**139**
RI/FS (Remedial Investigation/Feasibility Study) Starts	**157**
Fund-financed	*70*
PRP-financed	*87*
RI/FSs in progress on September 30, 1989 (including 11 stand-alone RIs and 16 stand-alone FSs)	**669**
RD (Remedial Design) Starts	**157**
Fund-financed	*63*
PRP-financed	*94*
RDs in Progress on September 30, 1989	**253**
RA (Remedial Action) Starts	**108**
Fund-financed	*57*
PRP-financed	*51*
RAs in progress on September 30, 1989	**221**

Exhibit ES-1
Summary of Fiscal 1989 Superfund Program Acitivities (continued)

REMOVAL PROGRAM ACTIVITIES

Removal Completions	**249**
Fund-financed	*174*
PRP-financed	*75*
Removal Starts	**322**
Fund-financed	*236*
PRP-financed	*86*

PRE-REMEDIAL PROGRAM ACTIVITIES

CERCLIS Inventory Sites Added	**1,891**
PAs - Preliminary Assessments	**2,228**
SIs - Site Inspections	**1,732**
NPL - National Priorities List[3] (program-to-date)	**1,225**
Sites Proposed for Listing During FY89	*64*
Final Sites Listed During FY89	*101*
Sites Proposed for Deletion During FY89	*9*
Sites Deleted During FY89	*10*

1 Estimated value of work PRPs have agreed to undertake.
2 RD/RA settlements include RD/RA consent decrees and unilateral administrative orders with which PRPs have stated their intention to comply.
3 Includes proposed and listed sites.

SOURCES: CERCLIS; U.S. EPA Office of Waste Programs Enforcement; *Progress Toward Implementing Superfund: Fiscal Year 1989 (Appendix A), OERR; Federal Register* notices through September 30,1989.

By the end of fiscal 1989, EPA Headquarters had distributed 500 new full time equivalents (FTEs) to the regions to begin implementation of 90-Day Study recommendations.

Enforcement Accomplishments

The 90-day study reinforces the Agency's decision to institute an "enforcement first" policy. The main objectives of this policy are to compel PRPs to conduct clean-up actions and to recover costs from PRPs for cleanups conducted by the government using Fund monies. As a result, the percentage of response actions in the remedial pipeline started by PRPs increased to 54 percent during the fiscal year. Specifically, PRPs started 53 percent more RI/FSs, 213 percent more remedial designs (RDs), and 145 percent more RAs than in fiscal 1988.

The estimated work value of the 218 response settlements reached in FY89 totaled over $1 billion, including 71 settlements for RD/RA activities with an estimated value of $747.6 million. EPA also issued 102 Unilateral Administrative Orders (UAOs). PRPs were in compliance with 67 of these UAOs, with an estimated value of $233.8. (Dollar amounts given for negotiated settlements and UAOs are estimates of the present value of work that PRPs have been ordered to undertake, not money actually returned to the Fund.) Additionally, EPA recovered more than $66.5 million from PRPs to replace Fund money spent to clean up Superfund sites.

During fiscal 1988, EPA issued 14 UAOs with an estimated value of $136 million and recovered $55.6 million through cost-recovery settlements. Fiscal 1989 figures represent significant increases over fiscal 1988 accomplishments and illustrate EPA's commitment to using enforcement to compel PRPs to finance Superfund site cleanups whenever possible.

The Superfund Pipeline

The success of the Superfund Program has generally been determined by the number of sites that have been deleted from the National Priorities List (NPL). When a site is deleted from the NPL, however, it has necessarily passed through a number of steps during which the threat posed by the site is evaluated and actions are taken to minimize and eliminate that threat. Given the complexity and long-term nature of the problem at most NPL sites, the success of the Superfund program is better measured by the rate at which sites are passing through these successive stages to project completion. The final stage, deletion from the NPL, is an administrative measure. If sites are being addressed at every stage in this "Superfund pipeline" and are moving steadily from stage to stage, the program is progressing toward the ultimate goal of deleting sites from the NPL.

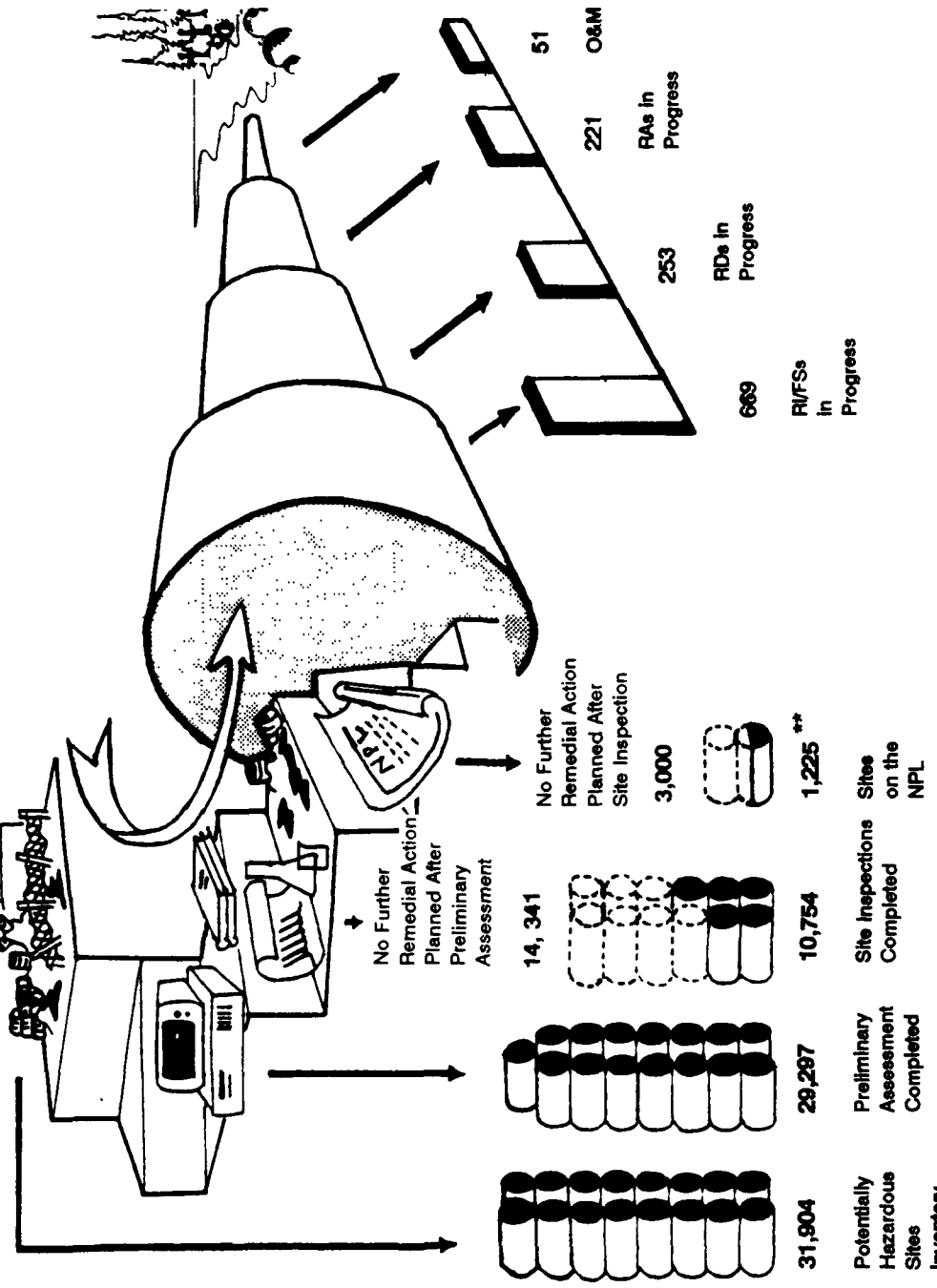
The remedial pipeline is at capacity at current resource levels, although PRPs are conducting an increasing number of responses. At the end of the fiscal year, remedial activity was in progress at 695 sites, including 669 RI/FSs and 221 RAs (compared with 563 RI/FSs, and 132 RAs at 580 sites at the end of FY88). Ongoing activities in the Superfund remedial pipeline are illustrated in Exhibit ES-2. Fiscal 1989 accomplishments include 157 RI/FS starts, 157 actions moving from the RI/FS to the RD stage of the pipeline, contract awards for RAs at 108 sites, and 51 sites moving into the monitoring and site completion stage. Also, the Agency deleted 10 sites from the NPL. Exhibit ES-3 compares fiscal 1989 program accomplishments with historic program accomplishments for activities undertaken before and after a site enters the remedial pipeline.

In the 139 Records of Decision (RODs) and four ROD amendments signed during the fiscal year, there were 100 occurrences of source control treatment technologies. This is the largest number of occurrences of source control treatment technologies in any fiscal year.

Establishing Priorities for Remedial Action Projects

In response to 90-Day Study recommendations, the remedial program undertook a major initiative during the fiscal year to develop a strategy for ensuring that sites in the pipeline presenting the worst threat to human health or the environment are addressed first. Previously, the Agency funded each RA project as it became ready for construction. Because of increases in the pace of projects ready to advance to the RA stage and funding reductions in the FY89 budget, this first ready/first funded approach was no longer appropriate. The new strategy developed by the Agency includes a method for prioritizing sites needing remedial action to ensure that work is begun first at those sites presenting the worst

Exhibit ES-2
Site Discovery and Evaluation and the Remedial Pipeline *



* Exhibit illustrates totals since the enactment of CERCLA. The remedial Pipeline does not include removal actions.

** Remedial activities illustrated do not equal sites listed on the NPL because (1) more than one activity may be in progress at a single site, and (2) there were 249 sites where remedial activity had not yet begun.

SOURCE: CERCLIS; *Superfund Progress Report*, September 30, 1989; Federal Register notices through September 30, 1989.

threats. In this fashion, the Agency will address contamination at sites in stages and ensure that available resources are spent first on sites presenting the most serious risks to public health and the environment. By the end of the fiscal year, EPA had ranked 88 projects where construction is scheduled to begin in fiscal 1990, according to the environmental or public health risk each site presents.

Superfund Environmental Indicators

Spurred on by 90-Day Study recommendations, the Agency continued its development of a system of environmental indicators that will help EPA measure the progress it is making toward reducing threats to human health and the environment. The Agency plans to use these indicators to communicate to Congress, the media, and the public the environmental progress made by the Superfund program during the remedial process. Thus, in addition to citing the number of sites flowing through the pipeline as proof of the achievements of the program, EPA will document specific environmental progress made at sites in each stage of the pipeline.

During the fiscal year, the Agency chose three indicators to be implemented in FY90:

- Achievement of the health and ecological goals specified in the ROD for reduction in the concentration of environmental contaminants;
- Control of an immediate threat to human health by reduction in the actual or potential exposure of human populations to hazardous materials; and
- Documentation of the amount of contaminated material treated, removed, or contained.

The Agency is currently collecting data related to these indicators in all 10 regions.

Removal Program Activities

EPA may conduct a removal action on an NPL or non-NPL site to stabilize, prevent, or mitigate a release or threat of a release. Because they significantly reduce the threat a site poses to human health and the environment, removal actions are an integral part of the Superfund program and contribute substantially to its achievements. During FY89, the removal program continued its successful record. The Agency started 322 removal actions, 68 of which were at sites listed on the NPL. In addition, the Agency completed 249 removal actions exceeding the program target by 46 percent. PRPs funded 86 of the 322 starts and 75 of the 249 completions.

The Agency also clarified requirements that regions must meet when using removal authority and contracting mechanisms to accelerate the pace of response actions at sites with remedial work underway. Additionally, in response to 90-Day Study recommendations, the program began assessing NPL sites, where neither a removal nor an RI/FS has been undertaken. The assessments will determine the sites at which it is necessary to conduct removal actions to reduce immediate hazards to public health and the environment.

Site Assessment

During the pre-remedial stage of the Superfund program, the Agency undertakes investigative and analytical activities to evaluate the threat or potential threat to human health or the environment posed by conditions at a site. Sites enter the program when they are recorded in the CERCLA Information System (CERCLIS). The pre-remedial stage starts when the Agency conducts a preliminary assessment (PA) of a CERCLIS site. (A PA must be conducted on a new CERCLIS site within one year of its entry into the system). EPA completed 2,228 PAs during FY89 bringing the total number of PAs completed by the program to date to 29,297. Based on the PAs, the Agency determined that no further remedial action was necessary at 14,341 sites. As of September 30, 1989, only 2,607 sites in the CERCLIS inventory still required PAs. If a PA indicates that further evaluation is required, the Agency conducts a site inspection (SI) of the site. EPA completed 1,732 SIs during the fiscal year, bringing the total number of SIs completed

by the program to 10,754. Based on the SIs, the Agency determined that no further remedial action was necessary at 3,000 sites. Approximately 6,000 sites still require SIs.

Using information developed in the SI, a site is scored under the hazard ranking system (HRS) to determine whether it is eligible for the NPL. The Agency added 101 new sites to the NPL in fiscal 1989 and proposed 64 additional sites. EPA also deleted 10 sites from the list. At the end of the fiscal year, there were 1,225 sites proposed for listing or listed on the NPL. Program-to-date totals achieved in the pre-remedial program are illustrated in Exhibit ES-3.

Estimate of Resources Necessary to Implement Superfund

Using the Outyear Liability Model (OLM), EPA estimates that it will cost the Superfund program $17.1 billion after FY91 to complete cleanup of sites on the existing NPL. The estimate is based on planning data for active sites and on a number of assumptions about future sites and events. The actual site data are drawn directly from CERCLIS. The three assumptions having the greatest impact on the $17.1 billion estimate include:

- In FY90, approximately 45 percent of all new RI/FS starts will be financed with Fund monies. PRPs, however, will takeover a growing portion of these clean-up actions so that by FY97, PRPs will be starting approximately 65 percent of all new RAs.
- There will be no new additions to the NPL.
- The cost of cleanup will change as the Agency adjusts the way it uses existing technologies and develops new technologies, and as the overall cost of technology changes.

The OLM is a computer-based model designed by EPA to produce meaningful long-range cost predictions, while maintaining flexibility to accommodate a wide range of possible programmatic conditions.

Federal Facility Compliance with Superfund Requirements

EPA continued to focus special attention on improving federal facility compliance with requirements under CERCLA, and a record number of federal facility sites entered the Superfund pipeline (the Agency reclassified one, proposed 52, and listed eight such sites on the NPL during FY89). Although federal facility sites are listed on the NPL, the Superfund program does not finance remedial actions for federal facilities. Instead, the federal agency or department responsible for the contamination of a particular site must fund all remedial activities at that site. EPA entered into 21 Interagency Agreements (IAGs) with the Department of Defense and three with the Department of Energy during FY89 to facilitate the remedial process at 31 NPL sites.

To support the federal facilities enforcement program, the Agency doubled the number of regional personnel available, and correspondingly increased the amount of resources allocated to the program. Also, many regions established federal facility enforcement sections to facilitate the coordination of issues related to federal facilities, such as Resource Conservation and Recovery Act (RCRA)/CERCLA integration.

Development of Treatment Technology

During FY89, the Agency was very active in research and development efforts directed towards identification and testing of new technologies to be used in the cleanup of Superfund sites. The Agency awarded 12 grants for research and development and issued two additional solicitations for proposals. In addition, EPA established several Hazardous Substance Research Centers and an Alternative Treatment Technology Information Center in response to 90-Day Study recommendations. The Agency also published a number of information manuals concerning technology-related research and development.

Additionally, the Office of Research and Development (ORD) expanded the capabilities of several programs in response to 90-Day Study recommendations to provide expanded on-site technical assistance and to facilitate interaction between regions and ORD. The programs include the Superfund Technical Assistance Response

Exhibit ES-3
Summary of Program Activity by Fiscal Year

Fiscal Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Program Total
Removal Completions	--	18	67	108	229	208	176	226	282	249	1,563
CERCLIS Sites[1]	8,000	10,500	13,386	16,309	18,884	22,621	25,194	27,571	30,013	31,904	31,904
PA Completions	2,204	1,072	1,209	1,809	4,447	5,181	4,262	4,001	2,884	2,228	29,297
SI Completions	613	428	566	642	1,308	1,618	1,267	1,343	1,237	1,732	10,754
NPL Sites[2]	--	--	--	546	546	858	888	951	1,175	1,225	1,225
RI/FS Starts	--	21	35	123	155	188	83	183	150	157	1,095
RODs Signed	--	--	4	13	38	68	84	75	152	139	573
RD Starts	--	5	4	12	21	29	45	94	99	157	466
RA Starts	--	--	9	11	25	15	21	54	72	108	315
NPL Deletions	--	--	--	5[3]	--	--	8	--	5	10	28

1 The figures reported in this row represent the cumulative total of sites in CERCLIS at the end of each fiscal year rather than the number added in each fiscal year.
2 The figures reported in this row include proposed and final NPL sites as of the end of each fiscal year.
3 Four of these sites were listed on the Interim Priorities List and were cleaned up prior to the publication of the first group of sites proposed for the NPL. The fifth site was included in the initial list of sites proposed for the NPL. EPA, however, determined that the PRPs had sufficiently cleaned up the site while it was on the list of proposed sites and, therefore, deleted it on September 8, 1983.

SOURCES: *Progress Toward Implementing Superfund: Fiscal Year 1987*, OERR, April 1989; CERCLIS; *FY 1988 ROD Summary Report*, HSCD/OERR, March 1989; *Superfund Site Completions and Deletions from the National Priorities List*, HSCD/OERR, October 25, 1988.

Team, the Treatability Assistance Program, the Alternative Treatment Technology Information Center, and the Superfund Technical Liaison Program.

Fiscal 1989 Superfund Contracting

To support the Superfund program, EPA awarded a total of 81 contracts during fiscal 1989, with a total potential value of $4,998,420,955 over the life of the contracts.

Minority Firm Participation in Superfund Contracting

Approximately $53,699,428 worth of Superfund contracts were awarded to minority firms during FY89. EPA awarded contracts worth $51,600,000 through direct procurement to minority firms. Other federal agencies and departments, and state and local governments awarded contracts worth an additional $1,862,307 to minority firms using Superfund money obtained through cooperative agreements and IAGs.

Public Participation

During fiscal 1989, the Agency began to expand its community relations program. Changes to community relations requirements in the proposed revised National Oil and Hazardous Substances Pollution Contingency Plan (NCP) reflect EPA's new emphasis on the importance of including the public in Superfund program activities. Additionally, the 90-Day Study encourages EPA to increase the role of citizens in the Superfund decisionmaking process. The study specifically emphasizes that the role of citizens at sites being cleaned up by PRPs should be expanded.

Also during fiscal 1989, the Director of OERR began to develop a system for ensuring that all aspects of EPA and other federal agency Superfund public information and outreach programs operate in a coordinated fashion. The system utilizes an inventory management system that simplifies the process by which information regarding Superfund is shared among the various information and outreach services. The Agency also continued its implementation of the Technical Assistance Grant (TAG) Program, awarding 26 TAGs with a combined value nearing $1.3 million during FY89 compared with four during FY88 and increasing TAG program personnel from 10 to 20.

EPA Partnership with States and Indian Tribes

The 90-Day Study encourages the Superfund program to build solid relationships with states and Indian tribes. The Agency, therefore, is strengthening its partnership with states and Indian tribes through cooperative agreements and other mechanisms. EPA entered into 43 core program cooperative agreements with states, including one with an Indian tribe during FY89.

To satisfy the hazardous waste treatment or disposal capacity assurance requirements of CERCLA section 104(c), a majority of states and territories had submitted Capacity Assurance Plans (CAPs) by the end of the fiscal year. All states were required by SARA to submit plans to EPA by October 17, 1989. Also, EPA published an interim final rule, *Cooperative Agreements and Superfund State Contracts for Superfund Response Actions*, and a brochure to assist in identifying sites on Indian Lands and included a new Subpart F in the NCP revisions that combines concepts from various sections of the previous NCP concerning state involvement in Superfund operations.

Major Rulemakings

The Agency published proposed revisions to the National Oil and Hazardous Substances Pollution Contingency Plan on December 21, 1988 and the final revised NCP was published on March 8, 1990. The revisions reflect the CERCLA section 105 requirement that the NCP be revised to incorporate the new statutory requirements of SARA. For the remedial program, the revisions incorporate a process to meet statutory clean-up standards whereby remedial alternatives are evaluated against nine criteria. In addition, the revisions include a new Subpart F that mandates more extensive state involvement, and a new Subpart I that establishes requirements for development of an administrative record. EPA also required that community relations be expanded to provide for increased public participation.

In another major rulemaking effort, the Agency completed the proposed revisions to the HRS, the Superfund pre-remedial tool used to identify sites warranting consideration for inclusion

on the NPL. The proposed revisions to the HRS incorporating SARA requirements were published on December 23, 1988. The revisions will result in a ranking system that is more accurate in assessing potential for exposure, contaminant concentration, and contaminant toxicity. As a result, the HRS will be a better tool for identifying the most problematic sites.

Health-Related Research and Development

ATSDR continued actively researching the effects that contamination at Superfund sites has on human health. During fiscal 1989, ATSDR completed final toxicological profiles of 10 of the group of 25 chemicals for which draft profiles were published in late 1987 and early 1988. Additionally, ORD continued its research in support of the Superfund Public Health Evaluation process.

Introduction

Approach of the Report

This Report documents progress made by EPA toward implementing Superfund during fiscal 1989. As a result of activities during this fiscal year that were not factors in earlier years, this Report emphasizes two themes: First, the Superfund remedial pipeline is filled to capacity at current resource levels and, as we enter fiscal 1990, there is the prospect of a backlog of sites awaiting the start of remedial action for the first time in the program's history. In July of 1989, a total of 88 projects representing $904 million were identified for construction in fiscal 1990. This estimate combines 70 new project starts with 18 projects needing $189 million in additional funding ("ongoing" projects) in FY90, and assumes that $35 million would be required for operation and maintenance (O&M), long-term response (LTR), and mixed funding. The table below details these funding needs by priority category. (See section 1.3.1 for a detailed discussion of the four different priority categories for RAs.) Some of these projects will be funded by PRPs, and some may slip into FY91.

Exhibit I-1
Funding Needs by Project Category

Project Category	Number/Value
O&M, LTR, Mixed $	* *($35 million)*
Ongoing Projects	18 *($189 million)*
Priority 1	5 *($31 million)*
Priority 2	39 *($388 million)*
Priority 3	1 *($5 million)*
Priority 4	2 *($31 million)*
Fourth Quarter	23 *($225 million)*
TOTAL NEED	**88 *($904 million)***

* The entry for O&M, LTR, Mixed $ is solely a cost estimate and is not related to a specific number of projects.

SOURCE: Prepared for this Report.

These data are preliminary and a number of factors will undoubtedly intervene to change both the dollar figures and number of projects. Nevertheless, 75 percent of these projects were already in design, and there is little doubt that the number of projects exceeds available funding.

The second factor, issuance of the 90-Day Study, has resulted in a clearer and more comprehensive strategy for program implementation that has an impact on all areas of response activity. Together, these factors establish the context for reporting accomplishments during this year, and they are expected to have even greater impact in years to come.

Defining the Remedial Pipeline

When a potential hazardous waste site is identified, it goes through a series of steps. The first steps determine if a risk to human health or the environment exists. Through these initial steps, the Agency determines whether a site should enter the remedial pipeline. If a site enters the pipeline, EPA develops and implements clean-up actions to remediate any problems. Following is a description of the specific steps a site goes through before and after it enters the pipeline:

- Preliminary Assessment. Once a potential site is identified, a PA is conducted by reviewing historical records and local or state files, interviewing the site owner/ operator, and obtaining information on the site in relation to its surrounding environment. The resulting site profile is used to determine whether the site requires a site inspection.

- Site Inspection. If it is determined that the site requires further analysis, an SI is conducted during which limited sampling is performed and additional information is gathered to support ranking of the site

(using the HRS) for listing on the NPL. The PA and SI phases are referred to as "pre-remedial" activities. The "remedial" process or remedial pipeline begins with the proposal to add the site to the NPL.

- Remedial Investigation/Feasibility Study. After the site is proposed for the NPL, an 18-24 month RI/FS is conducted. The purpose of the RI/FS is to determine the type and extent of contamination and to evaluate and develop remedial alternatives. The Agency has established a funding goal of $750,000 per RI/FS.

- Record of Decision. Upon completion of the RI/FS, and receipt of public comment on the remedial alternatives, a remedy is selected. The remedy selection process is documented in the ROD.

- Remedial Design. The RD is the development of plans and specifications for the selected remedy. This activity takes an average of one year to complete and is generally budgeted at $700,000.

- Remedial Action. An RA implements the selected remedy. The time frame and cost for performing an RA are as varied as the remedies selected. For budget and planning purposes, the RA is assumed to require 18 months for completion and cost an average of $15 million per operable unit or $25 million per site assuming that there are 1.8 operable units per site.

- Operation and Maintenance/Long-Term Response. Operation and maintenance and long-term response activities are conducted after construction is completed to ensure that the remedy is operational and functional and to maintain the effectiveness or integrity of the remedy.

The 90-Day Study

At the outset of his tenure, the EPA Administrator made a promise to conduct an objective analysis of the current state of the Superfund program. Three months later, these efforts culminated in an in-depth study of the program, *The Management Review of the Superfund Program*, or the 90-Day Study. The 90-Day Study articulates a comprehensive overview of the program's philosophy, and provides concrete, realistic recommendations. The study also draws on program experience, and many of the ideas presented in the Study are ongoing trends that have gained increasing credence over the past few years. The 90-Day Study documents these trends, and suggests new initiatives, that will serve as mid-course adjustments and steer the Superfund program on a definitive course.

The 90-Day Study identifies six major conflicts within the program.

- The public's desire for both quick actions at sites and adequate opportunity for community participation in the remediation and decisionmaking processes.

- The expectation that as a national program Superfund should operate consistently for the nation as a whole, yet remain responsive to varying site-specific requirements.

- Program success is often gauged only in terms of the number of sites completely cleaned up rather than by the extent to which various sites have progressed through significant stages of cleanup.

- The Agency's efforts to meet targets mandated by Congress have driven the program towards achieving administrative goals, rather than actual environmental results.

- EPA has had to strike a balance between securing potentially responsible parties to pay for cleanup and drawing on the revenues of the Superfund. Primary reliance on the Fund will result in swift cleanup, but leveraging responsible party involvement increases the total amount of resources available for cleanup.

- The Agency has had to grapple with the statutorily mandated provision to use permanent treatment technologies to the maximum extent practicable, while the debate continues about their technological

feasibility. Currently, the Agency is engaged in developing innovative permanent treatment remedies, and ensuring the protectiveness of these remedies.

To resolve these conflicts, the 90-Day Study recommends that the Agency adopt an environmental priorities approach to site cleanup. This approach places emphasis on addressing a larger number of sites in stages, where the margin of risk reduction is greatest, rather than focusing narrowly on a smaller number of sites as the rate of marginal returns decreases. This philosophy ensures that the sites posing the greatest public health or environmental risks are addressed first, but remains cognizant of the long-term remediation necessary at most sites. To implement this approach, the Study proposes that the mission of the program encompass three goals: (1) control acute threats immediately; (2) initiate remedial work at sites posing the worst threats; and (3) carefully monitor and maintain sites over the long term to ensure the protectiveness of the remedy selected. To achieve these goals the Study recommends that the Agency employ a six-part strategy:

- Emphasize enforcement to induce private party response;
- Accelerate and improve remedial actions;
- Encourage the use of innovative technologies;
- Re-energize the commitment to community involvement;
- Improve management and administration effectiveness; and
- Communicate progress effectively at the national level.

The recommendations in the Study on methods for achieving these goals both validate existing trends and articulate steps that will guide future work. Those recommendations already in practice at the Agency will continue, and a schedule to implement the remaining recommendations has been set. Published September 21, 1989, the 90-Day Study *Implementation Plan* includes the 120 tasks that, when completed, will effectively transform the ideas of the 90-Day Study into concrete program procedure. The schedule is aggressive -- almost 90 percent of the recommendations are planned for implementation during fiscal year 1990, and over half (72) of the tasks will be completed by next June. The 90-Day Study is discussed in more detail throughout this Report in sections that pertain to its specific recommendations.

Organization of the Report

The organization of the FY89 Report has been modified to reflect its new emphasis. This introduction includes a matrix that charts the progress EPA has made to date in meeting specific statutory deadlines. Chapter 1 summarizes key program developments. It documents progress made in the enforcement and remedial programs toward ensuring that the Superfund pipeline is filled to capacity and that PRPs are conducting or financing remedial activities whenever possible. Chapter 1 also describes progress made in implementing the Superfund environmental indicators initiative, the site prioritization strategy, and new technology-related initiatives. In addition, Chapter 1 summarizes removal program accomplishments.

Chapter 2 documents progress made in other response activities. Section 2.1 presents the accomplishments of the pre-remedial program and describes the site discovery and assessment process. Section 2.2 discusses progress made by EPA to ensure that other federal agencies are conducting clean-up activities at federal facility sites.

Chapter 3 discusses the resources required to complete implementation of Superfund. Chapter 4 presents reports on the use and development of permanent technologies, minority firm participation in Superfund contracting, and sites subject to 5-year review under CERCLA section 121(c).

Chapter 5 consolidates all other program implementation and support activities, including sections on community involvement in the Superfund process, EPA partnership with states and Indian tribes in the remedial process, health-related research and development, major Superfund rulemakings, and resource utilization and contracting.

Appendix A is a matrix that illustrates the status of RI/FSs and RAs in progress on September 30, 1989. Appendix B is a matrix that illustrates the status of RDs in progress at the end of fiscal 1989. All of the RODs signed in fiscal 1989 are summarized in Appendix C. Appendix D is the *EPA Annual Report to Congress: Progress Towards Implementing CERCLA at EPA Facilities as Required by CERCLA section 120(e)(5).* Appendix E is the EPA Inspector General's Report on the required review of this fiscal 1989 Superfund Report to Congress. Appendix F is the Office of Solid Waste and Emergency Response reply to the Report of the Inspector General. All references used in preparing the Report are listed in Appendix G.

For purposes of brevity and consistency, when the acronym "CERCLA" is used in the Report, it refers to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, by the Superfund Amendments and Reauthorization Act (SARA) of 1986. All additional acronyms are highlighted in boxes at the beginning of each chapter.

The sources for the information in each exhibit in the Report are included in the exhibit. The primary source for all data included in this Report is the CERCLA Information System (CERCLIS). The data in CERCLIS are constantly being modified to more accurately reflect events that took place during a particular fiscal year. Data retrieved from the system on different dates, therefore, may not be congruent.

Statutory Requirements for the Report

In addition to providing an overview of EPA FY89 progress in implementing CERCLA, this Report includes the following information specifically required by CERCLA sections 301(h)(1)(A) through (G), 105(f), and 301(h)(2):

- In response to the requirement of section 301(h)(1)(A) to include a detailed summary of each feasibility study, Appendix C contains an abstract of each record of decision signed during FY89.

- The status and estimated date of completion of each feasibility study and remedial action, required by sections 301(h)(1)(B) and (F), are summarized in section 1.2. The status of enforcement actions and a comparison of FY89 enforcement actions with those undertaken in previous years is included in section 1.1. Appendix A contains detailed information concerning the status and estimated time of completion of each feasibility study and remedial investigation. The appendix also provides information required by section 301(h)(1)(C) concerning remedial actions that will not meet previously published schedules.

- The evaluation of newly developed technologies required by section 301(h)(1)(D) is described in section 4.1.

- As required by CERCLA section 301(h)(1)(E), section 4.3 includes a discussion of the progress made in reducing the number of facilities subject to 5-year reviews under CERCLA section 121(c). Section 4.3 also contains information that satisfies the requirements of CERCLA section 121(c) to report to Congress: (1) a list of facilities for which such a review is required; (2) the results of reviews; and (3) any actions taken as a result of such reviews.

- The resource estimates for completion of CERCLA implementation, required by section 301(h)(1)(G), are included in Chapter 3.

- Section 4.2 satisfies the section 105(f) requirement that EPA describe the participation of minority firms in contracts carried out under CERCLA.

- The report of the review conducted under section 301(h)(2) by the EPA Inspector General on the reasonableness and accuracy of this Report to Congress is found in Appendix E.

Progress Toward Meeting Superfund-Related Statutory Requirements

In response to a recommendation of the *Lautenberg-Durenberger Report on Superfund Implementation: Cleaning up the Nation's Cleanup Program*, EPA includes the following matrix, which charts Agency progress in meeting statutory requirements imposed by SARA. The matrix lists all relevant administrative and program implementation (rather than site-specific) requirements by statutory section, describes the mandated activity, and indicates whether the requirement has been met. If the activity has not been completed, its status is reported.

Progress Toward Meeting Superfund-Related Statutory Requirements

CERCLA §[1]	Statutory Deadline	Requirement	Status
§102(a)	12/31/86[2]	EPA to promulgate final regulations establishing reportable quantities (RQs) for all hazardous substances for which proposed RQs were published prior to March 1, 1986	09/29/86, 08/14/89 -- EPA promulgated final RQs for all but two hazardous substances for which proposed RQs were published prior to March 1, 1986 (51 *FR* 34534, 54 *FR* 33426, 54 *FR* 33418); RQs for two remaining substances are expected to be finalized summer 1992
§102(a)	12/31/86[2]	EPA to propose regulations establishing RQs for all hazardous substances for which proposed RQs were not published prior to March 1, 1986	**Completed 03/16/87** -- EPA proposed RQs for all hazardous substances for which RQs were not proposed prior to March 1, 1986 (52 *FR* 8140); EPA proposed RQs for radionuclides (52 *FR* 8172)
§102(a)	04/30/88[2]	EPA to promulgate final regulations establishing RQs for all hazardous substances for which proposed RQs were not published prior to March 1, 1986	08/14/89 -- EPA promulgated final RQs for all but 13 hazardous substances for which RQs were not proposed prior to March 1, 1986 (54 *FR* 33418, 54 *FR* 33426); 05/24/89 -- EPA promulgated final RQs for radionuclides (54 *FR* 22524); RQs for 13 remaining substances are expected to be finalized summer 1992

[1] Requirements of CERCLA as amended by SARA preceed requirements of SARA that do not amend CERCLA.

[2] Dates specified in statute rather than correlated to date of enactment.

Progress Toward Meeting Superfund-Related Statutory Requirements

CERCLA §[1]	Statutory Deadline	Requirement	Status
§104(c)(9)	10/17/89	States to provide assurances of availability of hazardous waste treatment or disposal facilities	**Completed 03/19/90** -- All 50 states and one territory have submitted plans; **12/29/88** -- EPA issued guidance to state officials on providing assurances
§104(i)(2)(A)	04/17/87	Agency for Toxic Substances and Disease Registry (ATSDR)/EPA to produce list of 100 hazardous substances most commonly found at NPL sites that pose significant human health risks	**Completed 04/17/87** -- EPA published list of 100 hazardous substances (52 *FR* 12866)
§104(i)(2)(B)	10/17/88	ATSDR/EPA to produce list of a total of 200 hazardous substances most commonly found at NPL sites that pose significant human health risks	**Completed 10/20/88** -- EPA published list of 200 hazardous substances (53 *FR* 41280)
§104(i)(2)(B)	10/17/89[3]	ATSDR/EPA to add no fewer than 25 hazardous substances to list of those most commonly found at NPL sites that pose significant human health risks	**Completed 10/26/89** -- List of 25 substances published (54 *FR* 43615); additional lists of 25 substances will be published annually through 1991

[1] Requirements of CERCLA as amended by SARA preceed requirements of SARA that do not amend CERCLA.

[3] Due annually on this date through 1991.

Progress Toward Meeting Superfund-Related Statutory Requirements
(continued)

CERCLA §[1]	Statutory Deadline	Requirement	Status
§104(i)(3)	10/17/87[4/]	ATSDR/EPA to prepare no fewer than 25 toxicological profiles annually beginning October 17, 1987, on each of the hazardous substances on the list of those most commonly found at NPL sites that pose significant human health risks	**Completed 10/15/87** -- 25 profiles were announced in the Federal Register (*FR*) (52 *FR* 38340). 18 of these have been finalized as of 12/01/89 (54 *FR* 14037, 54 *FR* 26417, 54 *FR* 49816). The remaining 7 are nearing completion **Completed 12/20/88** -- 25 profiles were announced in the *FR* (53 *FR* 51192). All 25 were finalized December 1989; 08/14/90 -- notice of availability of final profiles published (55 *FR* 33172) **Completed 10/17/89** -- 30 profiles were announced in the *FR* (54 *FR* 42568) and are expected to be finalized in January 1991; ATSDR plans to publish an additional 30 profiles to meet the 10/17/90 deadline
§104(i)(3)	10/17/90	ATSDR to revise and republish profiles as necessary, but at least once every three years	**Not yet due**

[1/] Requirements of CERCLA as amended by SARA preceed requirements of SARA that do not amend CERCLA.

[4/] Profiles for original 100 hazardous substances on list must be completed by 10/17/90. Profiles for hazardous substances added subsequently must be completed within three years after addition to list.

Progress Toward Meeting Superfund-Related Statutory Requirements
(continued)

CERCLA §[1]	Statutory Deadline	Requirement	Status
§104(i)(5)(D)	10/17/87	EPA to promulgate regulations for the payment of costs of health effects research programs	**Completed 03/08/90** -- EPA believes that the revised NCP satisfies the statutory requirement (NCP Subpart B (300.160(d); (55 *FR* 8666)); see also preamble to proposed rule (12/21/88, 53 *FR* 51402). In addition, EPA will publish cost recovery regulations in fall 1990 which will further clarify the categorization of these costs
§104(i)(6)(A)	12/10/88[2]	ATSDR to complete health assessments for facilities proposed for NPL prior to date of enactment	**Completed 12/08/88** -- Health assessments performed for 951 facilities
§104(i)(10)	10/17/88 (every two years)	ATSDR to submit report to EPA and Congress on ATSDR activities	**Completed 08/23/89, 08/31/90** -- Volumes I and II submitted to EPA and Congress
§105(b)	04/17/88	EPA to revise the National Contingency Plan (NCP)	**Completed 03/08/90** -- EPA published revised NCP (55 *FR* 8666)
§105(c)(1)	04/17/88	EPA to promulgate amendments to the Hazard Ranking System (HRS)	12/23/88 -- EPA published proposed revisions (53 *FR* 51962); estimated promulgation date: fall 1990
§105(c)(1)	10/17/88	EPA to establish effective date for the amended HRS	HRS scheduled to take effect 30 days after publication in Federal Register; estimated promulgation date: fall 1990

[1] Requirements of CERCLA as amended by SARA preceed requirements of SARA that do not amend CERCLA.

[2] Dates specified in statute rather than correlated to date of enactment.

Progress Toward Meeting Superfund-Related Statutory Requirements
(continued)

CERCLA §[1]	Statutory Deadline	Requirement	Status
§107(K)(6)	5/	Comptroller General to conduct a study of options for a program for the management of the liabilities associated with hazardous waste treatment, storage, and disposal sites after their closure	**Completed 06/01/90** -- GAO reported entitled: Hazardous Waste -- Funding of Post-Closure Liabilities Remains Uncertain (GAO/RCED-90-64)
§111(k)	Annually	Inspectors General to submit audit reports of all uses of the Hazardous Substances Trust Fund	**Completed September 1988, September 1989, September 1990** -- EPA submitted FY87, FY88, and FY90 reports
§111(o)	01/17/87	EPA to develop and implement procedures to adequately notify concerned local and state officials of limitations on the payment of claims for response costs incurred for sites on NPL	**Completed 02/05/87** -- EPA published notice of regulatory limitations on response claims (52 *FR* 3699)
§112(b)(1)	5/	EPA to prescribe appropriate forms and procedures for response claims filed under CERCLA	09/13/89 -- EPA published proposed regulations to establish response claims procedures (54 *FR* 37892); 11/13/89 -- public comment period closed; estimated promulgation date of final regulations: October 1990
§113(k)	5/	EPA to promulgate regulations that will establish procedures for public participation in the development of the administrative record	**Completed 03/08/90** -- Regulations included in revised NCP Subpart I (55 *FR* 8666)

1/ Requirements of CERCLA as amended by SARA preceed requirements of SARA that do not amend CERCLA.

5/ Specific deadline not stated in statute.

Progress Toward Meeting Superfund-Related Statutory Requirements
(continued)

CERCLA §[1]	Statutory Deadline	Requirement	Status
§116(a)(1)	01/01/88[2]	EPA to complete preliminary assessments (PAs) of all facilities contained on the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) as of date of enactment	**Completed 01/01/88**
§116(a)(2)	01/01/89[2]	Following completion of PAs EPA to complete site inspections (SIs) at facilities contained in CERCLIS as of date of enactment, as necessary	Two regions met statutory schedule; three regions plan to meet goal by October 1990; remaining five regions plan to meet goal by October 1991. EPA is currently preparing a report to Congress, required by CERCLA section 116(c), detailing why goal was missed; report expected to be submitted Spring 1991
§116(b)	10/17/90	Following completion of PAs or SIs EPA to complete evaluation of each facility listed in CERCLIS as of date of enactment, as warranted	**Not yet due**
§116(d)(1)	10/17/89	EPA to start 275 remedial investigations/feasibility studies (RI/FSs)	**Completed May 1989** -- 275 RI/FS starts; 358 RI/FS starts at end of FY89
§116(d)(2)	10/17/90	EPA to start total of 450 RI/FSs only if 275 starts deadline not met	**Not applicable** -- Prior deadline met

[1] Requirements of CERCLA as amended by SARA preceed requirements of SARA that do not amend CERCLA.

[2] Dates specified in statute rather than correlated to date of enactment.

Progress Toward Meeting Superfund-Related Statutory Requirements
(continued)

CERCLA §[1]	Statutory Deadline	Requirement	Status
§116(d)(2)	10/17/91	EPA to start total of 650 RI/FSs only if 275 starts deadline not met	**Not applicable** -- Prior deadline met
§116(e)(1)	10/17/89	EPA to start 175 remedial actions (RAs)	**Completed 10/17/89** -- 178 RA starts at end of FY89
§116(e)(2)	10/17/91	EPA to start total of 375 RAs	**Not yet due**
§117(e)	5/	EPA to promulgate regulations for issuing Technical Assistance Grants	03/24/88 -- Interim final rule (IFR) published (53 *FR* 9736); 12/01/89 -- amendments to IFR published (54 *FR* 49848); estimated promulgation date of final rule: September 1991
§119(c)(7)	5/	EPA to develop guidelines and promulgate regulations on the indemnification of response action contractors	10/06/87 -- EPA issued interim guidance (OSWER Directive #9835.5); 10/31/89 -- EPA published proposed guidance and request for comments (54 *FR* 46012); 02/27/90 -- public comment period closed; final guidance is expected to be issued January 1991; estimated promulgation date of final regulations: August 1991
§119(c)(8)	09/30/89[2]	Comptroller General to report to Congress on application of indemnification of response action contractors provisions	**Completed 09/26/89** -- GAO report entitled: Contractors Are Being Too Liberally Indemnified by the Government (GAO/RCED-89-160)

1/ Requirements of CERCLA as amended by SARA preceed requirements of SARA that do not amend CERCLA.

2/ Dates specified in statute rather than correlated to date of enactment.

5/ Specific deadline not stated in statute.

Progress Toward Meeting Superfund-Related Statutory Requirements
(continued)

CERCLA §[1]	Statutory Deadline	Requirement	Status
§120(c)	5/	EPA to establish Federal Agency Hazardous Waste Compliance Docket and make available for public inspection	**Completed 02/12/88** -- Notice of initial list published (53 *FR* 4280)
§120(c)	Every six months	EPA to publish updates of Federal Agency Hazardous Waste Compliance Docket	**Completed 11/16/88, 12/15/89, 08/22/90** -- EPA published first three updates (53 *FR* 46364, 54 *FR* 51472, 55 *FR* 34492)
§120(d)	04/17/88	EPA shall take steps to assure that a preliminary assessment is conducted for each facility on the Federal Agency Hazardous Waste Compliance Docket	**Completed 04/17/88** -- EPA took steps to assure that federal agencies complied with this process prior to statutory deadline; EPA informs federal agencies of the requirement to gather information on sites and assists agencies in collecting and analyzing such information; PAs have not yet been completed at all federal facilities
§120(d)	04/17/89	Following PAs, EPA to evaluate federal facilities with criteria established in accordance with section 105 under the NCP for determining priorities among releases; those facilities which meet the criteria are to be included on the NPL	EPA evaluates federal facilities where appropriate in light of resource constraints and other demands; as of August 30, 1990, 116 federal facilities have been added to the NPL (55 *FR* 35502); a substantial number of additional sites have been evaluated and determined not to be appropriate for the NPL

1/ Requirements of CERCLA as amended by SARA preceed requirements of SARA that do not amend CERCLA.

5/ Specific deadline not stated in statute.

Progress Toward Meeting Superfund-Related Statutory Requirements
(continued)

CERCLA §[1]	Statutory Deadline	Requirement	Status
§120(e)(1)	[5]	EPA and states to publish timetable and deadlines for completion of RI/FSs at federal facilities listed on NPL	Schedules for completion of RI/FSs at federal facilities are routinely developed pursuant to interagency agreements (IAGs), or are published by EPA and the state when IAG negotiations are unsuccessful. IAGs have been signed for 34 of 41 sites at end of FY89; the seven remaining IAGs are currently being negotiated
§120(e)(1)	10/17/87	Federal agency, department, or instrumentality to begin RI/FS for federal facility listed on NPL prior to date of enactment	Not applicable -- No federal facilities were listed on NPL prior to date of enactment
§120(e)(1)	Not later than six months after listing of federal facility on NPL	Federal agency, department, or instrumentality to begin RI/FS for federal facility listed on NPL	07/22/87 -- First federal facilities listed on NPL (52 *FR* 27620); 03/13/89 -- EPA policy states that a CERCLA RI/FS begins at a federal facility when an IAG is executed or when EPA has approved a workplan pursuant to the IAG (54 *FR* 10520); EPA has approved RI/FS workplans at 34 of the 41 sites and negotiations are currently underway for the seven remaining sites; federal work is occurring at those sites where workplans have been approved

[1] Requirements of CERCLA as amended by SARA preceed requirements of SARA that do not amend CERCLA.

[5] Specific deadline not stated in statute.

Progress Toward Meeting Superfund-Related Statutory Requirements
(continued)

CERCLA §[1]	Statutory Deadline	Requirement	Status
§120(e)(2)	Within 180 days after EPA review of RI/FS	Federal agency, department, or instrumentality to enter into interagency agreement with EPA for completion of RA for federal facility listed on NPL	EPA policy is to enter into an IAG with federal facilities (listed on the NPL) during the RI/FS stage, prior to the RA stage. As a result, RA IAGs are completed well in advance of the statutory mandate; 34 IAGs were signed during the RI/FS stage; the seven outstanding IAGs are currently being negotiated and are expected to be reached within FY90
§120(e)(2)	Not later than 15 months after completion of RI/FS	Federal agency, department, or instrumentality to begin RA for federal facility listed on NPL	**Not applicable** -- At end of FY89, all federal NPL sites were in the RI/FS stage; the federal facilities program does not expect difficulties in meeting this mandate
§120(e)(3)	Submit with annual budget	Federal agencies with facilities subject to interagency agreements for RA to review alternative agency funding to provide for costs of RA; agencies to submit statement of the hazard posed by facilities and identify consequences of failure to begin and complete RA	**Completed January 1987, January 1988, January 1989, January 1990** -- Included in annual budget submissions to Congress
§120(e)(5)	Annually	Federal agency, department, or instrumentality to submit report to Congress on progress in implementing CERCLA requirements concerning federal facilities	**Completed May 1989, April 1990** -- EPA's FY87 and FY88 reports submitted; EPA's FY89 report will be included in FY89 Report to Congress, required by CERCLA Section 301(h), scheduled to be submitted fall 1990

1/ Requirements of CERCLA as amended by SARA preceed requirements of SARA that do not amend CERCLA.

Progress Toward Meeting Superfund-Related Statutory Requirements
(continued)

CERCLA §[1]	Statutory Deadline	Requirement	Status
§120(h)(2)	04/17/88	EPA to promulgate regulations in consultation with General Services Administration on the form and manner of notice required whenever any federal department, agency, or instrumentality enters into a contract to sell or transfer property owned by the United States on which a hazardous substance was stored, disposed, or released	**Completed 04/16/90** -- Final rule published (55 *FR* 14208)
§121(f)	5/	EPA to promulgate regulations providing for state involvement in all facets of remedial response regulations	**Completed 03/08/90** -- Regulations included in revised NCP Subpart F (55 *FR* 8666)
§122(e)(1)(C)	5/	EPA to issue procedures for special notice regarding negotiation with potentially responsible parties (PRPs)	**Completed 10/19/87** -- EPA sent procedural guidelines to Regional Administrators from Assistant Administrator for OSWER (OSWER Directive #9834.10)
§122(e)(3)(A)	5/	EPA to develop guidelines for preparing nonbinding preliminary allocations of responsibility	**Completed 05/28/87** -- EPA published interim guidelines (52 *FR* 19919)
§123(d)	10/17/87	EPA to promulgate regulations for reimbursement to local governments for costs incurred in responding to releases or threatened releases of hazardous substances	10/21/87 -- Interim final rule published (52 *FR* 39386); estimated promulgation date of final rule: February 1991

1/ Requirements of CERCLA as amended by SARA preceed requirements of SARA that do not amend CERCLA.

5/ Specific deadline not stated in statute.

Progress Toward Meeting Superfund-Related Statutory Requirements
(continued)

CERCLA §[1]	Statutory Deadline	Requirement	Status
§126(c)	Submit with FY88 budget request	EPA to submit report to Congress on hazardous waste sites on Indian lands	**Completed 11/06/87** -- Report submitted to Congress
§301(c)(1)	04/17/87	Department of Interior to issue regulations for the assessment of damages for injury to, destruction of, or loss of natural resources resulting from a release of oil or a hazardous substance	**Completed 02/22/88** -- Final regulations published (53 *FR* 5166)
§301(g)	10/17/87	Comptroller General to submit report to Congress on the results of the insurability study	**Completed 10/16/87** -- GAO report entitled: Issues Surrounding Insurance Availability (GAO/RCED-88-2)
§301(h)(1)	01/01/88[2]	EPA to submit annual report to Congress on CERCLA implementation	**Completed May 1989, April 1990** -- FY87 and FY88 reports submitted to Congress; FY89 report is under OMB review and is scheduled to be submitted fall 1990
§306(a)	11/17/86	Department of Transportation (DOT) to list and regulate under the Hazardous Materials Transportation Act each substance designated as hazardous under CERCLA (within 30 days of date of enactment or time of listing or designation, whichever is later)	**Completed 08/21/89** -- DOT amended Hazardous Materials Regulations by revising the "List of Hazardous Substances and Reportable Quantities" (54 *FR* 34666)

[1] Requirements of CERCLA as amended by SARA preceed requirements of SARA that do not amend CERCLA.

[2] Dates specified in statute rather than correlated to date of enactment.

Progress Toward Meeting Superfund-Related Statutory Requirements
(continued)

CERCLA §[1]	Statutory Deadline	Requirement	Status
§310(d)(1)	5/	EPA to issue regulations describing manner of notice of citizen suits	01/26/89 -- Proposed rule published (54 *FR* 3918); estimated promulgation date of final rule: December 1990
§311(a)(6)	07/17/87	Health and Human Services through National Institute for Environmental Health Sciences to issue plan to support and develop research and training program related to evaluation of the risks to human health by hazardous substances	**Completed 09/14/87** -- Notice of availability of final version of plan published (52 *FR* 34721)
§311(b)(5)(B)	01/17/87	EPA to publish annually a solicitation for innovative or alternative technologies suitable for full-scale demonstration at Superfund sites	**Completed January 1986, January 1987, January 1988, January 1989, January 1990** -- Solicitations published
§311(e)	Submit with annual budget request	EPA to submit report to Congress on progress of the research, development, and demonstration of alternative or innovative treatment technologies program	**Completed February 1988, March 1989, March 1990** -- FY87, FY88, and FY89 Superfund Innovative Technology Evaluation (SITE) program reports submitted to Congress
§312(e)	5/	EPA to conduct habitability and land use study of the Love Canal Emergency Declaration Area, and to work with New York State (NYS) to develop recommendations based upon the study results	**Completed 07/28/88** -- Study submitted to NYS Commissioner of Health; September 1988 -- Commissioner issued follow-up report; issue undergoing continuing discussion

1/ Requirements of CERCLA as amended by SARA preceed requirements of SARA that do not amend CERCLA.

5/ Specific deadline not stated in statute.

SARA §[1]	Statutory Deadline	Requirement	Status
§118(b)	01/17/87	EPA to grant $7.5 million to New Jersey for removal and temporary storage of radium contaminated soil	**Completed 01/15/87** -- Grant made to New Jersey
§118(d)	07/01/87[2]	Comptroller General to submit report to Congress on study of shortages of skilled personnel in EPA	**Completed 10/26/87** -- General Accounting Office (GAO) report entitled: Improvements Needed in Work Force Management (GAO/RCED-88-1)
§118(f)	03/01/87[2]	ATSDR to submit report to Congress on the nature and extent of lead poisoning in children from environmental sources	**Completed 07/12/88** -- Report submitted to Congress
§118(j)	04/17/87	EPA to submit report to Congress on joint use of vehicles for transportation of hazardous substances	**Completed 04/20/87** -- Report submitted to Congress
§118(k)(1)	10/17/87	EPA to submit report to Congress on radon site identification and assessment	**Completed 02/23/90** -- Report submited to Congress
§118(k)(2)	02/01/87[2]	EPA to submit annual report on Radon Mitigation Demonstration Program	**Completed 06/12/87, 01/18/89, 02/26/90** -- Three reports have been submitted; 1989 report is in final draft form and is expected to be submitted December 1990

[1] Requirements of CERCLA as amended by SARA preceed requirements of SARA that do not amend CERCLA.

[2] Dates specified in statute rather than correlated to date of enactment.

Progress Toward Meeting Superfund-Related Statutory Requirements
(continued)

SARA §[1]	Statutory Deadline	Requirement	Status
§118(n)(1)	04/17/87	Department of Energy (DOE) to carry out program of testing and evaluation of technologies which may be utilized in responding to liquified gaseous and other hazardous substance spills at the Liquified Gaseous Spills Test Facility	**Completed 06/30/87** -- Memorandum of Understanding developed among DOE, EPA, and Department of Transportation (DOT). DOE has suggested collaborative R&D efforts and has requested concurrence on such efforts from EPA and DOT
§121(b)(2)	11/17/86	EPA Administrator to certify in writing that Records of Decision (RODs) or consent decrees covering remedial action, signed within 30 days of enactment of SARA, comply to the maximum extent practicable with Section 121 of CERCLA	**Completed 11/17/86** -- All three RODs signed comply; no consent decrees lodged during this period
§126(a)	10/17/87	Department of Labor (DOL) to promulgate standards for the health and safety protection of employees engaged in hazardous waste operations	**Completed 03/06/89** -- DOL standards published (54 *FR* 9294)
§126(e)	12/17/86	DOL to issue interim final rule (IFR) on worker protection standards	**Completed 12/19/86** -- IFR published (51 *FR* 45654)
§126(f)	Not later than 90 days after promulgation of DOL final regulations	EPA to promulgate worker protection standards identical to those contained in the section 126(a) OSHA regulations	**Completed 06/23/89** -- Final standards published (54 *FR* 26654)

1/ Requirements of CERCLA as amended by SARA preceed requirements of SARA that do not amend CERCLA.

Progress Toward Meeting Superfund-Related Statutory Requirements
(continued)

SARA §[1]	Statutory Deadline	Requirement	Status
§205(b)	07/17/87	States to develop inventories of all underground storage tanks containing regulated substances	**Completed 07/17/87** -- All states submitted inventories to EPA
§205(h)	01/17/88	Comptroller General to submit report to Congress on study of the availability of pollution liability insurance, leak insurance, and contamination insurance for owners and operators of petroleum storage and distribution facilities	**Completed 01/15/88** -- GAO report entitled: Insuring Underground Petroleum Tanks (GAO-RCED-88-39)
211(a)	Each fiscal year	Secretary of Defense to submit report to Congress on progress in implementing Defense Environmental Restoration Program	**Completed March 1988, March 1989, February 1990** -- FY87, FY88, and FY89 reports submitted to Congress

1/ Requirements of CERCLA as amended by SARA preceed requirements of SARA that do not amend CERCLA.

CHAPTER

1
Key Program Developments

Significant activity in all program areas and on several new initiatives has resulted in considerable progress in moving sites into and through the pipeline to completion. To date, EPA has deleted 28 sites from the NPL, 10 of which were deleted in FY89. A greater proportion of those remedial projects underway in FY89 involved PRP funding than ever before. Since the passage of SARA, the Agency has reached agreements with PRPs for approximately $1.8 billion worth of site work through enforcement actions. In FY89 alone, PRPs agreed to undertake or fund approximately 54 percent of all starts of removal actions, RI/FSs, RDs, and RAs. EPA also reached response settlements with PRPs worth approximately $1,033.7 million in the fiscal year. This represents more than a five-fold increase in the dollar value of cleanup work in enforcement settlements since the passage of SARA. Exhibit 1.0-1 illustrates the acceleration of RI/FS, RD, and RA project starts by PRPs during the post-SARA time period.

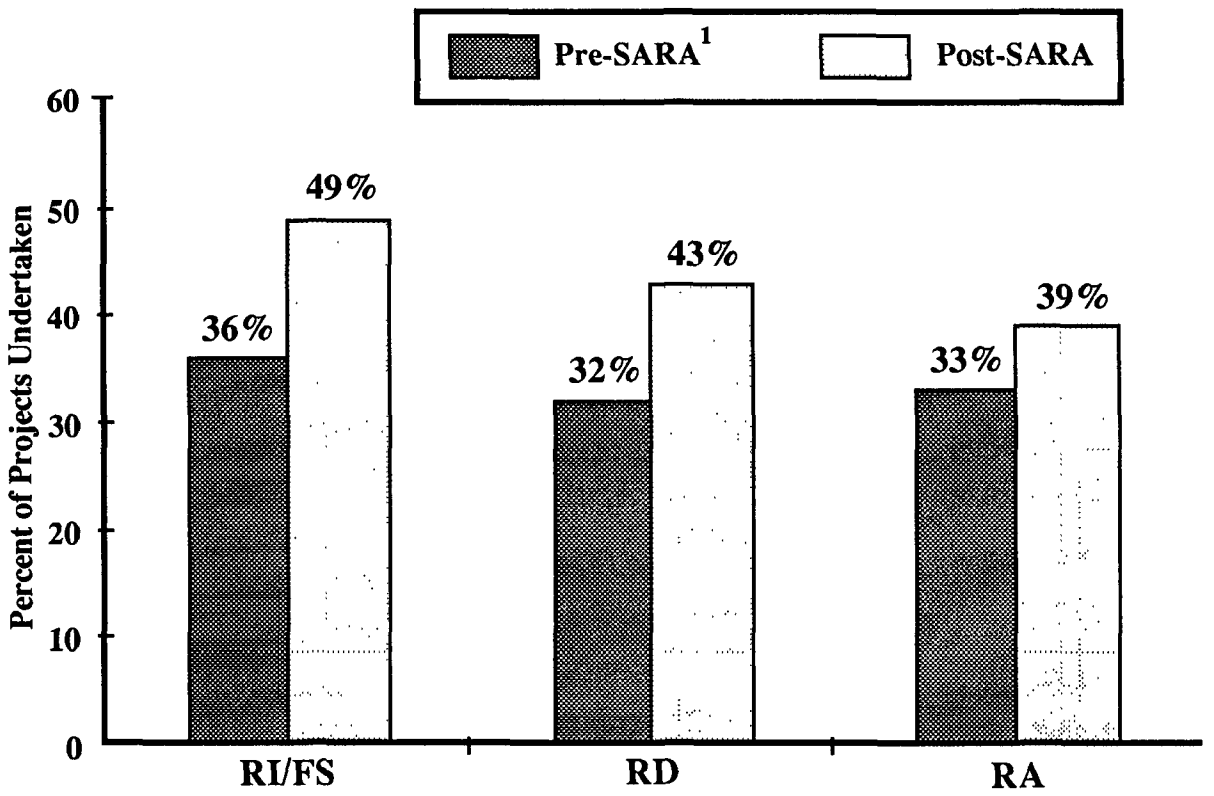
Additionally, the removal program continued its aggressive effort to ensure that sites presenting immediate threats were stabilized. Fiscal 1989 removal program accomplishments were only slightly lower than the record-breaking accomplishments of fiscal 1988. The removal program, in response to 90-Day Study recommendations, also began evaluating NPL sites where RI/FSs had not been initiated or previous removal actions had not been undertaken to assess whether conditions at these sites warranted immediate action. As of the end of the fiscal year, the Agency or PRPs had begun work at most sites listed on the NPL (see Exhibit 1.0-2).

The record number of ongoing projects has filled the remedial pipeline to capacity, requiring the Agency to develop a strategy for

Acronyms Introduced in Chapter 1

AOC	-	Administrative Order on Consent
ARAR	-	Applicable or Relevant and Appropriate Requirement
ATSDR	-	Agency for Toxic Substances and Disease Registry
ATTIC	-	Alternative Treatment Technology Information Center
CERCLA	-	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CERCLIS	-	CERCLA Information System
DOJ	-	Department of Justice
EE/CA	-	Engineering Evaluation/Cost Analysis
EPA	-	Environmental Protection Agency
ERD	-	Emergency Response Division
HSCD	-	Hazardous Site Control Division
NCP	-	National Contingency Plan
NEIC	-	National Enforcement Investigations Center
NPL	-	National Priorities List
OERR	-	Office of Emergency and Remedial Response
OMSE	-	Office of Management Systems and Evaluation
ORD	-	Office of Research and Development
OSC	-	On-Scene Coordinator
OWPE	-	Office of Waste Programs Enforcement
PRP	-	Potentially Responsible Party
RA	-	Remedial Action
RD	-	Remedial Design
RI/FS	-	Remedial Investigation/Feasibility Study
ROD	-	Record of Decision
RPM	-	Remedial Project Manager
RREL	-	Risk Reduction Engineering Laboratory
SARA	-	Superfund Amendments and Reauthorization Act of 1986
SRP	-	Superfund Removal Procedures

Exhibit 1.0-1
Percentage of Remedial Projects Undertaken by Potentially Responsible Parties Since the Enactment of SARA



1 The Superfund Amendments and Reauthorization Act of 1986 (SARA) was signed into law on October 17, 1986.

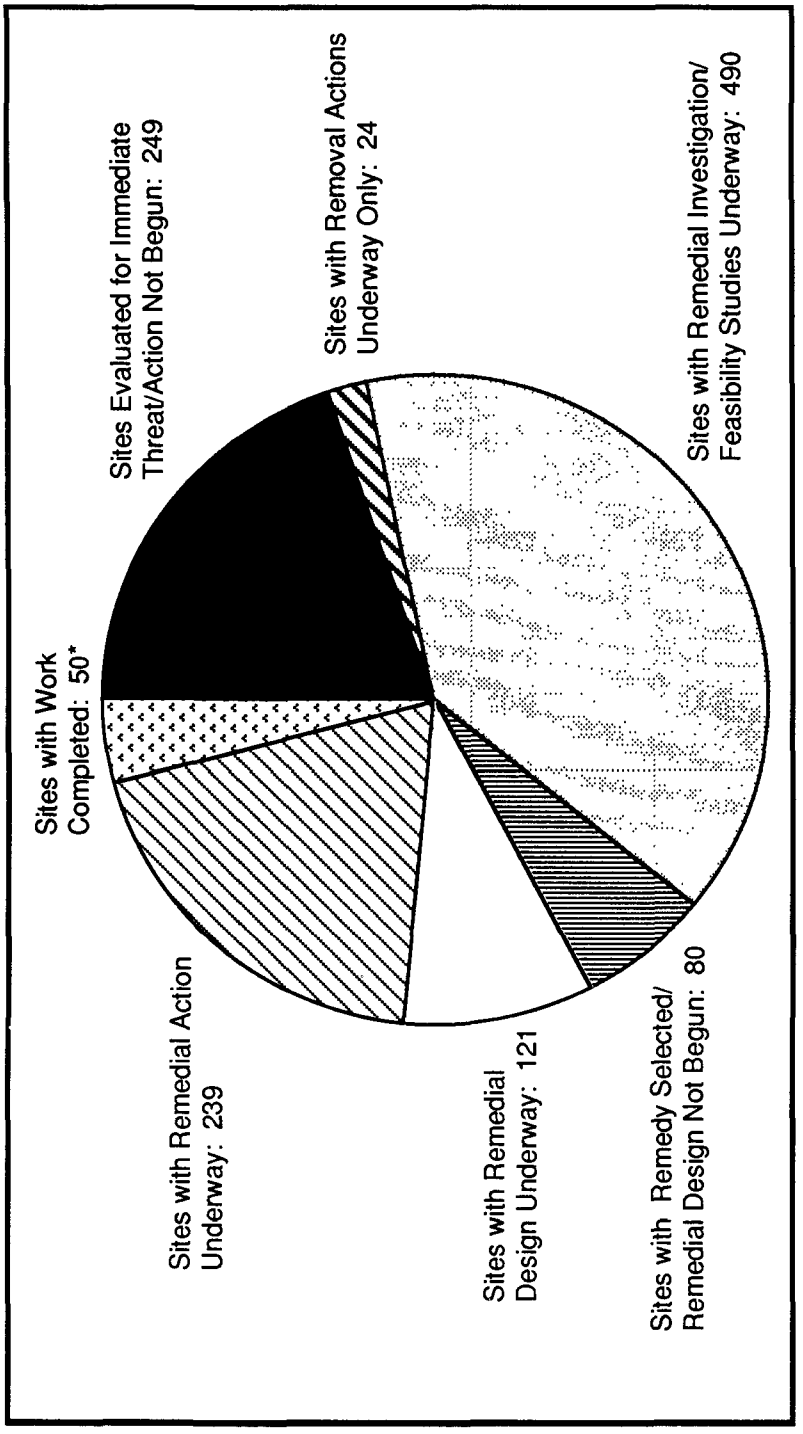
SOURCE: CERCLIS

Acronyms Introduced in Chapter 1
(continued)

START - Superfund Technical Assistance Response Team
STLP - Superfund Technical Liaison Program
TAP - Treatability Assistance Program
UAO - Unilateral Administrative Order

establishing remedial action priorities that focus on the worst sites and worst problems first. In fiscal 1989, through the Superfund Environmental Indicators initiative, the Agency began to assess not only the quantity of work performed, but also the quality of environmental progress in reducing human health and ecological risks. The 90-Day Study provided the Agency with momentum and a clear strategy to continue progress achieved during fiscal 1989.

Exhibit 1.0-2
NPL Sites Where Work Has Begun



Sites with Work Begun or Completed	1,004
Proposed NPL Sites	337
Final NPL Sites	888
Total Proposed and Final NPL Sites	1,225
Deleted NPL Sites	*28*
Total Past and Current NPL Sites	1,253

* Includes 28 deleted sites.

NOTE: Although there may be more than one remedial activity in progress at a single site, only the most advanced activity is counted for this exhibit.

SOURCES: CERCLIS; *Federal Register* notices through 9/30/89.

1.1 Enforcement Program Activities

The aim of the Superfund enforcement program is to place responsibility for cleanup of hazardous waste disposal sites on generators and transporters of the wastes and on the owners or operators of the sites. Relatively small investments of enforcement resources can yield significant environmental and public health benefits. During fiscal 1989, the Agency articulated a strategy that emphasizes the involvement of PRPs at a larger percentage of sites through greater use of statutory enforcement measures, which include flexible settlement procedures.

The 90-Day Study reinforced the Agency's commitment to enforcement activities. A central theme of the Study was greater use of the program's enforcement powers to maximize the amount of PRP-lead work at Superfund sites. The 90-Day Study provided numerous recommendations for enforcement, many of which were based on ongoing enforcement initiatives. This Report reviews the most significant recommendations and focuses in particular on FY89 initiatives and accomplishments related to them.

1.1.1 Integrating Program Priorities: The One Superfund Program Approach

EPA believes that it is essential to include PRPs as full contributors to program implementation from the start of cleanup. Superfund's current authorization of $8.5 billion is insufficient to address the continually growing universe of Superfund sites. Increasing the role of private parties, and thereby conserving the Fund for sites where no PRP can be identified, true "orphan" sites, among other situations, is a key factor in the Agency's planning process. The foremost consideration, however, is the protection of human health and welfare and the environment. One of the Agency's goals, then, is to integrate the Superfund priorities of expediting site cleanup and maximizing PRP-lead field work. To integrate these priorities, the Agency has formulated a One Superfund Program approach that will provide greater flexibility in overall implementation of the priorities.

Prior to fiscal 1989, at the early stages of the remedial pipeline, the Agency classified sites as either Fund- or enforcement-lead. This early classification led to differing clean-up processes for the site categories. For example, classification of a site as enforcement-lead often delayed the initiation of RAs to allow EPA to conduct PRP searches, notifications, and negotiations. Many times, if those efforts failed, remediation would be further delayed while EPA allocated Fund resources for the site.

Under the One Superfund Program approach, the Agency completes a thorough PRP search and negotiates with any viable PRPs it locates before classifying a site as Fund- or enforcement-lead. If the Agency and the PRPs have not reached a settlement within a specified period of time, the Agency will proceed to use the Fund to respond to contaminated sites. When the Agency chooses to take Fund-lead response actions under the One Program approach, it intends to pursue cost recovery both more quickly and vigorously than in the past. The availability of Superfund resources ensures that site cleanup and protectiveness of human health and the environment are primary, and that financing is secondary.

Under this new approach, even when efforts to include PRPs in remediation fail at the early stages of the remedial pipeline, the Agency will continue to consider PRP involvement at later stages. Accordingly, the Agency will be able to initiate clean-up actions quickly, without encountering the delays imposed by making an initial, inflexible decision to classify a site as enforcement-lead. The implementation of the One Superfund Program approach will ensure that PRPs assist the Agency in undertaking a maximum number of cleanups.

Implementation of the One Superfund Program Approach

EPA is using two tools to implement the One Superfund Program approach. The first tool is the establishment of a single, integrated timeline for all sites regardless of whether the project is eventually financed by the Fund or PRPs. PRP searches and other enforcement activities will be conducted at every site. The timeline establishes goals for line managers to use in planning their approach to site remediation. EPA expects to

move the entire Superfund program closer to this overall model of timely action, using the resources and infrastructure improvements provided as a result of the 90-Day Study. As ongoing projects progress through the stages of the remedial pipeline, the timeline will come to serve as a benchmark for assessing progress at sites.

The second tool is the joint Office of Waste Programs Enforcement (OWPE)/Office of Emergency and Remedial Response (OERR) matrix system, which will enable managers to establish, test, and adjust resource levels by:

- Identifying the most significant categories of program priorities;
- Listing all program activities to which EPA allocates resources; and
- Estimating the funding level needed to support each activity.

A closely related concept is EPA's initiative for broad site management, which is being developed for use by line managers. With these tools and concepts, EPA will be able to mitigate immediate threats while moving sites toward cleanup using PRP resources as the first source of funding.

Under the One Program approach, EPA is organizing its site activities to ensure that each region designates a site manager who is familiar with both Fund responses and enforcement activities. Ultimately, each person serving in this newly defined role is responsible for coordinating clean-up activities. Site managers are supported by groups skilled in particular areas of the Superfund process. Although EPA does not mandate a specific form of organization for the support units, it encourages the provision of an appropriate skill mix (including experts in legal, investigative, administrative, and technical matters) to enhance the enforcement process. Several regions formally reorganized during fiscal 1989 to implement the One Program approach through the matrix, and other regions are moving in that direction.

1.1.2 Enforcement Program Accomplishments in the Field

EPA's enforcement program accomplishments in fiscal 1989 far surpassed its comparable accomplishments in any previous year. The Agency increased the percentage of PRP-lead work in almost all program areas, including RI/FSs and the design and implementation of remedial actions. The range of accomplishments demonstrates that EPA is successfully exercising its enforcement authorities at several stages of the remedial pipeline. Exhibit 1.1-1 illustrates that Superfund enforcement momentum is increasing.

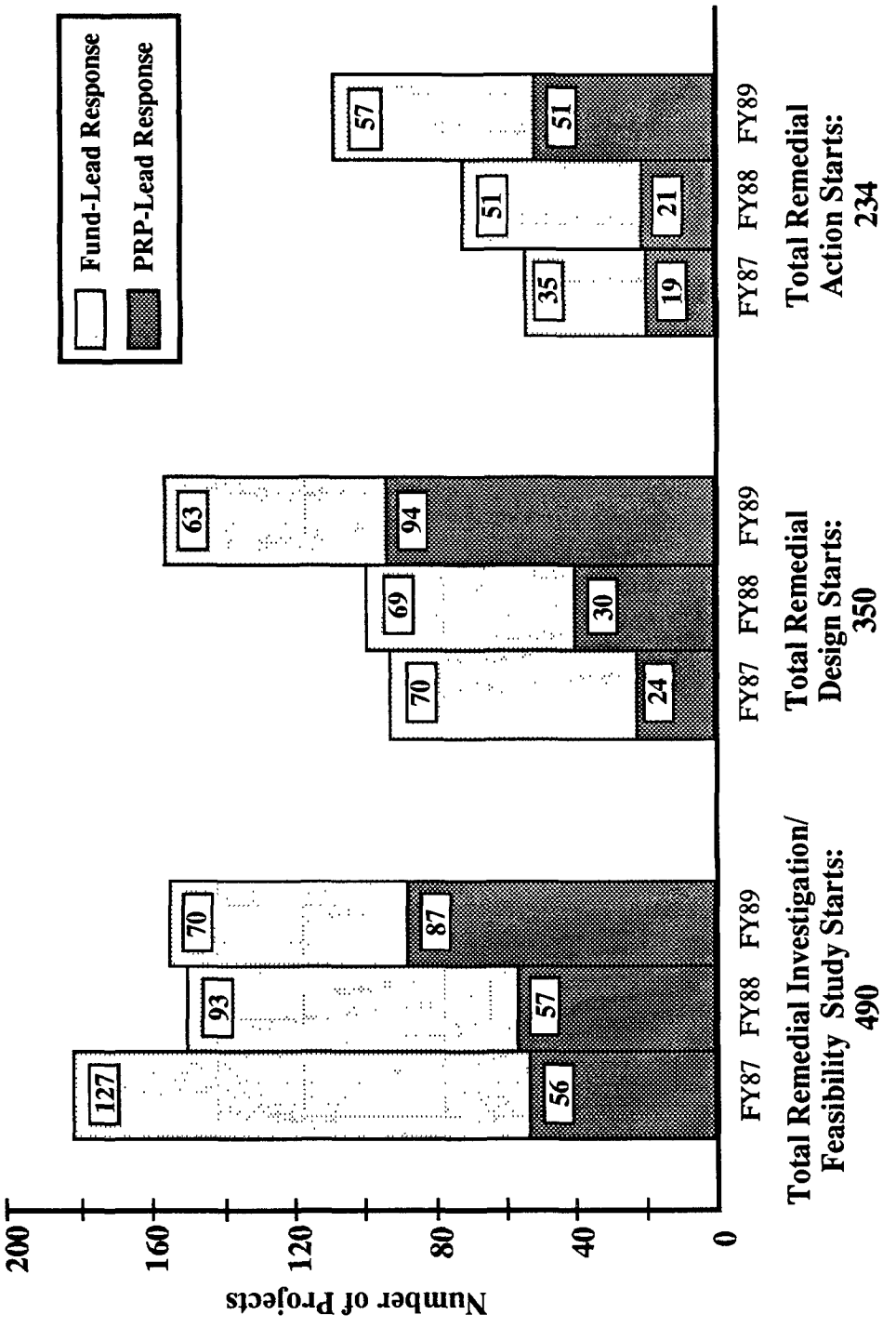
PRPs were involved in a greater percentage of RAs in FY89 than in any previous fiscal year. EPA completed eight final RAs for sites at which the Agency does not anticipate initiating any additional work; PRPs financed five of these final RA completions.

With regard to RA starts, PRPs financed 51 of the total of 108 RAs started in FY89. These enforcement accomplishments are the highest since the enactment of SARA. In FY87, PRPs financed 19 RAs, and in FY88, they financed 21. Additionally, of the 157 RD starts in FY 1989, PRPs financed 94. (EPA did not track these data in a comparable fashion before the enactment of SARA.)

Of the 157 RI/FSs started during FY89, PRPs financed 87, or 55 percent. This represents a continued trend of increasing PRP involvement in conducting RI/FSs over the past several years. In FY87, PRPs financed 38 percent of the RI/FS first starts; in FY88, they financed 48 percent.

The Agency's accomplishments in securing PRP participation in removal program activities were only slightly lower than in fiscal 1988. Of the 322 removal action starts, PRPs financed 86. Of the 249 removal action completions, PRPs financed 75. (During fiscal 1988, PRPs financed 108 of 328 removal starts and 74 of 282 removal completions.)

Exhibit 1.1-1
Potentially Responsible Party Response as a Proportion of Superfund Remedial Activities



SOURCES: CERCLIS; *Progress Toward Implementing Superfund: Fiscal Year 1988*, OERR, April 1990; *Progress Toward Implementing Superfund: Fiscal Year 1987*, OERR, April 1989.

1.1.3 Enforcement Program Accomplishments in Compelling Potentially Responsible Parties to Undertake Field Work and in Recovering Costs

EPA uses three major procedures to induce PRPs to undertake and finance cleanups. First, under CERCLA section 122, EPA negotiates enforcement agreements with PRPs, if the PRPs are willing to and capable of undertaking the necessary field work. These agreements are either (1) a judicial consent decree for remedial action; or (2) an administrative order on consent (AOC) for removal actions issued by the Agency. Both forms of agreement are enforceable in federal District Court, and EPA oversees work performed under both forms of agreement. The Department of Justice (DOJ) must approve cash-out settlements with values greater than $500,000.

Second, if EPA cannot reach an enforcement agreement, it can issue a unilateral administrative order (UAO) against the PRP under CERCLA section 106. Under this course of action, EPA directs the PRP to perform the necessary field work. If the PRP does not respond to the order, EPA may litigate to compel performance and seek statutory penalties. In addition, where the Agency undertakes cleanup, PRPs may also be liable for treble damages. Finally, if EPA undertakes the necessary field work, it will file suit under CERCLA section 107 against the PRPs to recover monies spent and reimburse the Fund.

To expedite the settlement process and in response to the 90-Day Study, EPA has made efforts to improve intergovernmental coordination of Superfund enforcement activities. In particular, EPA has established a case management planning process with DOJ to expedite enforcement and settlement decisionmaking.

Actions Taken Under CERCLA Sections 106 and 122

EPA negotiated a total of 218 enforcement settlements with an estimated value of $1,033.7 million in FY89, the highest number and value of work to be undertaken since the enactment of SARA (see Exhibit 1.1-2). This total includes 49 consent decrees and 22 UAOs for RD/RA work. The estimated value of these 71 RD/RA enforcement activities is $747.6 million. The Agency also issued 147 orders compelling PRPs to undertake other activities, including 117 removal actions. The estimated value of these 147 activities is $286.1 million.

Actions Taken Under CERCLA Sections 107

EPA recovered $66.5 million during FY89 from PRPs, which represents a continued upward trend in the cost recovery program. EPA recovered from PRPs $18.86 million in fiscal 1987 and $55.6 million in fiscal 1988.

1.1.4 Status of Enforcement Projects in the Remedial Pipeline

Under CERCLA sections 301(h)(1)(B) and (F), EPA must report to Congress the status and estimated completion date of each Fund- and enforcement-lead RI, FS, and RA project in progress at the end of FY89. Section 301(h)(1)(C) requires EPA to provide notice of RI/FSs that will not meet a previously published schedule for completions and to estimate new dates of completion. On September 30, 1989, PRPs were conducting a total of 366 clean-up actions. Of these 366 projects, 10 were ahead of schedule, 113 were on-schedule, and 91 were behind schedule. Projects began during the fiscal year accounted for 134 of the total. There also were 28 projects with no previous estimated date of completion. The projects in progress and their status are listed in Appendix A.

1.1.5 Current Enforcement Activities

In addition to the value of work completed by PRPs, EPA tracks two other types of cost information related to enforcement activities: (1) dollars allocated to the enforcement program from the Agency's annual budget for external support; and (2) EPA's costs for PRP oversight.

The Agency's renewed commitment to including PRPs throughout the stages of the remedial pipeline is demonstrated by the increases

Exhibit 1.1-2
Number and Value of Superfund Settlements for Fiscal 1987 Through Fiscal 1989

Type of Activity	Fiscal 1987		Fiscal 1988		Fiscal 1989	
Mixed Funding Decree for RD/RA	1	($45 million)	2	($13.4 million)	4	($69 million)
Unilateral Administrative Order for RD/RA	4	($2.2 million)	14	($12.4 million)	22	($245.7 million)
Consent Decree for RD/RA	8	($45 million)	28	($302.9 million)	45	($432.9 million)
Other Enforcement Activities (Removals, RI/FSs, and Other Response Activities)	101	($83 million)	169	($249.6 million)	147	($286.1 million)
TOTAL	**114**	**($175.2 million)**	**213**	**($578.3 million)**	**218**	**($1,033.7 million)**

SOURCE: U.S. EPA Office of Enforcement and Compliance Monitoring

in the enforcement budget allocations for fiscal 1989 and 1990. In response to the 90-Day Study, toward the close of fiscal 1989, EPA corrected its pricing factors for performing remedial activities. Subsequently, EPA increased the funding for PRP searches and oversight of PRP-lead removal actions in Regions 3, 4, 5, 7, 8, and 9. Congress also has authorized EPA to add 20 civil investigators to regional staffs to perform PRP searches and pursue cost recovery. In FY90, the Agency will provide analytical support and labor-saving tools for strengthening the regions' ability to oversee PRP-lead projects.

Also, during the fiscal 1989 budget planning process, the Agency greatly increased its resource allocations for remedial actions in all 10 regions, in comparison to previous fiscal years. These increased allocations will be channeled to support ongoing remedial oversight and PRP searches, as well as to initiate negotiations with PRPs to perform RDs and RAs.

During the fiscal year, EPA initiated a program-wide, flexible funding approach that (1) ensures the success of the One Program approach; and (2) emphasizes enforcement first, while adhering to a response timetable. This policy gives the regions the flexibility to shift funds among sites and to move quickly between enforcement activities and response activities, where necessary. Under the policy, the regions can transfer resources among categories of activities, provided that the region can still meet accountability commitments and notification requirements. The policy ensures that if additional resources become available because EPA reaches a settlement for a site with a PRP, the region has the opportunity to apply the resources that were originally allocated for that site to cleaning up other high-priority sites within that region.

1.1.6 Other Enforcement Activities

In fiscal 1989, OWPE conducted *The Removal Enforcement Interface Study* that addressed the initiation and implementation of enforcement activities for removal actions. The study made recommendations for both EPA Regions and Headquarters to improve the timeliness and efficiency of and to increase the number of PRP-lead removal actions. In particular, the study addressed reorganizing regional removal and enforcement personnel, expediting PRP searches and notification, and facilitating negotiations with PRPs.

The National Enforcement Investigations Center (NEIC), located in Denver, Colorado, provided important support to EPA during FY89 in responding to both civil and criminal CERCLA investigations. In the area of technical support for judicial enforcement of Superfund cases, NEIC was involved in the development of eight new civil cases and continued to support the development of 58 criminal and 17 civil Superfund cases. Also, within NEIC's Criminal Investigation Program, 77 investigations were conducted on cases involving some CERCLA activity; two of these cases involved no statutory requirements other than those of CERCLA.

1.2 Summary of Activities in the Remedial Pipeline

Nine years after enactment of CERCLA and three years into the Agency's implementation of SARA, the level of project activity in the Superfund program has reached a peak. At current resource levels, the project workload at the various phases of the remedial pipeline is at capacity and will remain so for the foreseeable future.

1.2.1 Remedial Activity Status Report

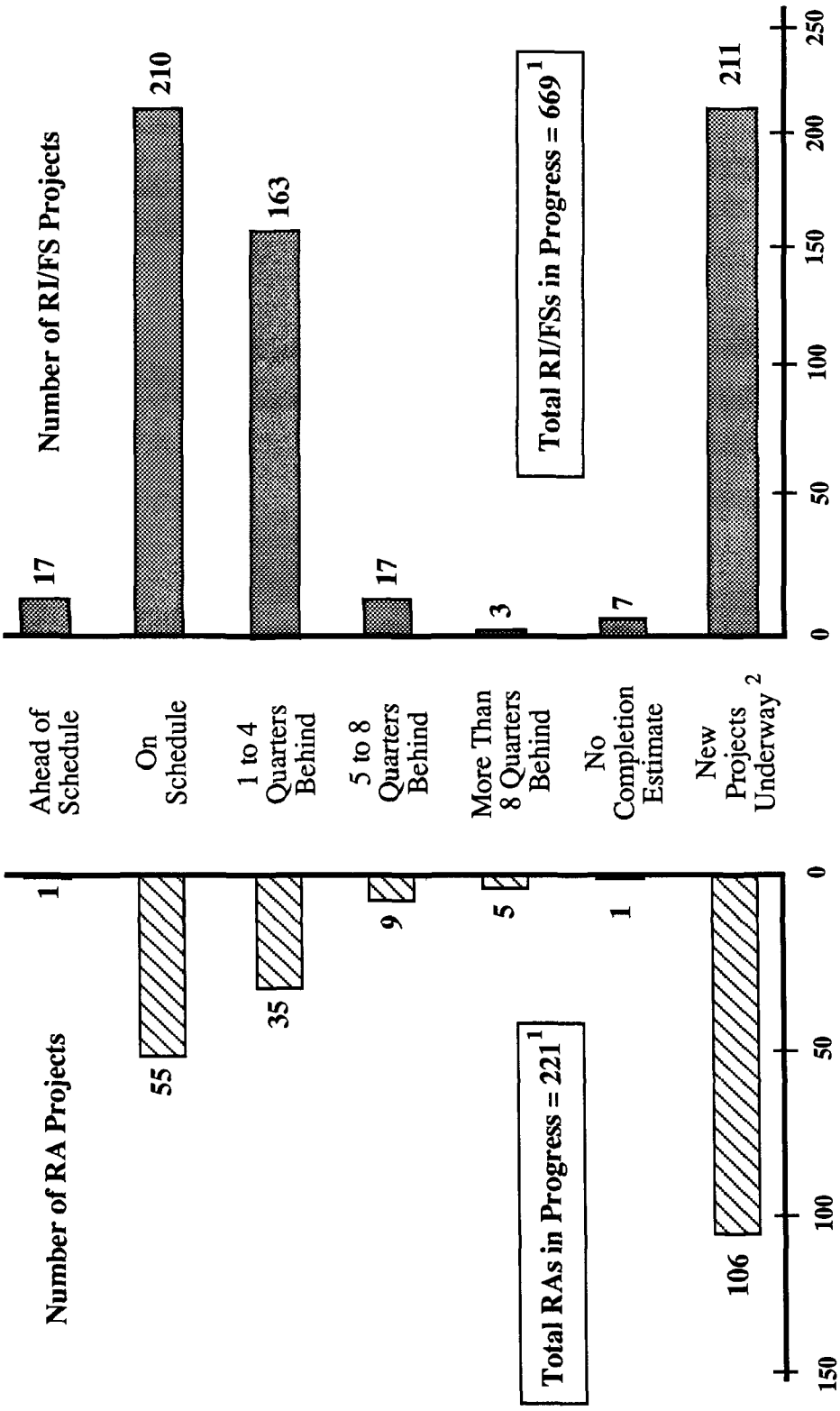
During the fiscal year, the Agency or PRPs started 157 RI/FSs (PRPs financed 87 of the 157). Additionally, RDs were begun at 157 sites (PRPs started 94 of the 157), and RAs were begun at 108 sites (PRPs started 51 of the 108).

Eight hundred ninety projects were ongoing on September 30, 1989, including 669 RI/FSs, 16 stand-alone FSs, 11 stand-alone RIs, and 221 RAs. These projects are listed in Appendix A. Appendix A also lists one site that was removed from the NPL during FY89. This site is not included in the figures presented in this section.

The status of the ongoing projects is summarized in Exhibit 1.2-1, based on a comparison of each project's planned completion

Exhibit 1.2-1

Status of Ongoing RI/FS and RA Projects at the End of Fiscal 1989



1 These totals include nine RAs and 41 RI/FSs that were begun in earlier fiscal years but not recorded in CERCLIS until fiscal 1989. Remedial investigation/feasibility study totals include stand-alone remedial investigations (11 in FY89) and stand-alone feasibility studies (16 in FY89), in addition to the traditional RI/FS units.

2 New projects are projects for which funding was allocated in fiscal 1989.

SOURCE: *Progress Toward Implementing Superfund: Fiscal Year 1989 (Appendix A)*, OERR.

date at the end of FY88 (where available), with its planned completion date at the end of FY89. Of the 890 projects ongoing at the end of FY89, 265 were on schedule. This represents a dramatic increase compared to the 29 ongoing projects at the end of FY88 that were on schedule. At the end of FY89, 18 ongoing projects were ahead of schedule. Projects begun in the fiscal year (i.e., "new projects underway") accounted for 317 of the ongoing projects, and 232 projects were behind schedule. There were also 58 projects that had no previously published estimates of completion.

In addition, there were 253 RDs ongoing at 208 sites at the end of FY89. All of the RDs in progress and their status are listed in Appendix B.

The Agency selected a wide range of remedies in the 139 RODs and four ROD amendments signed in FY89. Exhibit 1.2-2 illustrates the number of source control treatment technology occurrences for FY89. (The 100 treatment technology occurrences in FY89 represent the largest number of such occurrences in any fiscal year.) Exhibit 1.2-2 also lists the total number of occurrences of source and non-source control remediation methods for FY89.

To meet statutory schedules, EPA significantly accelerated remedial project activity during FY87-89. The specific statutory schedules were to initiate 275 RI/FS and 175 RAs by October 1989. To satisfy these deadlines, RI/FSs were initiated at 358 sites, and RA contracts were awarded for clean-up work at 178 sites. As a result, the amount of ongoing work in the Superfund program has never been higher. Exhibit 1.2-3 illustrates the Post-SARA (FY87-89) acceleration of remedial activity at the RI/FS, RD, and RA stages.

1.2.2 Budget Constraints

Despite the increase in PRP-funded actions, RA projects ready for funding are likely to exceed the available budget for several years. The resource-intensive nature of RA implementation is the ultimate constraint on the remedial pipeline. At an average cost of $15 million and at the current levels of PRP participation at the RA implementation stage, there are clear limits to the amount of RA work that can be undertaken each year.

In FY89, Superfund operated with a budget of $1.26 billion. This was $100 million less than the President's budget request. This funding reduction was applied to RA funding, which resulted in a final operating plan of $384 million that supported 56 projects. Through FY89, funds for RAs have been awarded on a first ready/first funded basis. The FY89 funding required several of the high-cost projects to be phase-funded. Phase-funding means that only the funds needed for a specific portion of the selected remedy (e.g., site preparation or incinerator test burn) were allocated and obligated to the site. Additional funds will be needed at these sites in future fiscal years.

1.2.3 The Prospect of a Backlog of Remedial Action Projects

A major portion (roughly $200 million) of the FY90 and FY91 RA budgets will be needed to support the projects that were phase-funded in FY89, which will limit the number of new Fund-financed RAs that can be supported in these two fiscal years. Consequently, a queue of projects awaiting RA funds is developing.

It is important to realize that all NPL sites that require further action after the RI/FS are, by definition, priority sites. A critical task for the Agency is how to rank these sites by relative priority. The setting of priorities based on protection of human health, welfare, and the environment will be the primary consideration EPA uses to determine which RAs will be funded first.

1.3 Remedial Initiatives

During the fiscal year, the remedial program developed a system for prioritizing remedial actions to ensure that, if a backlog of sites arises because of funding shortfalls, sites presenting the worst threats to human health and the environment will be cleaned up first. A detailed explanation of the Agency's process for setting priorities among RA projects is found in Section 1.3.1. The Agency also refined and began implementing a system of Superfund Environmental Indicators. The Agency is planning

Exhibit 1.2-2
Summary of Remedies Selected During Fiscal 1989 [1]

SOURCE CONTROL REMEDIATION	TOTAL NUMBER OF OCCURRENCES [2]
Treatment Technology [3,4]	**100**
Incineration/Thermal Treatment	*30*
Solidification/Stabilization	*18*
Vacuum/Vapor Extraction *	*17*
Biodegradation/Land Application *	*10*
Soil Washing/Flushing *	*6*
Solvent Extraction *	*6*
Volatilization/Soil Aeration *	*4*
Other/Not Specified Treatment Technologies	*9*
Containment Only	**31**
On-site	*24*
Off-site	*7*
NON-SOURCE CONTROL REMEDIATION TECHNOLOGY SELECTIONS	
Pump and Treat	67
Alternate Water Supply	8
Other (e.g., Natural Attenuation)	2
Leachate Treatment	7

* Innovative technologies.
1 Includes final and interim action RODs; more than one remedy may be associated with a ROD.
2 Data is based on 139 signed RODs and 4 ROD amendments.
3 Categorized by principal treatment technology; treatments used as subsequent components of a treatment chain are not included.
4 Data reflect occurrences of technologies selected in the 76 source control RODs that used treatment as the principal remedy; more than one technology may be associated with a ROD.

SOURCE: Based on the *ROD Annual Summary Report: Fiscal Year 1989*, HSCD/OERR.

Exhibit 1.2-3
Ongoing Work at National Priorities List Sites by Lead for Fiscal 1987 Through Fiscal 1989

	RI/FSs			RDs			RAs		
Fiscal Year	**87**	**88**	**89**	**87**	**88**	**89**	**87**	**88**	**89**
Fund-financed -- State-lead	89	70	65	32	30	30	24	25	39
Fund-financed -- Federal-lead[1]	215	218	224	59	85	105	30	60	97
Fund-financed -- EPA performs work at site[2]	--	1	4	--	--	1	--	--	--
PRP-financed and PRP-lead	195	205	242	28	39	97	24	37	69
Mixed Funding -- monies from Fund and PRPs	--	--	--	--	--	3	--	--	4
PRP-financed -- State Order and EPA Oversight[3]	--	29	60	--	--	7	--	3	5
State Enforcement	32	10	1	2	2	1	--	1	--
Federal Facility	25	27	73	1	2	9	1	6	7
Other	4	3	--	--	--	--	--	--	--
TOTALS	**560**[4]	**563**	**669**	**122**	**158**	**253**	**79**	**132**	**221**

1 Includes remedial program lead projects and enforcement program lead projects.
2 Projects at which EPA employees perform the site clean-up work, rather than contractors.
3 PRP-financed projects with site clean-up work performed by the PRPs under State order, with EPA oversight.
4 The FY87 *Report to Congress on Progress Toward Implementing Superfund* reports that 563 RI/FSs were ongoing at the end of the fiscal year. After further data analysis, this number has been changed to 560.

SOURCES: FY87 and FY88 data from CERCLIS; rest of data from *Reports to Congress on Progress Toward Implementing Superfund: FY87 (Appendix D), FY88 (Appendix A), FY89 (Appendixces A and B).*

to use the Environmental Indicators to report to the public progress being made towards meeting health and ecological standards at Superfund sites. Additionally, the Agency initiated several new programs to provide remedial project managers (RPMs) and on-scene coordinators (OSCs) better technical support on-site.

1.3.1 Establishing Priorities for Remedial Actions

The remedial action is the phase of the Superfund site clean-up process during which the selected remedy is implemented. All of the investigation, assessment, evaluation, and planning of prior steps lead to the RA; although duration and costs vary, the RA is easily the most resource-intensive step in the remedial pipeline.

Through 1989, every RA project was funded when it was ready to proceed. Previous budget levels allowed funding to keep pace with the flow of projects from the RI/FS to the RA phase of the pipeline. During FY89, however, because of the increased pace at which the Agency is preparing projects for RAs and the reduction in the FY89 RA budget, this first ready/first funded system was no longer appropriate. RA projects ready for funding were beginning to exceed the available budget, despite an increase in PRP-funded actions. At the end of the third quarter of FY89, $65 million were available for the RAs scheduled to begin in the fourth quarter. During that quarter, the Agency had planned to initiate 29 projects totalling more than $118 million. The Agency decided, however, to phase-fund several large projects, thereby avoiding the expected shortfall in fiscal 1989. In response to the magnitude of the potential shortfall identified in fiscal 1989, the Agency developed a system for setting priorities among RAs.

The system for setting priorities among RAs allocates limited resources to projects at NPL sites with the highest environmental priority. First, RAs are categorized into one of the four groups shown below. Within these groups, the RA projects are further ordered according to environmental criteria.

Priority 1: Immediate or imminent threat to human health.

Priority 2: Actual exposure or near-term exposure resulting in risk to human health or endangered species.

Priority 3: An Agency for Toxic Substances and Disease Registry (ATSDR) determination that a probable threat to health or sensitive environments exists.

Priority 4: Potential for exceeding any applicable or relevant and appropriate clean-up standard or any risk-based site remediation goal.

The system for setting priorities among RAs was tested on the RA projects planned to start in the fourth quarter of FY89. Following minor modifications, the system was instituted as a means of directing funds to the worst problems first. In July 1989, the system was used to prioritize 88 RA projects ready to start in FY90. An EPA Headquarters and regional review panel made up of senior management officials assessed each project based on established environmental criteria. During FY90, RAs will be funded in order of relative priority until budgeted funds are exhausted. At mid-point, the list of priority RAs will be reviewed and adjusted to reflect any schedule changes and to exclude projects that have been funded by other means (for example, settlements with PRPs). Also at mid-year, projects scheduled for fourth quarter starts will be prioritized and integrated into the standing list.

The system for setting priorities among RAs is based on a set of objective criteria that allow comparisons of different projects. Ranking criteria address the relative instability of the contaminants at the site, the nature of the contaminants present and their concentrations, the proximity of the hazardous material to populated areas, and the threat to environmentally sensitive areas and/or endangered species. Additional criteria were designed to address programmatic factors, such as the relationship of the work to be funded to the overall remediation effort at a site or related sites.

1.3.2 Superfund Environmental Indicators

EPA's assessments of the overall progress made in Superfund have focused primarily on the number of administrative milestones achieved at various points in the clean-up process. For

example, the Agency's accomplishments in addressing emergency problems have been reported as the number of removals started or completed. Similarly, progress in implementing overall site remediation plans has been reported as the number of remedial action projects started or completed. Historically, the measure of final site cleanup has been the number of sites deleted from the NPL.

This Report contains a great deal of information on the administrative accomplishments achieved by the Superfund program during and prior to FY89; much of this information is specifically required for inclusion in the Report by CERCLA section 301. Although these milestones are important, two major concerns have been raised about the reporting of Superfund program progress solely in administrative terms. First, since the deletion of a site from the NPL is generally a very long-term process, those who believe this to be the appropriate measure of the Superfund program's success have criticized the Agency for the small number of sites deleted from the NPL since the beginning of the program (28 through the end of FY89). Second, these milestones do not convey the progress toward health and environmental risk reduction made during the clean-up process prior to the final completion of all clean-up actions.

OERR and the Office of Management Systems and Evaluation (OMSE) have worked together during FY88 and FY89 to capture more directly the accomplishments of the Superfund program by the use of a system of Superfund Environmental Indicators. The system will report on the progress being made towards meeting health and ecological standards at Superfund sites by tracking interim and final results. EPA has attempted to ensure that these indicators are scientifically credible, understandable by Congress and the public, and applicable to the wide variety of sites and clean-up approaches. In addition, EPA will attempt to make the system both practical and efficient to implement by maximizing the use of existing Superfund data.

Development of Superfund Environmental Indicators

The development of indicators began with efforts to identify ways to measure progress in environmental terms and then to evaluate the most promising indicators of progress in several regions. During FY88 and part of FY89, EPA created and then analyzed a list of potential indicators of progress at Superfund sites. An EPA workgroup of headquarters, regional, and project management personnel identified an initial group of 43 indicators. The workgroup also reviewed potential sources of data to be used in implementing an indicators system, including automated Superfund data bases, Superfund site files and reports, and other non-Superfund data bases. The initial group of 43 indicators was then narrowed to eight potential indicators, since many were determined to be either duplicative or too narrowly or broadly focused. These eight indicators are:

- Immediate reduction in exposure to human populations;
- Volume of contaminated materials treated/removed/contained;
- Reduced concentrations of environmental contaminants;
- Comparison of concentrations with health standards/criteria;
- Comparison of concentrations with ecological criteria;
- Reduced toxicity to test organisms (bioassays);
- Reduced levels of contaminants in fish and shellfish; and
- Pathways of exposure eliminated.

To evaluate the usefulness of these indicators for measuring and communicating environmental progress, EPA teams visited Regions 1, 3, and 7 to conduct pilot test studies. Data were collected on both removal and remedial actions in these regions and were subsequently analyzed to determine the feasibility of collecting information for each indicator. EPA continued to collect site data early into FY89, conducting pilot test studies in Regions 2 and 6. During these later pilot tests, EPA relied increasingly on site project managers to provide the necessary data, since regional and site management personnel will play

a major role in future implementation of the system. These field activities were concluded in October 1988.

Progress Made During FY89

In April 1989, a feasibility study for implementing the system that incorporated summary data obtained during the pilot studies was published. A report presenting the results of an evaluation of the public's response to the project was also published in April. During May 1989, OERR and OMSE sponsored a workgroup to determine which of the proposed eight indicators would be used for reporting program progress beginning in FY90. After this, the workgroup made a final decision to narrow the list from eight to three "super" indicators of progress. The three indicators chosen were:

- Achievement of Final Health and Ecological Standards -- This indicator reports on the number and nature of final remedies at Superfund sites that address health or ecological goals specified in the ROD. Data will be collected to enable reporting on the sites at which health or ecological goals specified in the ROD have been met for a given medium through treatment, removal, or containment.

- Accomplishment of Interim Actions that Protect Human Health from Immediate Threat -- This indicator reports on remedial or removal actions that protect human health from immediate threat by preventing exposure to contaminated materials or by controlling contaminant migration. Data will be collected on removals or interim remedial actions that have controlled an immediate threat to human health by preventing exposure to contaminated materials or by controlling contaminant migration; and

- Documentation of Amount of Waste Treated/Removed/Contained -- This indicator reports on the actual volume of contaminated material dealt with at a site. Data will be collected on the volume of contaminated material treated (on site or off site), removed (to off-site landfills or approved storage) or contained on site for a given medium.

Spurred on by a recommendation in the 90-Day Study calling for collection of environmental indicator data, the focus of the project changed during the latter part of FY89 from evaluation to planning for implementation. The results of the developmental work were assessed to determine the amount of information that could be reported on completed Superfund clean-up actions. Data collection procedures were then developed to summarize the environmental results of past clean-up actions.

A second workgroup meeting was held in late July to make final the implementation schedule for the system, including the establishment of major milestones to be achieved from FY89 through FY91. During August and September 1989, EPA completed the development of data collection procedures to summarize the environmental results of past clean-up actions.

EPA completed collection of FY90 environmental indicator data in March 1990. The universe of projects for this data collection effort included RAs, NPL removal actions, and a subset of non-NPL removal actions. During the period between October 1989 and March 1990, data collection teams visited all 10 EPA Regions. The mission of these teams, as in the pilot studies, was to collect as much site-related information as possible, using a variety of data sources. Following the completion of this effort, all data collected was analyzed and entered into the modified CERCLIS. Modifications to CERCLIS will enable the Agency to monitor progress in nationwide site clean-up efforts on an ongoing basis.

Future Project Activities

Current plans call for the regions to collect and report environmental indicator data beginning in FY91. When it becomes fully operational, the Superfund Environmental Indicators system will be a valuable means of accurately measuring and monitoring program performance, enabling the Agency to communicate useful and understandable measures of progress.

1.3.3 Technical Assistance Programs

The Office of Research and Development (ORD) initiated four new programs during FY89 to provide expanded technical assistance in response to 90-Day Study recommendations. These programs are designed to provide needed support primarily through the use of EPA in-house experts. Three of the programs, the Superfund Technical Assistance Response Team (START), the Treatability Assistance Program (TAP), and the Alternative Treatment Technology Information Center (ATTIC), focus on engineering technical support. The fourth program, the Superfund Technical Liaison Program (STLP), is designed to facilitate interactions between the regions and ORD by placing an ORD technical liaison in each region.

Superfund Technical Assistance Response Team

ORD and the Risk Reduction Engineering Laboratory (RREL) are jointly developing START. The purpose of the program is to provide direct technical consultation and support to RPMs and Agency contractors for the identification and evaluation of appropriate remedial technologies for specific site problems. The goal is to establish a cadre of technologists that will provide expert advice on the use of commercial, innovative, and evolving technologies for specific sites from the RI/FS scoping phase through early RD phases. The program will involve significant commitment of ORD resources for each site. The Agency, therefore, anticipates that it will have to establish priorities for START assistance. Preliminary criteria for START support include:

- Sites with the potential for using innovative treatment;
- Sites with the potential for using complex treatment technologies; and
- Sites presenting complex problems.

Regional managers will identify sites for START support; final selection will be based on available resources and capabilities. START was successfully piloted during fiscal 1989 and is being implemented nationwide in fiscal 1990.

Treatability Assistance Program

ORD designed TAP to provide technical support for treatability studies, thereby facilitating their performance and ensuring that they are based on sound technical information. To meet these goals, ORD has initiated a number of technology transfer activities and has provided treatability assistance. The program also has established teams of RREL treatment technology experts to supply technical assistance to the regions and is augmenting RREL in-house treatability study capabilities to support the regions. The treatment technology experts will work in conjunction with START and through short-term technical support activities to provide treatability assistance.

The Alternative Treatment Technology Information Center

The Agency created ATTIC to provide EPA staff and contractors with access to a comprehensive list of technology alternatives for hazardous waste remediation. The system contains a wide range of technology information, such as site program data, treatability studies, industry and state alternative technologies data, and Department of Defense and North Atlantic Treaty Organization data. A user can access the system by contacting a telephone reference operator or by using an ORD-supplied computer disk. ATTIC will be on line in fiscal 1990.

Superfund Technical Liaison Program

EPA began to develop STLP in the fourth quarter of fiscal 1989 with input from personnel at headquarters and in Regions 3 and 7. The goal of the program is to facilitate interactions between ORD and the regions by placing an ORD technical liaison in each region. EPA Headquarters will manage and provide planning and evaluation support to the program.

1.4 Removal Initiatives

CERCLA section 104(a) authorizes EPA to perform cleanups or other actions necessary to prevent or minimize the risk posed by an incident (for example, a chemical spill) or a site (for example, leaking drums at a landfill). When there is such a release or threat of a release of a hazardous substance that presents a near-term threat to human health or the environment, EPA generally responds with a removal action. Removal actions are designed to address the most immediate threats of toxic exposure. Section 300.415 of the revised National Contingency Plan (NCP) further describes the factors for determining when a removal action is appropriate.

Removal actions are intended to be relatively quick, low-cost actions the Agency can take to get response actions underway. The nature of these actions is reflected in the statutory limits set forth in section 104(c) of CERCLA. In general, removals are intended to last no more than one year and cost no more than $2 million. A removal action may exceed these limits only after an exemption has been granted. There are two cases in which exemptions may be granted under CERCLA section 104(c). The first situation is where there is an immediate risk to public health or welfare or the environment, continued response actions are immediately required to prevent, limit, or mitigate the emergency, and such assistance will not otherwise be provided on a timely basis. The second situation is where continued response action is otherwise appropriate and consistent with the remedial action to be taken. During FY89, the Agency issued final guidance on the use of the exemption in the second case. The Agency also approved 21 of the 22 requests to exceed the $2 million limit.

1.4.1 The Removal Action Process

The removal program takes action on a wide variety of sites, using various techniques on many types of contaminants. As a result, removal actions are grouped into three categories based on the urgency of the situation. The most urgent is an emergency, which requires immediate attention. An overturned truck that is leaking a hazardous substance would be an emergency. If a site requires action within a 6-month period it is considered a time-critical action. A time-critical action includes the containment of hazardous wastes until a remedial action can be conducted. If a site does not require attention for at least 6 months, it is considered non-time-critical. Emergencies, time-critical removals at NPL sites, and time-critical removals that do not fall under any other response authority receive the removal program's top priority.

Based on a removal preliminary assessment, the Agency may classify the site into one of the three removal categories or decide that no further action is necessary. Before beginning a removal action, the Agency must prepare an action memorandum that discusses the authority for undertaking the removal action and describes the action(s) to be taken, as well as the rationale for the selected action(s). EPA also must establish an administrative record that consists of the documents that form the basis for the selection of the response action. In the case of an emergency, the documentation may not always occur prior to the response. In the case of a non-time-critical removal, the Agency conducts an engineering evaluation/cost analysis (EE/CA). The purpose of the EE/CA is to focus on the analysis of alternatives. A description of the response alternatives identified in this study are made available to the public in the administrative record.

After the removal action has been completed, the OSC is required to submit a final report on the removal action. The OSC is the official who is designated to coordinate and direct removal actions. The OSC report must describe the situation at the site as it developed, the response actions that took place at the site, and any problems that occurred during the response.

1.4.2 Removal Actions Status Report

Since the inception of Superfund, the removal program has achieved impressive results. Removal actions have been conducted at 1,563 sites at a cost of $518,306,753. The average cost of a Fund-lead removal action is increasing and is approaching $500,000. Exhibit 1.4-1 compares the number of removal action starts and completions

in FY89 to the program's achievements in previous fiscal years.

During FY89, the Agency started 322 removal actions, exceeding the EPA target of 248. The Agency also completed 249 removal actions in FY89, which exceeds the target of 171. Exhibit 1.4-2 displays the number of removal starts and completions by state. The number of starts and completions are only slightly lower than the record highs achieved in FY88.

During FY89, PRPs continued to play a significant role in the removal program. PRPs were responsible for 86 removal starts in FY89 and for 75 of the removal completions, which is nearly 35 percent of the total completions for the fiscal year. This is the largest number of completions by PRPs since the inception of the Superfund program. Of the PRP removal starts, 27 were at NPL sites. Of the PRP removal completions, 22 were at NPL sites.

In FY89, 236 removal action starts were financed using money from the Trust Fund. This includes 41 sites that are on the NPL. Of the removal actions completed during the fiscal year, 174 were financed using Fund money; 42 of these actions were at sites on the NPL. There were 224 removal actions in progress at the end of FY89.

1.4.3 Actions Taken in Response to the 90-Day Study

The 90-Day Study made several recommendations affecting the removal program. The recommendations included making NPL sites safer, accelerating responses at NPL sites, and completing removal assessments at all unaddressed NPL sites. The Agency began to address these recommendations in FY89.

Making National Priorities List Sites Safer

The 90-Day Study emphasized that it is the Agency's policy that sites presenting the most acute risk to human health and the environment will receive the earliest actions to prevent the spread of contamination and to control or reduce the risk posed by the site. Taking steps to ensure that all NPL sites are made more safe than they were at the time of listing to alleviate immediate risk that would be posed by the site until the remedial action can be completed is a significant step in achieving this policy.

In October 1989, just after the close of the fiscal year, OERR's Emergency Response Division (ERD) issued draft guidance that clarified the meaning of a "safer NPL site." According to this guidance, making NPL sites safer involves the elimination of immediate endangerment to human health and the environment from physical threats (e.g., fire or explosion) at a site. At a safer site, the near-term risk from releases of contaminants has been controlled. The endangerment to human health will be minimized at such a site while the remediation of the site is being completed. This draft guidance also explains the mechanisms available to make NPL sites safer, which include emergency and time-critical removals and removal authority used to address remedial projects (discussed under accelerating responses at NPL sites, immediately below).

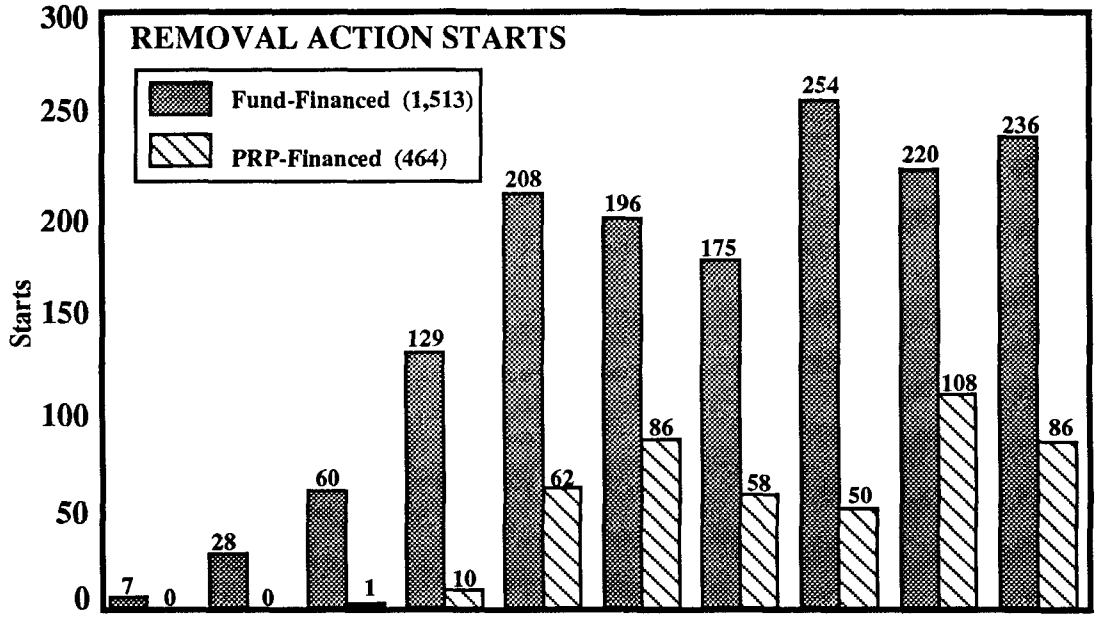
Accelerating Responses

The 90-Day Study recommended that EPA take expedited approaches to site cleanup whenever possible. If an accelerated response is taken at an NPL site (or operable unit), the action could be completed more quickly than if a conventional response were taken. In order to accelerate a remedial action at an NPL site, the Agency may either use removal authorities or removal contractors and remedial funding. On July 6, 1989, EPA issued guidance on the specific requirements that must be met before this hybrid approach to a cleanup may be used. This approach is intended only as a temporary response option until rapid remedial contracting alternatives are fully developed. Removal approaches have been used to speed up remedial action projects on 11 sites to date; three were started in FY89. In December 1989, EPA also issued draft guidance entitled "Accelerating Response at NPL Sites." This guidance summarizes the mechanisms available to accelerate responses and encourages the use of these mechanisms whenever possible.

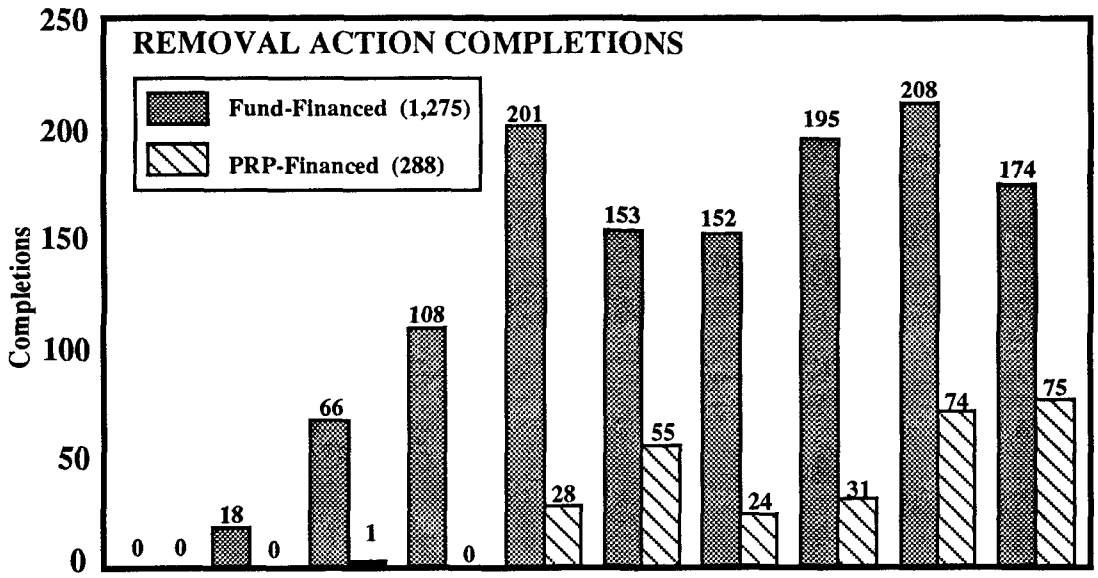
Conducting Removal Assessments

On July 6, 1989, OERR issued a memorandum declaring its intention to complete removal assessments at all unaddressed NPL sites by the end of FY89. These assessments determine

Exhibit 1.4-1
Removal Action Starts and Completions by Fiscal Year



Fiscal Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	
TOTAL	7	28	61	139	270	282	233	304	328	322	1,974



Fiscal Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	
TOTAL	0	18	67	108	229	208	176	226	282	249	1,563

SOURCES: CERCLIS; *Progress Toward Implementing Superfund: Fiscal Year 1988*, OERR, April 1989.

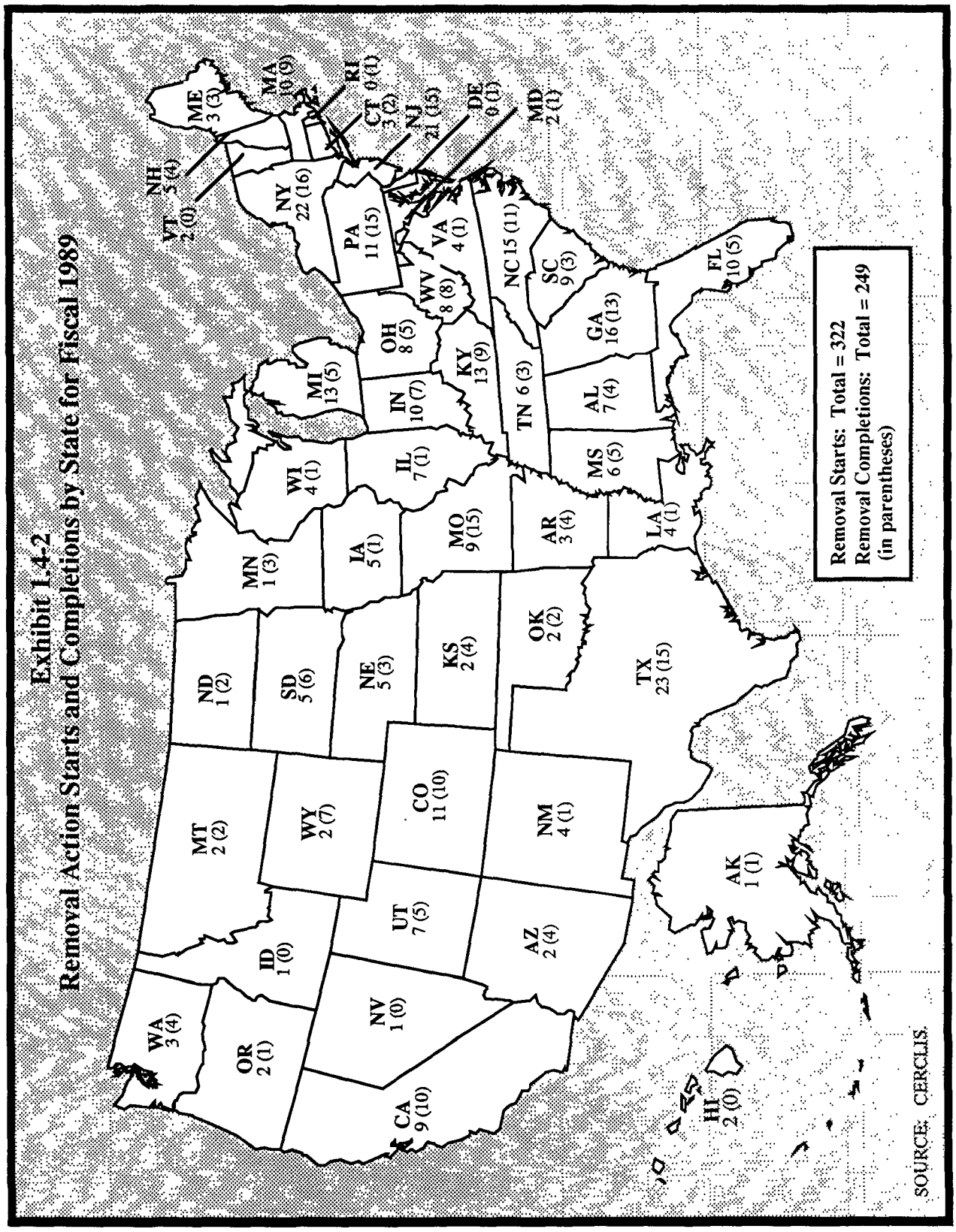


Exhibit 1.4-2
Removal Action Starts and Completions by State for Fiscal 1989
WA 3 (4)
OR 2 (1)
CA 9 (10)
NV 1 (0)
ID 1 (0)
MT 2 (2)
WY 2 (7)
UT 7 (5)
AZ 2 (4)
CO 11 (10)
NM 4 (1)
ND 1 (2)
SD 5 (6)
NE 5 (3)
KS 2 (4)
OK 2 (2)
TX 23 (15)
MN 1 (3)
IA 5 (1)
MO 9 (15)
AR 3 (4)
LA 4 (1)
WI 4 (1)
IL 7 (1)
MS 6 (5)
MI 13 (5)
IN 10 (7)
TN 6 (3)
AL 7 (4)
OH 8 (5)
KY 13 (9)
GA 16 (13)
WV 8 (8)
VA 4 (1)
NC 15 (11)
SC 9 (3)
PA 11 (15)
NY 22 (16)
VT 2 (0)
NH 3 (4)
ME 3 (3)
MA 10 (9)
RI 0 (1)
CT 3 (2)
NJ 21 (15)
DE 0 (1)
MD 2 (1)
FL 10 (5)
AK 1 (1)
HI 2 (0)
Removal Starts: Total = 322
Removal Completions: Total = 249
(in parentheses)
SOURCE: CERCLIS.

whether action is necessary to render the site safe from immediate hazards to public health and the environment. At the end of FY89, the Superfund program had initiated 276 removal assessments, of which 249 had been completed. Information from removal assessments will be used to establish priorities for any longer-term response action necessary to complete a cleanup.

1.4.4 The Superfund Removal Procedures Manual

The Superfund Removal Procedures (SRP) manual is the removal program's guidance manual covering all of the procedural and administrative requirements for removal actions. This manual is used for reference by OSCs, other response personnel, the remedial program staff, and EPA enforcement personnel, as well as other federal and state agencies. During FY89, ERD began developing a new conceptual approach to the SRP manual. To make the SRP manual easier to read and use, ERD is in the process of breaking down the single, comprehensive volume into 12 separate volumes. For example, all pertinent information on action memoranda will now be located in a single volume, rather than being distributed over several parts of the larger document. In addition, ERD is in the process of developing a pocket-size Field Manual, which will be especially helpful to OSCs.

1.4.5 Actions Involving Nationally Significant or Precedent-Setting Issues at Sites that are not on the National Priorities List

In March 1989, OERR issued *Guidance on Non-NPL Removal Actions Involving Nationally Significant or Precedent-Setting Issues.* The guidance categorizes such removals into six groups and includes the rationale for each category. The key considerations used to establish the categories were whether a Fund-financed response to a particular incident will establish a precedent for future response actions and whether a response will commit EPA to a course of action that could have a significant impact on future resources, if the problem addressed occurs frequently. The concurrence of the Director of OERR is required prior to the initiation of a removal action taken at non-NPL sites where the proposed action is of national significance or precedent-setting.

1.4.6 Changes in the Revised National Contingency Plan that Affect the Removal Program

In addition to incorporating necessary statutory changes, the revised NCP addresses changes in the removal program, such as:

- EPA's expectation that states, PRPs, or the remedial program will provide post-removal site control;
- Extension of the time allowed for submission of the OSC report;
- Clarification on how to determine whether identification and attainment of applicable or relevant and appropriate requirements (ARARs) are practicable in a particular situation; and
- EPA's decision not to establish "trigger" levels (for example, a particular maximum contamination level) that would always require a removal action rather than a remedial action.

CHAPTER 2 Other Response Activities

In addition to activities at sites in the remedial pipeline, the Agency conducted a number of other response activities to ensure the protection of public health, welfare, and the environment.

Acronyms Introduced in Chapter 2

DOD	-	Department of Defense
ERNS	-	Emergency Response Notification System
HRS	-	Hazard Ranking System
IAGs	-	Interagency Agreements
LSI	-	Listing Site Inspection
NFRAP	-	No Further Remedial Action Planned
NRC	-	National Response Center
PA	-	Preliminary Assessment
RQ	-	Reportable Quantity
RCRA	-	Resource Conservation and Recovery Act
SI	-	Site Inspection
SSI	-	Screening Site Inspection

2.1 Site Assessment

Among the crucial elements in the timely response to a potentially dangerous incident or site are notification to the appropriate authority and assessment of the situation. These activities represent the initial stages of the Superfund process and take place before a site enters the remedial pipeline. EPA is made aware of possible hazardous waste sites in a variety of ways. For example, an individual might report concerns about a particular site, or local law enforcement officials or a facility manager might make a formal report to EPA. In addition, CERCLA section 103 specifies that persons in charge of a vessel or facility must immediately report any release of a hazardous substance that is equal to or greater than the reportable quantity (RQ) for that substance to the National Response Center (NRC). The NRC operates a 24-hour hotline that allows for this immediate notification. CERCLA imposes penalties for failure to comply with this requirement.

The Emergency Response Division has developed various training/outreach and information transfer programs to support the implementation of notification regulations:

- The Emergency Response Notification System (ERNS). This national computer data base and retrieval system is used to store information on releases of oil and hazardous substances. ERNS provides a mechanism for documenting and verifying incident notification information as initially reported.

- EPA/Department of Transportation workshops. These workshops provide a public forum to explain the federal requirements for transporting and reporting releases of hazardous materials.

- EPA *On-Scene*. The purpose of this newsletter is to inform regional personnel of the statutory, regulatory, and policy changes that may affect emergency response program implementation. The newsletter also disseminates information on emergency activities taking place in the regions.

- Continuous Release Compliance Assistance. This assistance includes a risk screening model that is being developed to help the regions identify the sites with the highest potential problems.

- The Worker Protection Standards Workshops. These workshops will include an explanation of the standards and a description of what state and local governments must do to comply with them.

These activities, directed toward the public, industry, State Emergency Response Commissions, Local Emergency Planning Committees, and EPA Regional personnel, facilitate the compliance and understanding of reporting regulations promulgated by the Agency. (For details on rulemakings concerning RQs, see Section 5.4.4.)

When a site has been identified, regardless of the substance(s) involved or the significance of the incident, it is entered into an EPA computer data base, known as the CERCLA Information System (CERCLIS). CERCLIS is a national inventory of all sites potentially appropriate for listing on the NPL. When EPA knows of a site, the site assessment or pre-remedial phase of the Superfund process begins. The pre-remedial portion of the Superfund program is intended to identify those sites that represent the highest priority for further investigation and possible cleanup under CERCLA. Less than 10 percent of these sites have been included in the NPL.

2.1.1 The Inventory of Sites (CERCLIS)

When the Agency becomes aware of a site where hazardous substances may exist, it is entered into CERCLIS. There were 1,891 sites added to CERCLIS in FY89, resulting in an inventory of sites at the end of the fiscal year totalling 31,904.

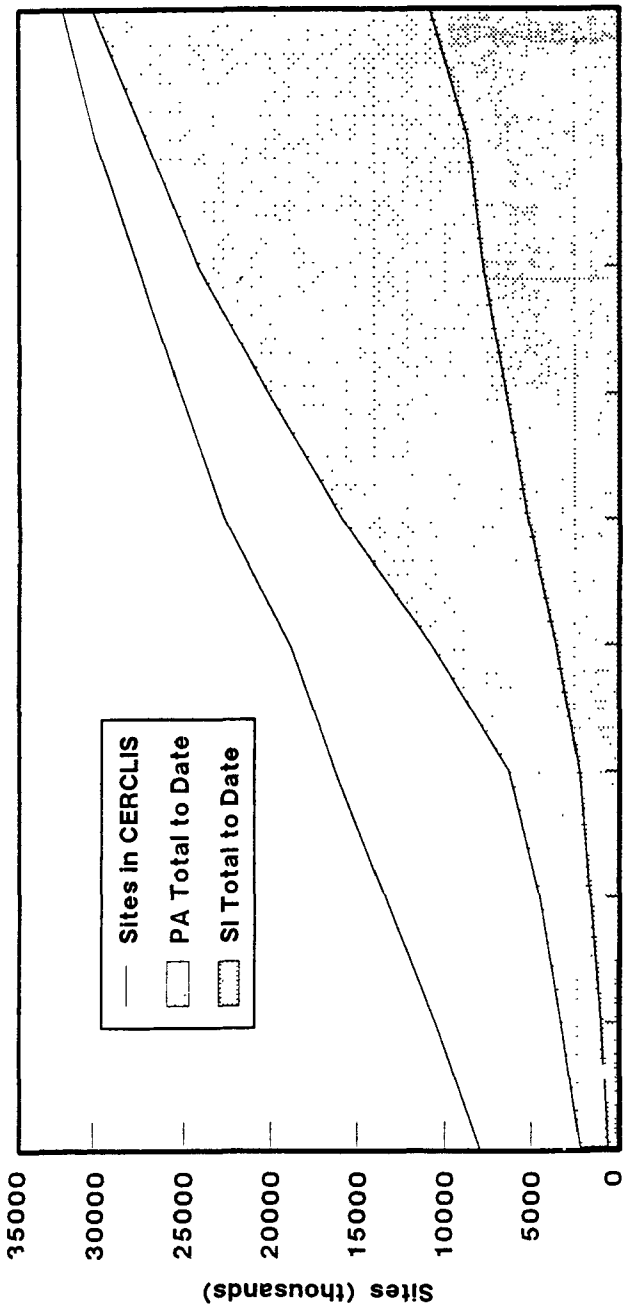
The data in CERCLIS primarily provides administrative information, such as the completion date of the preliminary assessment (PA). In order to better understand CERCLIS sites, the Agency completed work on a study that analyzed a random sample of these sites by their physical characteristics (for example, predominant land uses in the site's vicinity). During the year, the Agency began work on a similar characterization study of those sites on the NPL. This study will compile data on NPL sites through the tenth major update to the NPL (October 25, 1989). The results of these two analyses will allow the Agency to compare and contrast the CERCLIS universe with the sites that are on the NPL on a region by region and national basis. Data from these two analyses could be used to respond to questions regarding policy and statistical issues, to respond to Congressional inquiries, and to prepare for Congressional hearings on Superfund reauthorization.

2.1.2 Preliminary Assessments

The first step EPA takes upon notification of an incident or site is known as a PA. The PA is a vital step used by the Agency to determine whether further investigation of a site may be necessary or whether a removal assessment should be recommended. During the PA, EPA collects information that may include past state permitting activity, local population statistics, or environmental pathways of concern. All sites receive a site reconnaissance unless access to the area is restricted.

In FY89, 2,228 PAs were completed at a budgeted cost of $15,400,000. Since the elimination of the PA backlog on non-federal facility sites in FY88, the Agency has achieved its goal of completing a PA within one year after each site has been entered into CERCLIS. This approach allows the Agency to rapidly identify sites needing removal or remedial activity. PAs are recorded in CERCLIS by completion date and by the decision based on the PA (for example, no further remedial action planned (NFRAP)). To date, PAs have been completed on 29,297 sites, nearly 92 percent of the sites in CERCLIS. About 50 percent of PAs to date have resulted in a decision to conduct no further action. The total number of sites in CERCLIS that still need PAs is 2,607. Exhibit 2.1-1 presents the pre-remedial program accomplishments from FY80 to FY89. This exhibit also displays site inspection accomplishments, as well as the total number of sites in CERCLIS for FY80 through FY89.

Exhibit 2.1-1
Historical Pre-Remedial Accomplishments by Fiscal Year



	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Sites in CERCLIS	8,000	10,500	13,386	16,309	18,884	22,621	25,194	27,571	30,013	31,904
PA Completed	2,204	1,072	1,209	1,809	4,447	5,181	4,262	4,001	2,884	2,228
Total to Date	2,204	3,276	4,485	6,294	10,741	15,922	20,184	24,185	27,069	29,297
SI Completed	613	428	566	642	1,308	1,618	1,267	1,343	1,237	1,732
Total to Date	613	1041	1,607	2,249	3,557	5,175	6,442	7,785	9,022	10,754

NOTE: The graph represents the number of PAs and SIs completed during each fiscal year, and depicts the increase in the number of sites in the CERCLIS inventory as of the end of each fiscal year.

2.1.3 Site Inspections

After the PA, if EPA believes additional information should be gathered, a site inspection (SI) is conducted. There are two types of site inspections: the screening site inspection (SSI) and the listing site inspection (LSI).

The purpose of the SSI is to collect data that will help determine whether a site should be listed on the NPL. Environmental media are sampled to determine the nature and extent of the possible contamination during the SSI. The Superfund program completed 1,732 SSIs during FY89 at a budgeted cost of $34,000,000, exceeding the SSI goal of 1,250 by 39 percent. There are 6,000 sites where it has been determined that an SI is necessary but has not yet been conducted.

The Agency decides if an LSI is warranted only after the completion of the SSI. During the LSI, the Agency actually scores the site using the Hazard Ranking System (HRS) (discussed in section 2.1.5). During FY89, 75 LSIs were started. These LSIs cannot be completed until the HRS revisions are final.

CERCLA section 116(a)(2) requires EPA to have completed, by January 1, 1989, all SIs necessary at sites entered into CERCLIS as of the date of enactment of SARA (October 17, 1986). In order to maximize compliance with this requirement, 88 percent of all SIs completed in FY89 were conducted on pre-SARA sites. Regions 6 and 10 were able to meet the statutory schedule and the other eight regions are quickly eliminating their backlog of SIs on pre-SARA sites. Section 116(c) of CERCLA requires the Agency to publish an explanation of why the mandated SI goal could not be completed by the January deadline. EPA is currently preparing a report to Congress detailing why the goal could not be fully attained in eight regions.

2.1.4 National Priorities List Update

The NPL is the list of sites that appear to warrant federal funding for remedial action. In general, a site is eligible for inclusion if it obtains a score of 28.50 or higher using the Hazard Ranking System. Before a site is included on the NPL, it is proposed for inclusion and subject to public comment. EPA proposed 64 sites for listing on the NPL during FY89.

At the end of the fiscal year there were 337 proposed NPL sites. The number of sites that were made final on the NPL during the fiscal year was 101. This brings the total number of sites that are listed on the final NPL to 888. The total number of proposed and final NPL sites at the end of FY89 was 1,225.

The Agency may delete sites from the NPL if all appropriate response actions have been implemented or no further cleanup is appropriate. EPA announced the deletion of 10 sites from the NPL this past fiscal year. This is the largest number of sites deleted in any year to date. For a complete listing of the site names, locations, and deletion dates see Exhibit 2.1-2.

2.1.5 The Hazard Ranking System

The HRS is the scoring system used by EPA to determine if a site will be proposed for listing on the NPL. One amendment made to CERCLA by SARA requires EPA to promulgate amendments to the HRS so that, to the maximum extent feasible, the HRS accurately assesses the relative degree of risk to human health and the environment posed by sites and facilities subject to review. To comply with this requirement, the Agency published proposed revisions to the HRS early in the fiscal year (53 FR 51962, December 23, 1988). The proposed revised HRS makes several changes to the scoring system. For example, the original HRS is oriented primarily toward population risk rather than individual risk. EPA proposed changes to the HRS that will more accurately reflect the potential risk to individuals and populations exposed to documented contamination. For example, EPA proposed to incorporate into the scoring exposure by direct contact, which is evaluated in the original HRS, but does not affect the site ranking. In the original HRS, targets are weighted based on dilution and distance only with respect to exposure by air. The revised HRS would apply dilution/ distance weighting directly to other exposure

Exhibit 2.1-2
Sites Deleted from the National Priorities List During Fiscal 1989

Site Name	Location	Deletion Date
Toftdahl Drums	Brush Prairie, Washington	12/23/88
Matthews Electroplating	Roanoke County, Virginia	1/19/89
Presque Isle	Erie, Pennsylvania	2/13/89
Parramore Surplus	Mount Pleasant, Florida	2/21/89
Cooper Road	Voorhees Township, New Jersey	2/22/89
Krysowaty Farm	Hillsborough, New Jersey	2/22/89
New Castle Steel	New Castle County, Delaware	3/17/89
Wade (ABM) (once listed as ABM-Wade)	Chester, Pennsylvania	3/23/89
Voortman Farm	Upper Saucon Township, Pennsylvania	5/31/89
Cecil Lindsey	Newport, Arkansas	9/22/89

SOURCE: *Federal Register* notices published on dates shown.

pathways, such as ground water and surface water. Also, the proposed revised HRS changes the basis of the toxicity factor score to account for chronic exposure to hazardous substances, instead of basing the score primarily on acute exposures. In addition, the proposed HRS makes revisions to the factors of mobility, hazardous waste quantity, sensitive environments, on-site exposure pathway, surface water, and air. (For further discussion of the HRS, see section 5.4.2.)

EPA conducted a field test to examine the feasibility of implementing the proposed revised factors, to determine the resources that would be necessary, and to assess the availability of information needed for the evaluation of sites. In September, the Agency announced the availability of the field test report (54 FR 37949, September 14, 1989) and solicited public comment. The field test results provide the Agency with useful information on how the proposed revised HRS will perform with actual environmental data.

Following the publication of the proposed revisions and analysis of public comments and the results of the field test, the Agency began preparing the final HRS for publication.

2.1.6 Additional Guidance Documents and Rulemakings

During FY89 EPA published several guidance documents and rulemakings important to the site discovery and evaluation program including:

- Guidance on Hazardous Waste Releases on Indian Lands: Beginning the Superfund Process (March 1989);
- Site Investigation Bulletin (April 1989);
- Guidance on Preliminary Assessment Petitions (November 1988); and
- Regional Pre-Remedial Program Objectives for FY89 and First Quarter of FY90 (March 10, 1989).

EPA also made substantial progress during the fiscal year toward completing:

- *Prescore.* Prescore is a computer program that will store data, calculate an HRS score, and generate a documented HRS package using the revised HRS.
- *Increased Oversight of Contractor Activities.* EPA will increase oversight of field investigation team zone contracts. Activities will include increased technical oversight, cost control, evaluation of subcontract requests, and a review of progress to date and contractor performance.
- *The Superfund Evaluation Universe Study.* This study will provide an estimate of the potential Superfund evaluation universe through a screening process. In addition, it will assess the relative hazard potential of various site categories.
- *A Site Discovery Pilot.* This study will help define efficient discovery methods and environmental settings of particular concern.

2.2 Federal Facilities Program

Facilities owned and/or operated by the federal government are subject to all requirements of CERCLA and its implementing program, as stipulated in section 120 of CERCLA. The Federal Facilities Hazardous Waste Compliance Office in the Office of Waste Programs Enforcement (OWPE) works with others at EPA headquarters, the regional offices, and the states to ensure that federal facilities comply with CERCLA and Resource Conservation and Recovery Act (RCRA) requirements. Specifically, this office focuses on the management of the federal agency docket, policy and guidance development, and compliance monitoring.

The EPA resources allocated to the federal facilities program increased in FY89, as regional personnel resources for the Superfund federal facilities enforcement program were doubled. In addition, many regions established federal facility enforcement sections. These specific organizational units facilitate increased coordination and concentration on issues relevant

to federal facilities, such as RCRA/CERCLA integration.

2.2.1 Federal Agency Hazardous Waste Compliance Docket and Facility Site Evaluation

The Federal Agency Hazardous Waste Compliance Docket, established pursuant to CERCLA section 120(c), documents the federal facilities program by:

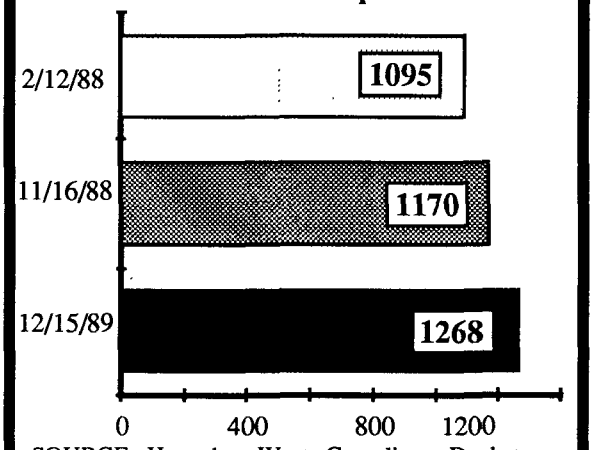
- Identifying federal facilities that may be contaminated with hazardous substances;
- Compiling and maintaining information submitted to EPA on these facilities under the provisions of CERCLA section 120(c); and
- Providing a mechanism to make this information available to the public.

The initial federal agency docket was published in the *Federal Register* on February 12, 1988 and listed 1,095 federal facilities. Exhibit 2.2-1 illustrates the increase in the number of sites on the docket since its first publication. During FY89, 128 sites were added and 30 were removed. The docket listed 1,268 federal facilities at the end of FY89.

Of the 1,268 sites, the Department of Defense (DOD) owns and/or operates 634 (50.00 percent), and the Department of Interior owns and/or operates 315 (24.84 percent). The remainder are distributed among 16 other federal departments, agencies, and instrumentalities, listed in Exhibit 2.2-2. The Agency published a notice of availability of the first six-month update and revisions to the initial list on November 16, 1988. The second update of the docket was published in the *Federal Register* on December 15, 1989 (54 FR 51472).

For facilities listed on the docket, EPA has established a policy specifying that for each federal facility that is included on the docket during an update, the responsible federal agency or department must complete a preliminary assessment and if warranted, a site inspection, within 18 months of publication of the docket.

Exhibit 2.2-1
Number of Facilities on the Hazardous Waste Compliance Docket



SOURCE: Hazardous Waste Compliance Docket.

Exhibit 2.2-2
Distribution of Federal Facilities on the Hazardous Waste Compliance Docket

Department of Defense	634
Department of the Interior	315
Department of Energy	70
Department of Agriculture	56
Department of Transportation	54
Civil Corps of Engineers	21
General Services Administration	20
Environmental Protection Agency	17
Tennessee Valley Authority	17
NASA	15
Department of Commerce	14
Veterans' Administration	14
United States Postal Service	10
Department of Health and Human Services	5
Department of Justice	3
Central Intelligence Agency	1
Small Business Administration	1
Department of Treasury	1
TOTAL	**1,268**

SOURCE: Hazardous Waste Compliance Docket.

2.2.2 Federal Facilities and the National Priorities List

The first 32 federal facilities were added to the NPL on July 22, 1987 (52 FR 27620). In FY89, in a final rule addressing only federal facilities, eight facilities were added to the NPL as final sites and one site already on the NPL was reclassified as a federal facility, bringing the total number of federal facilities on the NPL to 41 (54 FR 10512, March 13, 1989). In addition, 52 facilities were proposed for addition to the NPL (54 FR 29820, July 14, 1989).

2.2.3 Federal Facility Agreements Under CERCLA Section 120

To facilitate the remedial process at federal facilities, EPA entered into 24 Interagency Agreements (IAGs) covering 31 NPL sites in FY89. Since the program began, 27 IAGs have been signed. These agreements, between EPA and the responsible federal department or agency, document some or all of the phases of activity to be undertaken, from the RI/FS through the implementation of the remedial action.

IAGs formalize the procedure and timing for submittal and review of documents and include a schedule for all remedial activities fulfilling the requirements of CERCLA 120(e)(1). They also establish a mechanism to resolve any disputes between the signatories. IAGs must comply with the public participation requirements of CERCLA section 117 and are enforceable by citizens and states through citizen suits. Additionally, CERCLA authorizes the courts to impose penalties against federal agencies and departments for failure to comply with IAGs in suits brought by states or citizens. DOD was a signatory to 21 IAGs and the Department of Energy was a signatory to three.

2.2.4 Report to Congress on EPA Responsibility Under CERCLA Section 120(e)(5)

Each federal department and agency is required by CERCLA section 120(e)(5) to furnish an annual report to Congress on progress towards implementing CERCLA at its facilities. The report must include information on the following areas: progress towards entering into IAGs; cost estimates for each IAG; public comments on IAGs; progress in RI/FSs and RAs initiated at federal facilities on the NPL; and progress in RAs at sites not listed on the NPL.

Of the 1,268 sites on the federal facilities docket, 17 are owned and/or operated by EPA as illustrated in Exhibit 2.2-2; three of these facilities, however, were erroneously included and corrections have been submitted to the docket. None of the EPA facilities are currently included on the NPL. At all sites, EPA has conducted PAs. The annual report of progress remediating EPA facilities required by CERCLA section 120(e)(5) is included in Appendix C of this Report, along with a complete list of EPA facilities and their status.

2.2.5 Federal Real Property Transfer

When the U.S. government sells or transfers real property on which a hazardous substance was released, disposed of, or stored for a year or more, the sales contract must, as required by CERCLA section 120(h)(1), include a notice that discloses the type and quantity of the hazardous substance and when it was stored, released, or disposed of on the property. Similarly, CERCLA section 120(h)(3) requires that any U.S. government department or agency transferring federally owned real property must include in the deed a covenant assuring the transferee that all remedial action necessary to protect human health and the environment was taken before the transfer and that any remedial action found to be necessary after the property is transferred will be conducted by the U.S. government.

EPA is required by CERCLA section 120 to promulgate regulations on the form and manner of the notice to be put in sales contracts. Regulations were proposed on January 13, 1988.

These proposed regulations indicate that the transfer of residential properties of up to four dwelling units acquired through foreclosure by government agencies such as the Federal Housing Administration and the Veterans Administration is exempt from the notice requirement. Further, property at which less than 1000 kilograms of a hazardous substance or less than the CERCLA reportable quantity for a hazardous substance (whichever is larger) was stored also would be exempt from the notice requirement under the proposed rule. The final regulations were promulgated on April 16, 1990 (55 *FR* 14208).

CHAPTER

3 Estimation of Resources Required to Implement Superfund

Section 301(h)(1)(G) of CERCLA requires EPA to estimate the resources needed by the federal government to complete Superfund implementation. The Agency interprets this requirement to mean the cost of completing CERCLA's implementation through the current authorization (FY91) and beyond. This chapter includes complete information through FY91. The resource estimate presented in this chapter is divided between resources needed by EPA and those needed by other federal departments and agencies. An estimate of the long-term costs of cleaning up the existing NPL is included in section 3.2 of this chapter, together with an overview of the method used to develop the estimate.

As noted in section 1.2, the remedial pipeline is full and is likely to remain so for the foreseeable future. Despite an increase in PRP-funded actions, the backlog of RA projects that have not been started will grow for the next several years. This is the result of: (1) the trend toward use of treatment technologies, which has raised the average RA cost to approximately $25 million per site (assuming that each site consists of 1.8 operable units and that an RA is conducted on each operable unit); (2) completion of preliminary work at many sites, which means that more sites than ever before are ready to enter the RA phase; and (3) phase-funding of many RAs undertaken to date, which means that a substantial portion of each year's RA budget is used to move ongoing projects toward completion. To maintain the momentum attained in FY89, it is critical that the Superfund program continues to both initiate scoping actions as new sites are identified and to aggressively clean up hazards once they are known.

Congress provided EPA with $5,623,000,000 in budget authority for the implementation of CERCLA, as amended, for the four-year period, FY87 through FY90. The actual level of funds obligated annually may be different than the level of budget authority provided due to the use of unobligated balances from prior years.

Acronyms Introduced in Chapter 3

DERP	- Defense Environmental Restoration Program
DOC	- Department of Commerce
DOE	- Department of Energy
DOI	- Department of the Interior
DOL	- Department of Labor
DOT	- Department of Transportation
FAA	- Federal Aviation Administration
FEMA	- Federal Emergency Management Agency
FMS	- Financial Management System
FTE	- Full-Time Equivalent
GSA	- General Service Administration
HHS	- Department of Health and Human Services
IRCN	- Interagency Report Control Number
MARAD	- Maritime Administration
NASA	- National Aeronautics and Space Administration
NIEHS	- National Institute of Environmental Health Sciences
NOAA	- National Oceanic and Atmospheric Administration
NRT	- National Response Team
OLM	- Outyear Liability Model
OSHA	- Occupational Safety and Health Administration
PCB	- Polychlorinated Biphenyl
RRT	- Regional Response Team
RSPA	- Research and Special Programs Administration
USCG	- U.S. Coast Guard
USDA	- Department of Agriculture
VA	- Veterans Administration

In millions, the enacted budget authority is as follows:

1987	$1,411.3
1988	$1,128.0
1989	$1,425.0
1990	$1,560.7
TOTAL	$5,525.0

The resource estimate in this chapter is based primarily on the responsibilities and duties assigned to EPA and other federal departments and agencies by Executive Order 12580. Computing such an estimate entails making assumptions about the size and scope of the Superfund program, the nature and number of response actions, participation by states and private parties, the increasing use of treatment technologies, and other factors. For active NPL sites (sites that have reached or passed the RI/FS planning stage), these assumptions relate to management of the workload already in the remedial pipeline and the costs of those actions. For inactive NPL sites (sites that have not yet attained the RI/FS planning stage), the model uses a wide assortment of assumptions to estimate which activities will be necessary to move those sites through cleanup and into the delisting stage.

In developing the resources estimate required by section 301(h)(1)(G), EPA has considered several sources:

- EPA Superfund budgets and budget estimates for FY88, FY89, FY90, and FY91, including budget requests from other federal departments and agencies;
- Data submitted to EPA by other federal departments and agencies under an approved General Services Administration (GSA) Interagency Report Control Number (IRCN), issued on February 5, 1988, as required under the provisions of 41 CFR 201-45.6;
- The federal facilities docket developed under section 120(c) of CERCLA and each individual federal department's and agency's Annual Report to Congress on Federal Facilities Implementation, as required under section 120(a)(5) of CERCLA;
- EPA's Report to Congress entitled Extent of the Hazardous Release Problem and Future Funding Needs (December 1984), as required under section 301(a)(1)(C) of CERCLA;
- EPA's Annual Report to the Office of Management and Budget on Pollution Abatement Needs at Federal Installations, required under Executive Order 12088 and based on annual pollution abatement plans (A-106 reports) by federal departments and agencies; and
- Various EPA information systems, primarily the Financial Management System (FMS).

These sources will also be used for future reports, but at the same time, the Agency is working to identify data requirements, improve data quality, develop cost estimating methods, and collect additional information. Specifically, EPA has completed a resources estimate for the balance of the current authorization, FY90 and FY91, and for the unfunded period beyond FY91. The initial results of this effort, presented in section 3.2 of this chapter, are based on the current size of the NPL. This long-term effort has been coordinated with the development of the FY91 budget.

EPA's ability to project the federal resources required for CERCLA implementation will improve with more experience implementing CERCLA, as amended by SARA, additional actual cost information, and a better understanding of size and composition of the NPL. Better coordination with other federal departments and agencies and additional data on the implementation of the federal facilities requirement of section 120 will also help to improve the estimate.

3.1 Developing the Estimate of Resources Necessary to Implement Superfund

In estimating the resources needed by EPA to complete the implementation of CERCLA, the Agency typically focuses its projections on the expected future costs of the remedial and removal

programs. These programs are the major components of the Superfund program and account for the majority of Fund expenditures by the Agency. The estimates of the resource needs for these program areas are based on actual experience from FY87-FY88 and the most current budgets for FY90 and FY91.

Developing a complete estimate of Fund costs to complete CERCLA implementation is dependent on a number of factors, many of which change as the program matures. The most important of these factors are:

- Changes in Superfund program policies and procedures because of the revised NCP, particularly the clean-up standards imposed by section 121 of CERCLA;
- Changes in the remedial program because of HRS revisions required under section 105 of CERCLA;
- Changes in the character and size of the CERCLIS inventory and, as a consequence, the facilities that are added to the NPL;
- The effects of the long period required to identify, develop, select, and construct a remedy, particularly those using treatment technologies;
- The level of state Superfund program activity;
- The level of PRP participation in the program; and
- The nature of and demand for removal actions.

Superfund expenditures support EPA activities in three major areas: direct site activities, indirect site work, and program support. The proportion of Trust Fund resources allocated to each of these program areas may vary over time. Variations may be brought about by concentration of activity in certain program areas, changes in the focus of program implementation, and the maturity of the Superfund program. Other federal department and agency activities are also supported by resources from the Fund.

For the period from FY87 to FY91, inclusive, Superfund resources are expected to be used in the following proportions.

Direct Site Activities

Direct site activities account for approximately 69 percent of total Superfund resources and funds:

- Direct Site Work (50 percent), which consists of:

  Removal actions,
  Remedial actions,
  Pre-remedial action site assessments, and
  Engineering and design studies; and

- Direct Site Support (19 percent), which consists of:

  Extended remedial actions,
  Community relations,
  Contract laboratory support,
  Contract management,
  Enforcement,
  PRP settlements, and
  The Superfund Innovative Technology Evaluation program.

Indirect Site Work

Indirect site work accounts for approximately 6 percent of total Superfund resources and funds:

- Preliminary enforcement and cost recovery activities under section 107 of CERCLA (4 percent);
- National Response Team (NRT) and Regional Response Team (RRT) activities (1 percent); and
- Health studies and research, criminal casework, and other miscellaneous activities (1 percent).

Program Support

Program support accounts for approximately 25 percent of total Superfund resources and funds:

- Siting capacity and community assistance grants, training, the Office of the Inspector General, and other miscellaneous activities (10 percent);
- Research and support for other federal departments and agencies (5 percent);
- Information management and policy/ planning activities (4 percent); and
- General and financial administration (6 percent).

PRPs contribute to the hazardous substance clean-up effort by undertaking and financing voluntary or enforced remedial activities, thereby reducing the number of remedial actions that require Fund expenditures. EPA is currently developing and implementing policies designed to encourage PRP cleanups.

3.1.1 Remedial Program Costs

Expenditures for remedial activities currently are the single largest category of Superfund expenditures and are expected to remain so in the future. To project EPA funding needs for the remedial program, several key factors must be estimated:

- The projected size of the NPL (the estimate presented in section 3.2 relates to only the current NPL);
- The projected number of RI/FSs, remedial designs, and remedial actions to be undertaken;
- The average cost of an RI/FS, RD, and RA; and
- The direct clean-up actions to be taken by PRPs.

Exhibit 3.1-1 presents summary data on the actual and planned elements of EPA's Superfund actions. Exhibit 3.1-2 and 3.1-3 present data on EPA Superfund resource estimates in dollars and work years, respectively.

3.1.2 Cost Recovery Revenues

In addition to the direct remedial and removal actions undertaken by PRPs, a portion of the costs of certain Fund-financed response actions will be recovered from PRPs through cost recovery actions. The cost recovery revenues obtained from PRPs will ultimately reduce the overall costs of both the remedial and removal programs. Typically, there is a three-year delay between expenditures from the Trust Fund for final site work and the reimbursement of these response costs by PRPs to EPA.

The cost recovery rate for remedial expenditures is subject to a range of possible estimates given varying assumptions about: (1) the probability of successful litigation; (2) the ability to recover interest costs from litigation; (3) how many NPL sites will be cleaned up by private parties without expenditures from the Trust Fund; and (4) the role of new CERCLA settlement provisions, such as mixed funding and de minimis settlements. To date, Fund-financed remedial action generally has been taken at sites where PRPs are potentially capable of taking clean-up responsibility. The cost recovery rate for these sites is likely to be relatively high. In future years, as the rate of successful EPA enforcement actions increases, more PRPs will directly undertake actual cleanups. As a result, more Fund-financed actions will be taken at sites where there is less likelihood of cost recovery because there are fewer PRPs connected with these sites. The cost recovery rate for these sites may be lower than the rate for the earlier sites.

Although the cost recovery revenues obtained from PRPs will reduce the costs of the removal and remedial programs, the available data for these revenues are not sufficient to allow for an accurate estimate of the percentage of Fund-financed removal costs and remedial costs that will be recovered from PRPs. The Agency is putting significant effort into improving its cost recovery performance, as is demonstrated by the

Exhibit 3.1-1
Summary of EPA Superfund Actual/Planned Actions by Fiscal Year[1]

Activity	1989 Actual	1990 Planned	1991 Planned
Removal Action Starts[2]	322	253	253
Pre-Remedial Actions			
PA Completions	2,228	2,020	2,000
SI Completions	1,732	1,660	1,175
NPL Additions[3]	64	50	110
Remedial Actions[4]			
RI/FS Starts	157	88	30
RD Starts	157	104	155
RA Starts	108	46	76
Final RA Completions[5]	8	8	23

[1] The data shown are for Trust Fund-financed actions and those undertaken by PRPs at NPL facilities/sites, except for removal actions. The numbers shown are by year and are not cumulative.

[2] NPL and non-NPL sites. Fund-financed and PRP actions, first and subsequent starts.

[3] NPL facilities/sites proposed for final listing on the NPL.

[4] Data are for both first and subsequent starts by Fund and PRP lead.

[5] Data represent completion of all construction work at sites.

SOURCE: Fiscal 1989 data, Final Strategic Targeted Activities for Results System; fiscal 1990 and 1991 planned activities, Congressional budget submissions.

Exhibit 3.1-2
EPA Superfund Obligation History and Funding Requirements by Fiscal Year
(dollars in millions)

Program Area	Pre-SARA Total	1987 Actual	1988 Actual	1989 Actual	1990 Operating Plan	1991 Budget Request	Post-SARA Total	Post-SARA Percentage	Post-FY91 Estimate
Direct Site Activity	**1,226.1**	**738.0**	**1,085.7**	**1,062.0**	**998.0**	**1,216.6**	**5,103.4**	**69**	**11,976.4**
- Direct Site Work	786.5	534.9	849.1	751.3	687.6	862.5	3,677.0	50	7,523.0
-- *Removal Actions*	*135.4*	*115.9*	*101.7*	*116.7*	*111.9*	*111.2*	*557.4*	*8*	*377.3*
-- *Pre-Remedial Work*	*76.1*	*33.6*	*42.8*	*45.5*	*57.6*	*45.3*	*224.8*	*3*	*437.2*
-- *Engineering & Design Studies*	*368.0*	*190.8*	*211.7*	*185.9*	*208.2*	*172.4*	*962.4*	*13*	*1,563.6*
-- *Remedial Actions*	*207.0*	*194.6*	*492.9*	*403.2*	*309.9*	*533.6*	*1,932.4*	*26*	*5,144.9*
- *Direct Site Support*	*439.6*	*203.1*	*236.6*	*310.7*	*310.4*	*354.1*	*1,426.4*	*19*	*4,453.4*
Indirect Site Work	***91.9***	***58.3***	***79.8***	***97.6***	***122.7***	***116.8***	***465.9***	***6***	***3,558.0***
Program Support	***488.1***	***254.4***	***331.9***	***384.1***	***419.6***	***419.7***	***1,815.9***	***25***	***1,577.7***
Total Superfund[1]	***1,806.1***	***1,050.7***	***1,497.4***	***1,543.7***	***1,540.3***	***1,753.1***	***7,385.2***	***100***	***17,112.1***

Note: Includes funds transferred to other federal departments and agencies from the Hazardous Substance Superfund appropriation (Trust Fund) via: (1) the Superfund Intergency Budget (see Exhibit 3.3-1), and (2) site-specific IAGs. The costs shown here for remedial activities include first starts, subsequent starts, and work-in-progress. In setting mandatory schedules, such as that for remedial actions, Congress focused on first starts only (see CERCLA section 116(e)). In FY91, direct site activity will account for 69 percent of resources, indirect site work for 6 percent, and program support for 25 percent.

SOURCE: EPA Superfund Budget Documents.

Exhibit 3.1-3
EPA Superfund Staffing Requirements in Workyears by Fiscal Year

Program Area[1]	FY88 Actual	FY89 Actual	FY90 Estimate	FY91 Request
Hazardous Substance	1,186.5	1,342.2	1,469.0	1,468.1
Research	*94.0*	*103.3*	*130.1*	*130.1*
Response	*1,092.5*	*1,238.9*	*1,338.9*	*1,338.0*
Enforcement	928.4	987.6	1,474.9	1,445.6
Management and Support	482.9	521.0	621.1	638.3
Superfund Support	44.4	37.8	44.5	44.5
TOTAL	2,642.2	2,888.6	3,609.5	3,596.5

[1] See section 5.5 for more information on the content of these EPA program areas.

SOURCE: EPA Superfund Budget Documents.

FY87 and FY88 cost recovery revenues, the highest in the program's history.

3.2 Estimate of Resources Needed to Complete the Cleanup of the Existing National Priorities List

EPA has developed the Outyear Liability Model (OLM) to estimate the long-term resource needs of the Superfund program. The OLM's design allows it to produce meaningful long-range forecasts, while maintaining the flexibility to accommodate a wide range of possible programmatic conditions. The estimating approach uses a computer-based model that incorporates many aspects of the Superfund program and provides numerous points at which adjustments can be made.

Conceptually, the OLM estimates which activities will be undertaken in the future by applying several "generic" activity sequences to the number of new sites being estimated. Once the activity flows have been set, individual cost and workyear factors are applied to estimate the total cost of new sites. This estimate is then combined with actual planning data on current sites (from CERCLIS) and expected budget growth of program support elements to produce a comprehensive estimate of the cost to operate the Superfund program.

3.2.1 Estimated Cost to Complete Current National Priorities List Sites

As of the end of FY89, the OLM has estimated the total cost to clean up the existing NPL at $26.4 billion (Exhibit 3.2-1). Major considerations contributing to this estimate include:

- No new additions to the existing NPL;
- Zero percent annual growth of non-NPL removals;
- Zero percent annual decline in the number of NPL removals;
- Ten percent annual decline in pre-remedial site starts;
- RA cost factors will follow a pattern similar to that which occurred in FY87, FY88, and FY89;
- Zero percent annual growth for all program support and other agency elements (except those tied to site-related activities);
- Approximately 45 percent of all new RI/FS starts will involve Fund lead (that is, the Trust Fund will pay 100 percent of the cost); and
- On average, 80 percent of the Fund-lead sites, 50 percent of the PRP-lead sites, and 100 percent of the federal facility sites will require more than one RA before the site can be recommended for deletion from the NPL.

The estimate of long-term Superfund liabilities contained in this report is based on planning data for active sites and a number of assumptions about future sites and events. The actual site data are drawn directly from CERCLIS, Superfund's principle site activity data base. The assumptions represent a combination of programmatic directives (planning assumptions taken from the Superfund Program Management Manual) and historic performance averages. As a result, estimates produced by the model will vary over time (both the CERCLIS data and the performance averages are updated every six months as a compromise between stability and accuracy) and in response to different sets of assumptions. Consequently, subsequent annual editions of this Report will contain different estimates.

Assumptions that have the greatest effect on the estimate include:

- *Changes in PRP involvement.* To the extent that PRPs assume greater responsibility for cleanups, Fund costs will drop dramatically (the $26.4 billion estimate assumes that in FY90 PRPs will take the lead on approximately 55 percent of all new RI/FS starts, but that takeovers will rapidly increase the PRP portion of annual RA starts to 65 percent by FY97);
- *The ultimate size of the NPL.* The current estimate addresses the existing NPL only; and
- *Clean-up costs.* Changes in the use of existing technologies, development of new technologies, and overall changes in the cost of technology will affect these assumptions.

The total program estimate for completing the cleanup of the 1225 sites on the NPL as of the end of FY89 is $26.4 billion, including $6.0 billion (FY81-FY89), $1.5 billion (FY90), $1.8 billion (FY91), and $17.1 billion (post-FY91) (the outyear liability estimate) (see Exhibit 3.2.1). The total program estimate in the FY88 Report was $26.1 billion, which included an outyear estimate of $18.6 billion (post-FY90). Principal contributors to the difference between the estimate are:

- Addition of 64 new proposed NPL sites;
- Assuming a continued aggressive use of removals at NPL sites as a way to initiate on-site remedial action as quickly as possible;

Exhibit 3.2-1
Estimate of Liability to Complete the Existing National Priorities List
(dollars in millions)

Program Area	FY90 Operating Plan	FY91 Budget Request	Post-FY91 Estimate	Total
Direct Site Activity	**998.0**	**1,211.6**	**11,976.4**	**14,186.0**
- Direct Site Work	687.6	868.2	7,523.0	9,078.8
-- Removal Actions	*111.9*	*111.2*	*377.3*	*600.4*
-- Pre-Remedial Work	*57.6*	*45.3*	*437.2*	*540.1*
-- Engineering and Design Studies	*208.2*	*178.1*	*1,563.6*	*1,949.9*
-- Remedial Actions	*309.9*	*533.6*	*5,144.9*	*5,988.4*
- Direct Site Support	310.4	343.4	4,453.4	5,107.2
Indirect Site Work	**122.7**	**126.4**	**3,558.0**	**3,807.1**
Program Support	**419.6**	**415.1**	**1,577.7**	**2,412.4**
TOTAL SUPERFUND	**1,540.3**	**1,753.1**	**17,112.1**	**20,405.5**
TOTAL FY81-FY89				**6,015.3**
TOTAL PROGRAM				**26,420.7**

SOURCE: EPA Superfund Budget Documents and Outyear Liability Model.

- Use of new activity and full-time equivalent (FTE) pricing factors (each estimate uses the budget formulation pricing factors from the most current President's Budget);
- Use of the FY91 President's Budget as the source of FY91 resource and output levels. (FY91 was estimated by the model for the FY88 report and the FY91 President's budget includes revisions to FY90 information, most notably a $365 million reduction in RA obligations.); and
- Revising the expected proportion of PRP leads to more closely match recent experience.

As long as the Superfund program is operating, new information and data will be collected and will continuously be added to the model. In addition, every assumption in the model, including those noted above, may be adjusted to better depict future programmatic direction and refinements of previous analysis. The resources estimates contained in subsequent reports may change due to the addition of new

data and the adjustment of the assumptions contained in the model.

3.2.2 Major Program Elements Represented in the Outyear Liability Model

To provide a better estimate of the cost of the program and the flexibility needed to estimate the costs of future initiatives, the OLM includes many components that represent specific programmatic elements.

Currently Active Sites

At the close of FY89, remedial efforts had been started at 997 of the 1,253 final and proposed sites on the existing NPL (this figure for final and proposed NPL sites includes 28 deleted sites so that costs associated with these sites can be included in budget estimates). Remedial plans are being developed for other sites and initial remedial efforts are expected to be in progress at all of these remaining sites by the end of FY92.

Data on the active NPL sites are stored in CERCLIS. A version of these CERCLIS data is incorporated into the model to present the most accurate picture of planned activities at active sites. Because all but a few of the existing NPL sites are active, these sites will constitute a large portion of any overall liability estimate for the existing NPL.

In addition to planned remedial activities, enforcement activities have a significant impact on the costs of addressing Superfund sites. The OLM estimates occurrence of enforcement activities using past programmatic experience and several standard sequences of activities, each representing a different enforcement approach. Enforcement-related variables within the model address not only costs and workyears, but also the shifts in remedial costs that occur when the program assumes responsibility from, or passes responsibility to, a PRP. As with remedial activities, all activity costs and workyears are estimated using Superfund planning factors.

New Site Starts

The OLM estimates the occurrence of all activities and related costs for any inactive NPL sites, sites that are on the NPL but at which efforts have not yet reached the RI/FS phase. The resource estimate included in this chapter addresses only the existing NPL. The OLM can be used to estimate the clean-up cost of a larger NPL. To do this, activities and related costs would be estimated for the specified number of additional NPL sites.

The OLM estimates site-related costs by assembling activity sequences for each new start and then determining the cost of those activities. The user controls the number and scheduling of new sites. The user can specify either annual growth rates and an overall cap (for example, increase by 5 percent per year to a maximum of 200 annually) or an actual number of annual new starts (for example, a constant level of 150 per year) for each of the following types of starts:

- Non-NPL removals;
- NPL removals;
- Preliminary assessments (initiates a pre-remedial program site start); and
- RI/FSs (initiates a remedial program site start).

For the purposes of the OLM, site starts for the removal, pre-remedial, and remedial programs are not linked, but there are enforcement considerations for each. By "uncoupling" these program areas, it is possible to estimate costs for the existing program and to incorporate a wide range of possible programmatic changes. For example, changes in either the HRS or the NCP could redefine the number and types of sites which must be addressed by the program and the objectives of such actions.

Who is Responsible? -- Who Pays?

Aside from the number of sites requiring cleanup and the cost of individual cleanups, the factors surrounding the assumption of managerial and/or financial responsibility for a site have, perhaps, the largest impact on the cost of the Superfund program. There are many factors involved in this area, including:

- Emphasis on and effectiveness of the enforcement program; and
- Cost-sharing arrangements between the Superfund program and PRPs.

The OLM accommodates each of these factors with one or more variables, allowing the estimation of Superfund liabilities for a wide range of lead and cost-sharing possibilities. Related variables include:

- The proportion of sites addressed by each lead category;
- The number of PRP lead sites eligible for cost sharing and the portion of such costs assumed by the Fund;
- The number of sites that follow each of several enforcement paths; and
- The expected success of cost recovery efforts.

Choices among these variables may affect the duration of individual clean-up efforts and the overall program by altering the mix of activity sequences that are used. The OLM includes several different sequences of activities, each of which is intended to characterize one path that site-related activities might take. Also, the OLM responds to lead and enforcement adjustments by changing the mix of these activity sequences. Each of the sequences involves different activities, durations, and schedules. A heavier reliance on enforcement, for example, will result in longer elapsed time between the RI/FS start and RA completion, but will reduce Fund obligations.

Factors Related to RA Costs

The approach to RA cost estimation revolves around the development of seven technology categories, each with a unique average cost and expected treatment volume. The technology categories used in the OLM were developed by researching RODs from FY87, FY88, and FY89.

Variables used to estimate RA costs include:

- The proportion of sites where a particular technology category is employed;
- The average volume of contaminated media at sites using each technology category; and
- The unit costs (for example, cost per cubic yard of contaminated media) for each technology.

Adjustments of these variables make it possible to estimate the fiscal impact of:

- Policies that affect the selection of technological approach (for example, treatment versus containment);
- Changes in the contaminants found onsite (for example, if remaining sites have higher levels of heavy metals than sites already addressed, incineration would be less useful);
- Changes in technology costs; and
- Changes in site size, either by policy (for example, a policy to incinerate contaminated material at any site where the volume is less than 10,000 cubic yards) or across an entire range (for example, if all of the biggest sites have been completed, remaining sites will be smaller, on average).

Program Support and Other Agency Costs

Although not directly related to site activities, these elements constitute a large part of Superfund's budget and are included in the model. In general, these elements are based on their most recent budget levels and change at some specified annual rate. Each of the growth rates can be changed independently, allowing for more rapid or slower growth, or even for the gradual reduction of selected areas as programmatic demands change. A small number of support elements are linked to site-related activities reflecting an indirect site relationship. In these cases, estimated costs will increase or decrease from baseline budget levels in response to changes in the appropriate site activity.

3.3 Other Executive Branch Department and Agency Estimates of Resources Necessary to Complete Superfund Implementation

The second element in fulfilling the requirements of section 301(h)(1)(G) of CERCLA for this Report is to estimate the resources needed by other federal departments and agencies. EPA requested the resource requirement information from the other federal departments and agencies under a GSA IRCN issued on February 5, 1988, under the provisions of 41 CFR 201-45.6. EPA has sought to collect more comprehensive information for the FY89 report.

The resource needs of the other Executive Branch departments and agencies for Superfund implementation activities are met through two sources:

- Hazardous Substance Superfund (Trust Fund)

  Interagency Budget: EPA transfers monies to other federal departments and agencies from the Trust Fund to fund their activities in support of EPA's Superfund efforts. This is accomplished through an interagency budget under Executive Order 12580.

  Site-Specific Agreements: EPA transfers funds to other federal departments and agencies from the Trust Fund through site-specific agreements.

- Individual Federal Department or Agency Budgets

  CERCLA-Specific Funds: These funds are budgeted by the individual departments and agencies specifically for Superfund activities and support as part of the President's annual budget submission.

  General Funds: These funds are used for CERCLA activities and support by the individual departments and agencies and are obtained from general budget resources or are taken from resources designated for other programs.

Exhibit 3.3-1 summarizes reported resource needs of other federal departments and agencies. The following information was provided by other departments and agencies to supplement the resource estimates.

- Department of Defense. The Department of Defense (DOD) has the authority and responsibility under CERCLA to clean up contamination associated with its past activities. Beginning in 1984, DOD increased its emphasis on hazardous waste cleanup by establishing the Defense Environmental Restoration Program (DERP). Under this program, DOD identifies, investigates, and cleans up contamination and other environmental damage on its installations and on formerly used properties. One element of DERP, the Installation Restoration Program, follows the procedures of the NCP in cleaning up contamination from past activities. The preliminary studies and remedial investigations that have been performed for sites in the past few years under this program are now leading to the identification of needed response work in 1990 and beyond.

- Department of Energy. The Department of Energy (DOE) has the authority and responsibility under CERCLA to clean up contamination association with its past activities. The Environmental Restoration and Waste Management Five-Year Plan is the cornerstone of the Department's clean-up activities and research efforts.

  As stated in the Secretary of Energy's ten-point plan, it is DOE's policy that full compliance with the letter and spirit of environmental laws, regulations and requirements is an integral part of operating DOE facilities. The fundamental goals are to ensure that risks to human health and the environment posed by the Department's past, present, and future operations are either eliminated or reduced to prescribed, safe

Exhibit 3.3-1
CERCLA Resource Needs and Interagency Funding for Other Federal Departments and Agencies
(dollars in thousands/full-time equivalent workyears)

Federal Departments and Agencies	1987 Actual			1988 Actual			1989 Actual		
	Dollars		FTEs	Dollars		FTEs	Dollars		FTEs
	Trust Fund	Agency Budget	Agency Budget	Trust Fund	Agency Budget	Agency Budget	Trust Fund	Agency Budget	Agency Budget
Defense	--	375,900	N/A	--	402,800	1,060	--	500,000	N/A
Energy	--	47,663	N/A	--	86,953	N/A	--	112,839	N/A
Health and Human Services									
• ATSDR	32,439.3	--	175	42,999.9	--	175	44,499.0	--	175
• NIEHS	--	--	N/A	28,915	--	N/A	21,915	--	N/A
Justice	10,473	--	N/A	18,473	--	163	16,700	22,100	167
NASA	--	--	N/A	--	23,900	N/A	--	26,000	N/A
Transportation									
• USCG	4,023.3	6,615	168.5	3,027.6	7,803	27	4,948.2	1,720	40
Interior	707.6	6,900	15	1,113.5	9,600	24	1,111.0	24,700	23
FEMA	1,173.7	1,255	N/A	1,969.6	--	23	2,509.6	982	23
Commerce									
• NOAA	1,819.9	666	17.8	2,429.4	1,695	17.8	2,280.1	1,000	14
Labor									
• OSHA	281.3	--	N/A	380.9	--	15.5	1,008.2	--	9
Veterans Admin.	--	--	--	--	--	--	--	5,000	--
General Services Administration	--	150	0.3	--	261	4	--	--	19
Tennessee Valley Authority	--	200	--	--	323.1	--	--	242	--
Agriculture	--	--	N/A	--	1,500	N/A	--	2,500	N/A
TOTAL	50,918.1	439,349	376.6	99,308.9	534,835.1	1,509.3	94,971.1	697,083	470

Exhibit 3.3-1 (continued)
CERCLA Resource Needs and Interagency Funding for Other Federal Departments and Agencies
(dollars in thousands/full-time equivalent workyears)

Federal Departments and Agencies	1990 Operating Plan			1991 Budget Request			1987-91 Total		
	Dollars		FTEs	Dollars		FTEs	Dollars		FTEs
	Trust Fund	Agency Budget	Agency Budget	Trust Fund	Agency Budget	Agency Budget	Trust Fund	Agency Budget	Agency Budget
Defense	--	601,100	N/A	--	817,000	--	--	2,696,800	1,060
Energy	--	289,503	N/A	--	437,853	--	--	974,811	--
Health and Human Services									
• ATSDR	45,178.7	--	250	44,500	--	250	209,616.9	--	1,025
• NIEHS	36,254.8	--	N/A	21,915	--	--	108,999.8	--	--
Justice	25,754.2	26,300	187	32,324	26,300	187	103,724.2	74,700	704
NASA	--	30,000	N/A	--	32,000	--	--	111,900	--
Transportation									
• USCG	4,807.6	1,025	34	4,948.2	1,000	36	21,754.9	18,163	305.5
Interior	1,218.1	22,446.7	45	1,253.5	36,246.7	55	5,403.7	99,893.4	162
FEMA	1,826.3	1,300	23	1,879.6	1,700	23	9,358.8	5,237	92
Commerce									
• NOAA	2,215.6	950	15	2,280.1	950	17	11,025.1	5,261	81.6
Labor									
• OSHA	979.6	--	12	1,008.2	--	12	3,658.2	--	48.5
Veterans Admin.	--	12,000	--	--	2,000	--	--	19,000	--
General Services Administration	--	--	N/A	--	--	--	--	411.0	23.3
Tennessee Valley Authority	--	1,055	--	--	2,700	--	--	4,520.1	--
Agriculture	--	19,900	N/A	--	29,600	--	--	53,500	--
TOTAL	118,234.9	1,005,579.7	566	110,108.6	1,387,349.7	580	473,541.6	4,064,196.5	3,501.9

SOURCE: EPA Superfund Budget Documents.

levels. DOE Order 5400.4, "Comprehensive Environmental Response, Compensation, and Liability Act Requirements" formally establishes the DOE program responsibilities and policies for implementing CERCLA requirements. The Order requires that DOE respond to releases and potentially imminent releases of hazardous substances in accordance with CERCLA, the NCP, and Executive Order 12580. It also requires that the Department enter into Interagency Agreements (IAG) with federal, state, and local entities for conduct of RI/FSs and remedial action under Section 120(e).

DOE is conducting remedial activities at all 16 sites currently listed on the NPL. In addition, as of the end of FY89, the Department has entered into Section 120 agreements with EPA and the states at the Lawrence Livermore National Laboratory, Monticello Mill Site and Vicinity Properties, and the Hanford Site. CERCLA Section 120 IAGs are currently under negotiation with federal and state regulatory agencies for the remaining NPL sites.

- Department of Health and Human Services

Agency for Toxic Substances and Disease Registry. During FY89, the Agency for Toxic Substances and Disease Registry (ATSDR) completed 592 health assessments, bringing the total number of health assessments completed to 1,154. ATSDR also completed two pilot studies/ investigations on selected populations during FY89; nine health studies were initiated. Over 2,200 health consultations were provided at remedial sites.

In compliance with section 104(i)(3) of CERCLA, which requires ATSDR to prepare toxicological profiles on the first 100 most hazardous substances found at Superfund sites, ATSDR completed 25 during FY89. Thus, 75 profiles were either in draft or final form at the end of FY89. ATSDR conducted approximately 1,000 health consultations to private or public health care providers in the provision of medical care and testing of exposed individuals.

The policy and procedures manual for the National Exposure Registry was completed during FY88. In FY89, ATSDR initiated a trichloroethylene sub-registry comprised of eight sites with a population base of approximately 5,000. A dioxin sub-registry was also established during FY89, and a benzene sub-registry will be developed in FY90. ATSDR continued discussions with other agencies regarding toxicological profiles and health assessment research.

ATSDR's health education activities during FY89 included the continuation of training for state and local health officials on the use of Toxnet and other on-line systems operated by the National Library of Medicine, the development of environmental health care studies for use by the medical community, and education activities through the environmental and occupational health clinic network.

National Institute of Environmental Health Sciences. CERCLA section 311(a) authorizes National Institute of Environmental Health Sciences (NIEHS) to conduct research in the development of advanced techniques for the detection and evaluation of the effects of hazardous substances on human health. In FY89, nine universities received funding from NIEHS to conduct 78 separate basic research studies in a grants program designed to fulfill the requirements of a Superfund Basic Research and Professional Training Plan. The Plan was developed by NIEHS and approved by the Department of Health and Human Services (HHS) Advisory Council on Hazardous Substances Research and Training as required by Section 311(a) of SARA.

The worker safety training program also became fully operational in FY89. Complete training programs were put in

place by 11 grantee organizations at centers across the United States. A clearinghouse was established by and for the NIEHS grantees to assure communication and coordination of a nationwide training effort in Superfund worker training. Technical advice and assistance was provided during the emergency response to the Alaska oil spill.

- Department of Justice. The Department of Justice (DOJ) has two objectives under the Superfund program: to defend the program from legal challenges and to compel PRPs to comply with the law. Because of limited resources to support Superfund over the long term, enforcement is one of the keys to the success of the program.

  DOJ plays an integral role in the Superfund program through judicial enforcement actions to recover clean-up costs, impose civil penalties, and compel PRPs to perform cleanups. To this end, DOJ's three priorities for Superfund litigation are: (1) lodging and entering consent decrees that provide for privately funded remedial action; (2) injunctive relief actions to compel privately funded remedial action; and (3) cost recovery lawsuits to recoup Trust Fund monies spent cleaning up sites.

- National Aeronautics and Space Administration. The National Aeronautics and Space Administration (NASA) had a very active and aggressive FY89 Environmental Compliance and Restoration Program valued at over $26 million. This program is presently planned for continuation into FY90 at an additional level of $30 million. The purpose of this program is to enable compliance with mandatory statutory environmental requirements and standards. In FY90, approximately $5.8 million is slated for air pollution abatement, asbestos removal, and PCB replacements; $12.4 million has been allocated for hazardous waste monitoring and control; and $3.9 million for replacement of underground storage tanks and the upgrade of treatment systems. Many other activities are also within the program including studies, assessments, remedial investigations, and feasibility studies. These activities are valued at $7.9 million.

- Department of Transportation. The Department of Transportation (DOT) estimates that it will use funding from its budget to support CERCLA-related activities as carried out by the Federal Aviation Administration (FAA), the Research and Special Programs Administration (RSPA), the U.S. Coast Guard (USCG), and the Maritime Administration (MARAD). No Superfund money is included in this report; only funds which are applied from the Departmental budget are included. The primary funding areas in support of CERCLA requirements include pollution abatement related to the operation of DOT facilities and response to any release or threatened release of hazardous substances within the Coastal Zone, Great Lakes waters, ports and harbors.

- Federal Aviation Administration. All of FAA's CERCLA activities involve pollution abatement. They focus on hazardous waste cleanup at regional facilities and other clean-up efforts to remove asbestos and PCBs.

- Research and Special Programs Administration. RSPA conducts four activities which support CERCLA/ Superfund responsibilities. These activities which require funding and manpower/FTE support include: rulemaking, technical support, information and planning data, and emergency response training and support. RSPA does not have any A-106 pollution abatement projects.

- U.S. Coast Guard. The USCG is a major supporter of the Superfund program through its role as the predesignated federal on-scene coordinator (OSC) in the

Coastal Zone for responding to any release or threatened release of hazardous substances in the Coastal Zone. It must also address pollution abatement related to the operation of its own facilities.

- Maritime Administration. All of MARAD's activities in support of CERCLA involves testing for hydrocarbons in storage tank facilities at Kings Point and other locations.

- Department of the Interior. Each of the nine bureaus and four territorial elements of the Department of the Interior (DOI) has provided support to the Superfund program, mostly assisting the National Response Team and the Regional Response Teams. DOI's role in the program focuses on three general areas:

  Response Management, including RRT assistance activities, incident-specific activities, and NPL site remedial response activities;

  Emergency Response Preparedness, including RRT participation, regional RRT workgroups, and RRT support; and

  Trust Resources/Damage Assessment, including coordination of natural resource trustee concerns, natural resource damage assessment briefings, and settlements of trustee resources.

- Federal Emergency Management Agency. The enactment of SARA in 1986 made many of the voluntary preparedness and planning activities of the Federal Emergency Management Agency (FEMA), including activities required by Title III, ineligible for funding under the Superfund budget after September 30, 1987. To continue the ongoing Superfund assistance to state and local governments and to support their efforts to implement Title III, FEMA, in FY88, consolidated its funding requests under two separate authorizations of appropriation.

  Funding for all Superfund activities was requested under the Superfund Interagency Budget, and the remainder of FEMA's hazardous materials activities, including Title III, was incorporated into FEMA's own operating budget (under its Earthquake and Other Hazards Budget). Thus, no additional funds were requested under Section 301(h)(1)(G) to carry out Superfund activities after FY87.

- Department of Commerce. The National Oceanic and Atmospheric Administration (NOAA) carries out many of the responsibilities of the Department of Commerce (DOC) under CERCLA. NOAA's Superfund program goals are: (1) to strengthen and accelerate technologies to plan for, and respond to, hazardous substance releases in coastal and marine areas; and (2) to assist EPA in identifying, evaluating, and mitigating the adverse effects of hazardous substances on natural resources in coastal and marine ecosystems.

  These goals are addressed primarily through NOAA's efforts to build an effective network of Scientific Support Coordinators and core support groups to assist federal on-scene coordinators in responding to hazardous substance releases into coastal or marine waters. It also has developed computerized contingency plans for major U.S. ports.

  NOAA also acts on behalf of the Secretary of Commerce as a federal trustee for natural resources in coastal and marine areas affected by hazardous substance releases. NOAA Coastal Resource Coordinators, funded through Superfund and assigned to EPA regional offices, assist the Agency in evaluating natural resource concerns at coastal hazardous substance release sites and in improving coordination with federal and state natural resource trustees. The resource estimates do not include those resources necessary to meet NOAA's role as a federal trustee for natural resources.

- Department of Labor. Funds appropriated under general IAGs will allow the Occupational Safety and Health Administration (OSHA) of the Department of Labor (DOL) and states operating OSHA-approved plans to continue providing EPA and other response personnel with technical assistance to protect workers at Superfund sites, implementing the workers safety program at Superfund sites, and supporting the National and Regional Response Teams.

  OSHA conducts inspections at Superfund sites to ensure that employers are in compliance with all applicable OSHA standards, including the standard for employees engaged in hazardous waste operations, as mandated by section 126 of CERCLA.

  OSHA performs laboratory analyses of samples collected at Superfund site inspections and maintains and calibrates technical equipment used for these inspections. OSHA's analytical laboratory also maintains a computerized system for tracking hazardous waste inspection activity. In FY91, OSHA will shift emphasis from enforcement to assistance and will perform up to six compliance assistance visits and will conduct six on-site plan reviews. As a member of the National Response Team and the associated Regional Response Teams, OSHA assists the teams in meeting their annual workplans.

- Department of Veterans Affairs. Prior to 1989, no funds had been specifically budgeted for Superfund cleanups. In FY89 and FY90, Department of Veterans Affairs (VA) budgeted $5 million and $12 million, respectively, to meet projected costs. For FY91, the requested budget amount is $2 million. At present, VA is a PRP at a number of Superfund sites including: Baldwin (FL), Maxey Flats (KY), Holden (MO), Envirotek II (NY), Pristine Co. (OH), Chillicothe (OH), and Northside-Envirochem (IN).

- Department of Agriculture. Congress appropriated $2 million in FY88, $5 million in FY89, and $20 million in FY90 for hazardous waste management activities at the Department of Agriculture (USDA). Because hazardous waste management activities comprise both CERCLA and RCRA compliance, USDA split the monies between the two programs 75/25 (CERCLA/RCRA) in FY88 and 50/50 beginning in FY89. USDA intends to dedicate its Superfund effort to planning and remedial action efforts at abandoned mines for the Forest Service and to various other activities by the Agricultural Research Service, Forest Service, Rural Electrification Administration, and Animal & Plant Health Inspection Service. The substantial increase from FY89 to FY90 reflects the planned increase in the level of remedial actions underway.

- General Services Administration. During FY88, GSA conducted PAs for 18 GSA facilities that appeared on the federal facilities docket. GSA does not anticipate that further work will be performed at these 18 sites. Therefore, no additional resources have been specifically identified for CERCLA activities. Resources for environmental studies/corrective projects, however, are included in the GSA budget and can be utilized for CERCLA studies/corrective projects, if necessary. In addition, GSA currently is involved in five Superfund site investigations in which it is a PRP; as a result, it may incur third-party PRP costs in future years.

- Tennessee Valley Authority. TVA's CERCLA resource requirements are to support its cleanup effort at the Muscle Shoals fertilizer plant.

CHAPTER

4

Other Statutory Requirements for the Report

In addition to reporting on program progress, CERCLA requires EPA to submit annual reports to Congress on several other activities: (1) research on and development of treatment technologies; (2) minority firm participation in Superfund contracting; and (3) progress in reducing the number of sites where contamination remains after remedial action is completed. Progress in these areas is described in detail in this chapter.

Acronyms Introduced in Chapter 4

ETP	-	Emerging Technologies Program
MBE	-	Minority Business Enterprise
NAMC	-	National Association of Minority Contractors
OER	-	Office of Exploratory Research
OSDBU	-	Office of Small and Disadvantaged Business Utilization
OSWER	-	Office of Solid Waste and Emergency Response
PCP	-	Pentachlorophenol
SITE	-	Superfund Innovative Technology Evaluation
VOCs	-	Volatile Organic Compounds
WBE	-	Women's Business Enterprise

4.1 Use and Development of Permanent Technologies

EPA is required under CERCLA section 301(h)(1) to submit an annual evaluation of newly developed feasible and achievable permanent treatment technologies. Superfund technology-related research and development efforts are administered primarily through EPA's Office of Research and Development (ORD).

During FY89, two solicitations for research and development proposals were issued (including one specifically for Superfund research and development), and 12 grants were awarded. In addition, the establishment of Hazardous Subtance Research Centers, the establishment of an Alternative Treatment Technology Information Center, responses to the 90-Day Study, and the publication of a number of information manuals were significant Superfund research and development accomplishments of the past fiscal year.

4.1.1 The Superfund Innovative Technology Evaluation Program

In 1986, EPA's Office of Solid Waste and Emergency Response (OSWER) and ORD created the Superfund Innovative Technology Evaluation (SITE) program. The goal of the program is the development, demonstration, and subsequent use of new and innovative treatment technologies in the cleanup of Superfund sites across the country. The SITE program, now in its third year, is continuing to provide the treatment technologies required for the implementation of updated federal and state clean-up standards. The SITE program emphasizes the development of technologies that may provide permanent remedies as opposed to "quick fixes."

The SITE program of technology research and development is focused upon a number of technology development milestones, set by ORD, to measure the progress of new and innovative

treatment technologies. Further information regarding the status of particular technologies in relation to those milestones can be found in the SITE Report to Congress, which is published annually by ORD.

The SITE program is divided into five operational areas, three of which were especially active in FY89. These three areas are: the Demonstration Program, the Measurement and Monitoring Technologies Program, and the Emerging Technologies Program (ETP).

The Demonstration Program

The majority of the research efforts in terms of time and cost fall under the Demonstration Program. The goal of this program is to develop data on the performance, cost-effectiveness, and reliability of new treatment technologies. The Agency uses these data to determine the applicability of particular technologies to individual Superfund sites.

The Agency develops working relationships with the developers of the technology. The developers are responsible for the demonstration of their proposed technologies. Although these demonstrations often occur at Superfund sites, they also may take place at the developer's own facilities, EPA laboratories, or private sites. EPA's role in this process involves the sampling, analysis, and evaluation of all test results. The Agency thus has the opportunity to assess the performance, reliability, and cost of new and innovative technologies, while the developer is provided with an extensive data set that serves to validate the capabilities of its technology.

Solicitations for applications to the SITE Demonstration Program are made both annually (the last was in January 1989) and on a rolling basis (whenever a developer has a treatment project scheduled with a Superfund waste). Once a proposal has been accepted, the Agency works with the developer to find a suitable test site for the technology.

In FY89, ORD reported on the completion of the following seven field demonstrations, bringing the number of completed demonstrations to 14.

Ultrox International, Incorporated demonstrated its ultraviolet radiation and oxidation system at the Lorentz Barrel and Drum company Superfund site in San Jose, CA. The system uses a combination of ultraviolet light radiation, ozone, and hydrogen peroxide to oxidize organic compounds in water. Ultrox International treated approximately 13,000 gallons of contaminated ground water using the system. The system achieved removal efficiencies as high as 90 percent for total volatile organic compounds (VOCs) present in the ground water. The removal rates were lower for some compounds (65 percent for 1,1-dichloroethane) and higher for others (99 percent for trichloroethylene). The mean concentration of the total VOCs in the effluent was 12-51 ug/l, compared to a mean value of 120 to 200 ug/l in the influent.

Chemfix Technologies, Incorporated demonstrated its solidification/stabilization process at the Portable Equipment Salvage company Superfund site in Clackamas, Oregon. The process is used to treat a variety of industrial wastes contaminated with heavy metals and organic compounds with high molecular weight. Proprietary reagents are mixed with wastes to form a stable, solidified mass. About forty tons of soil contaminated with lead, copper, and polychlorinated biphenyls (PCBs) were treated during the testing. Tests conducted on the treated waste showed that lead concentrations were reduced 94 to 99 percent and copper concentrations were reduced 95 to 99 percent.

Ogden Environmental Services demonstrated a circulating fluidized bed combuster at the McCall Superfund site in Fullerton, CA. The combuster destroys a variety of waste materials at temperatures below 1560°F (850°C). Limestone is injected simultaneously with the waste stream into the combuster unit, capturing acid gases, thereby eliminating the need for a scrubber. Ogden used a combuster to treat 5,500 pounds of high sulphur acidic petroleum refinery waste. Results of stack gas tests indicated that, using carbon tetrachloride as the performance indicator, the waste, after treatment, met the RCRA 99.99 percent destruction and removal efficiency limit for trial burns. Acid gas emissions and flue gas particulates were well below RCRA limits, although further testing is needed to ensure compliance with local air standards for concentrations of flue gas particulates. No significant concentrations of hazardous organics or metals were detected in the flue gas. Carbon monoxide, nitric oxides, and total hydrocarbon emissions were within facility permit conditions. Additionally, organics originally

present in the waste feed were not detected in the fly ash bed streams, and PCBs, dioxins, and furans were not detected.

Toxic Treatments (USA), Incorporated demonstrated a full-scale prototype of the In-Situ Detoxifer at the Annex Terminal Superfund site in San Pedro, CA. This In-Situ Detoxifer injects hot air and steam into the ground to remove volatile organics from soil. The increase in soil temperature resulting from the injection of hot air and steam causes volatile organic compounds to vaporize. A steel shroud collects the soil off-gases, and a gas treatment system separates the volatile organics and polishes the air and water before reuse. The Detoxifer was demonstrated on soil contaminated with common industrial chemicals, chlorinated solvents, plasticizers, adhesives, and paint additives.

Biotrol, Incorporated demonstrated a pilot-scale biological treatment system for organics in wastewater at the MacGillis and Gibbs Superfund sites in New Brighton, MN. The system uses a fixed-film bioreactor that contains three cells filled with corrugated PVC media on which the biofilm grows. The biofilm consists of indigenous microorganisms, and added naturally occurring microorganisms. During the demonstration, approximately 176,000 gallons of ground water principally contaminated with pentachlorophenol (PCP) were treated. EPA sampled influent, biomass, off-gases, and effluent. The unit operated well during the test.

Biotrol, Incorporated also demonstrated a soil washing system for soil contaminated with PCP and polynuclear aromatic hydrocarbons at the MacGills and Gibbs Superfund site. The system consists of a soil washer, a slurry bioreactor, and the fixed-film bioreactor described above. The soil washer uses water in a multi-staged series of intensive scrubbing and physical classification steps to separate the heavily contaminated fine fraction (silt, clay, and humic particles) of the soil from the coarser, less contaminated sand fraction. All process water used in the soil washer is treated in the fixed-film bioreactor prior to being discharged or recycled. A small portion of the fine particle slurry is being treated by a prototype slurry bioreactor.

Soliditech, Incorporated demonstrated its solidification and stabilization process, which chemically and physically immobilizes hazardous constituents contained in slurries, at Imperial Oil Company Superfund sites, an oil recycling facility in Morganville, New Jersey. During the process, the proprietary reagent URRICHEM™ is dispersed throughout the waste and works to micro-encapsulate hazardous compounds by crosslinking organic and inorganic particles, coating large particles, and sealing small pores and spaces. This sealing process significantly reduces leaching potential. Wastes treated during the demonstration were from three sources at the facility: contaminated soils from a marshy area, used filter-clay material from an existing waste pile, and an oily sludge from an unused storage tank. Approximately two to five cubic yards of each waste were processed in Soliditech's mobile mixing unit. Contaminants included heavy metals, petroleum hydrocarbons, and low levels of volatile organic chemicals. Samples of untreated and treated waste were analyzed for a wide range of organic and inorganic contaminants, and other physical and chemical characteristics. Samples were also subjected to several leaching tests. The treated wastes were evaluated for strength and durability through tests such as the unconfined compressive strength test, freeze/thaw tests, wet/dry tests, and microstructural analysis. Preliminary results are not yet available. The treated waste will also be sampled and analyzed over a period of three to five years.

EPA is currently working with 36 technologies under the Demonstration Program. Exhibit 4.1-1 lists the five categories of Superfund technologies addressed under the Demonstration Program, and provides the status of each project.

The Measurement and Monitoring Technologies Program

A second component of the SITE program is the Measurement and Monitoring Technologies Program. This program provides assistance in the development and demonstration of new and innovative measurement and monitoring technologies to be used in Superfund site characterization. Technologies are evaluated under this program at the Agency's Environmental Monitoring Systems laboratory in Las Vegas, Nevada. Technologies are investigated for their capacity to:

- Assess the extent of contamination;

Exhibit 4.1-1
Superfund Innovative Technology Evaluation Demonstration Program: Project Status

Technology Type	Number of Projects: Selected Technologies	Number of Projects: Demonstrations Completed
Solidification/Stabilization Technologies	9	4
Biological Technologies	5	1
High and Low Temperature Thermal Technologies	7	4
Physical Technologies	12	4
Chemical Technologies	3	1

SOURCE: Based on the March 1990 draft of the *1989 Report to Congress on Superfund Innovative Technology Evaluation.*

- Determine effects on human health and the environment;
- Aid in the selection of the most appropriate remedial action; and
- Monitor the effectiveness of a selected remedy.

Projects in FY89 included: (1) a laboratory analysis of the Westinghouse Bio-Analytic systems immunoassay for pentachlorophenol (PCP) through a field test of these systems on PCP-contaminated water at a Superfund site; (2) the development of a trihalomethane (chloroform) fiber optics sensor; and (3) the development of a fiber optic sensor for gasoline and other fuels.

The Emerging Technologies Program

A third component of the SITE program is the Emerging Technologies Program (ETP) that received substantial attention in FY89. Seven projects were accepted for ETP in FY89. In addition, in July of 1989, EPA issued a request for proposals. Forty-seven preproposals were submitted to the Agency by the September 7, 1989 deadline and are currently under review.

ETP conducts investigation and development activities for treatment technologies that have not yet reached the demonstration stage. The goal of ETP is to feed the demonstration program, ensuring a steady flow of potentially useful, permanent, and cost-effective treatment technologies. ETP awards are in the form of two-year competitive cooperative agreements with developers. Funding levels extend to a maximum of $300,000 over two years.

4.1.2 Technology Transfer Centers

The Agency recognizes the importance of the transfer of knowledge concerning the status of new and innovative Superfund technologies. The SITE program has responded to this important need with the creation of an information clearinghouse and a technology information center, both of which collect, synthesize, and disseminate technology performance data.

Technology Transfer Clearinghouse

The Technology Transfer Clearinghouse has three components:

- Up-to-date information on SITE projects, including demonstration schedules, and demonstration results which are available from the SITE hotline in Washington, D.C. The phone number is (800) 424-9346, or 382-3000 for local calls.
- An electronic Bulletin Board System provides summary information on SITE projects, demonstration schedules, and demonstration results.
- The hazardous waste collection of the EPA library houses a number of journals, reports, and other documents. These documents are also available at the regional and laboratory libraries.

The Alternative Treatment Technology Information Center

In May of 1989 the Agency's Alternative Treatment Technology Information Center (ATTIC) became operational. ATTIC is an automated, comprehensive information retrieval system that integrates hazardous waste data into a centralized, searchable resource. ATTIC is intended to serve as an information focal point for individuals and organizations involved in hazardous waste site remediation.

ATTIC was initially developed in the Hazardous Waste Management Division of EPA Region 3. The system was also successfully demonstrated in other regions before being brought to EPA Headquarters.

The information contained in ATTIC is obtained from the ATTIC data base that contains executive summaries and abstracts from more than 700 technical sources. Plans for FY90 include the extension of ATTIC to all EPA Regional offices, the addition of new data bases, and the extension of ATTIC via an on-line system to all Agency and contractor support personnel.

4.1.3 The Hazardous Substance Research Center Program

The Agency is authorized under section 311(d) of CERCLA to establish between five and 10 hazardous substance research centers. The centers are to be "equitably distributed around the country" and funded at a level of $25 million over a five-year authorization period. The purpose of the centers is to perform innovative short- and long-term research and technology transfer activities relating to key hazardous substance problems experienced in their geographical area.

Solicitations for research centers were issued in March of 1988. The Agency received 33 proposals. The Agency divided the 10 EPA Regions into five pairs and awarded a research center to each pair of regions. The centers were officially established in February of 1989. Several features make these centers unique in the federal assistance program. The first distinctive feature of the centers is their local orientation; the research conducted specifically addresses hazardous waste issues experienced in that center's geographical location. Another feature is the requirement that a center spend no less than 10 percent of its budget on technology transfer and training activities; this will ensure that the information will leave the center and reach those who need it (e.g., waste handlers and manufacturers). Finally, on an annual basis, each center must provide $250,000 of its own funding for every million dollars awarded by EPA; this measure will ensure the center's vested interest in its own success. The centers, their regions of operation, and their research topics are listed in Exhibit 4.1-2.

4.1.4 Superfund Research Grants

The Agency's Office of Exploratory Research (OER) is responsible for the solicitation of proposals for research in all areas administered by the Agency. A general solicitation is issued by this office on an annual basis, under which proposals for Superfund research may be submitted. Funding under this program is available for both continuing research projects and new proposals. Funds awarded for the continuation of work on existing Superfund projects totaled $770,671 for FY89.

Exhibit 4.1-2
Hazardous Substance Research Centers

Research Center	Location	Research Emphasis
The Northeast Hazardous Substance Research Center, New Jersey Institute of Technology, Newark, New Jersey	Regions 1&2	*In situ* treatment technologies and incineration
The Great Lakes/Mid-Atlantic Hazardous Substance Research Center, University of Michigan, Ann Arbor, Michigan	Regions 3&5	Bioremediation and other techniques for the removal of organic contaminants from soils and ground water
The Waste Minimization and Management Center, North Carolina State University, Raleigh, North Carolina	Regions 4&6	Pollution prevention and techniques to make industrial operations cleaner
The Hazardous Substance Research Center, Kansas State University, Manhattan, Kansas	Regions 7&8	Recovery of metals and other wastes from mining, and the cleanup of pesticides from soils
The Western Region Hazardous Substance Research Center, Stanford University, Stanford, California	Regions 9&10	Physical and chemical treatment techniques for surface and subsurface contaminants

SOURCE: Prepared for this Report.

OER published a solicitation in March of 1989 for grant proposals specifically concerning Superfund technologies. The proposals were due in May. The topic for new research grants in FY89 was "Innovative Biodegradation Technologies for Treatment of Hazardous Organic Wastes at Superfund Sites." Under the March solicitation, 12 grants were awarded for new starts at a funding level of $1,601,800.

A number of Superfund research projects have, in the past fiscal year, moved beyond the research and development phase. These products of the OER Superfund grants program are now in actual use at Superfund sites. A summary of these technologies is presented in Exhibit 4.1-3.

4.1.5 90-Day Study Activities

A number of the management objectives listed in the Administrator's 90-Day Study pertain to ORD. In specific response to these

Exhibit 4.1-3
Accepted Superfund Treatment Technologies
(Development Grants Funded by the Office of Exploratory Research)

Fast Gas Chromotography for Hazardous Waste Monitoring/Analysis
-- Steven Levine, University of Michigan

Photocatalysis of Halogenated Hydrocarbons Using Hydrous Oxides and Ordered Ceramic Membranes
-- Marc Anderson, University of Wisconsin

In-Situ Treatment of Organic Hazardous Waste in Surface Soils Using Fenton's Reagent
-- Richard Watts and Glenn Miller, University of Nevada-Reno

In-Situ Treatment of Hazardous Waste
-- Ronald Sims, Utah State University

Interactions of Organic Arsenals with Clay Minerals and Hydrous Oxides
-- Mriganka Ghosh, Pennsylvania State University

SOURCE: "Highlights of Superfund Grants Program," prepared by the U.S. EPA Office of Research and Development, September 1989.

objectives, ORD has undertaken the following activities:

- Implemented a four-point program of new technical services to support the regions in their use of innovative technologies for Superfund clean-up operations.
- Created the Superfund Technology Assistance Response Team. In FY89, this team assisted EPA Regions at six Superfund sites. The assistance often involves the identification of new and innovative technologies that are cost-effective and environmentally sound.
- Established a Treatability Assistance Program that, in FY89, produced a list of vendors capable of performing treatability tests.
- Accelerated the development and implementation of ATTIC, which is discussed above.
- Developed a charter for the development of a regional liaison system to assist the regions in obtaining ORD technical support.

4.2 Minority Firm Participation in Superfund Contracting

CERCLA section 105(f) requires EPA to consider the availability of minority contractors when awarding contracts for Superfund work. EPA's Office of Small and Disadvantaged Business Utilization (OSDBU) ensures that the Agency complies with CERCLA section 105(f) and has prepared this section of the FY89 Report. EPA satisfies section 105(f) through direct procurement of minority contractors, or, when a state or Indian tribe is involved, through cooperative agreements with "fair share" procurement subagreements. Additionally, other federal agencies with which EPA has negotiated interagency agreements (IAGs) may award contracts to minority firms with the funds transferred to the agencies from Superfund through IAGs.

During fiscal 1989, contracts worth $53,699,428 were awarded to minority contractors to perform Superfund work. (This represents 5.0 percent of the total dollars obligated to finance Superfund work.) As Exhibit 4.2.1 illustrates, EPA awarded the largest sum of funds to minority firms ($51,600,000) through direct procurement. Other federal agencies or departments awarded $1,862,307 worth of contracts to minority firms with funds transferred from the Superfund program through IAGs. Contracts worth an additional $237,121 were awarded as a result of cooperative agreements. (This total does not include a $500,000 grant that EPA awarded to the National Association of Minority Contractors, a non-profit organization.)

Minority firms provide three types of services to the Superfund program: professional, field support, and construction. Exhibit 4.2-2 illustrates examples of tasks performed under each category.

As illustrated by Exhibit 4.2-3, most minority firms awarded contracts fall into the category of Small Business Administration 8(a) contractors. The Superfund program also awards prime contracts to minority firms and Superfund prime contractors use minority firms as subcontractors.

4.2.1 EPA Efforts to Identify Qualified Minority Firms

OSDBU conducted a number of activities during the fiscal year to identify qualified minority firms and to inform them of opportunities available in the Superfund program.

- In cooperation with the National Association of Minority Contractors (NAMC), OSDBU conducted training sessions designed to make minority contractors eligible to compete for Superfund contracts. One hundred fifty-eight people representing 113 firms participated in the training.

- EPA hosted the Superfund Marketing Trade Fair in February 1989 to provide minority firms the opportunity to meet one-on-one with both Superfund prime contractors and state officials responsible for Superfund cleanups; 83 participants from FY88 training sessions attended the fair.

- OSDBU, in cooperation with New Jersey, Rhode Island, Texas, Washington, and Georgia, hosted minority business enterprise (MBE) and women's business enterprise (WBE) workshops that were designed to better familiarize minority and women business owners with the opportunities available in Superfund and other EPA programs; a total of 515 people attended the workshops.

- OSDBU hosted its annual MBE/WBE workshop in April 1989, and, during the workshop, emphasized the need for improving surveillance of the Superfund program to ensure that minority contractors are used whenever possible.

- OSDBU conducted a special workshop in November 1988 to inform EPA Regional small and disadvantaged business utilization officers of the need for timely and accurate reporting and to provide the officers with the latest information concerning the pending procurement regulations for Superfund cooperative agreements and state contracts.

4.2.2 Efforts to Encourage Other Federal Agencies and Departments to Use Minority Contractors

OSDBU, in cooperation with Superfund Program officials, Grants Administration officials, and the Office of General Counsel, developed special conditions to be included in each memorandum of understanding between EPA and any agency or department receiving Superfund monies. The special conditions ensure that agencies or departments receiving Superfund money are aware of and act on the requirements of CERCLA section 105(f). Previously, EPA had sent letters to all federal agencies and departments that receive Superfund money stressing the importance of using minority contractors. OSDBU, however, developed the special conditions because the Agency believed that a

Exhibit 4.2-1
Minority Contractor Utilization

Type of Activity	Total Dollars Obligated	Minority Contractor Participation	Percentage of Total
Cooperative Agreements	$ 234,703,272	$ 237,121	1.0
Interagency Agreements	185,604,949	1,862,307	1.0
Direct Procurement	657,000,000	51,600,000	7.9
TOTAL	**$ 1,077,308,221**	**$ 53,699,428**	**5.0**

SOURCE: Prepared for this Report.

Exhibit 4.2-2
Services Provided by Minority Contractors

Professional	Field Support	Construction
Health Assessments	Drilling/Well Installation	Site Cleanup
Community Relations	Laboratory Analysis	Excavations
Feasibility Studies		Waste Hauling and Disposal
Data Management		Security
Geophysical Surveys		Site Support
Remedial Investigations		Facilities
Expert Witness		
Editing		
Air Quality Monitoring		

SOURCE: U.S. EPA Office of Small and Disadvantaged Business Utilization.

Exhibit 4.2-3
Amount of Money Awarded for Each Type of Minority Contract

Type of Contract	Total Dollars (in millions)
Minority Prime Contracts	4.7
Small Business Administration (8a) Contracts	34.9
Minority Subcontracts	12.0

SOURCE: Prepared for this Report.

more formalized and uniform measure was needed to inform all recipients of Superfund monies of the section 105(f) requirements. One of these special conditions requires that departments or agencies undertaking Superfund work submit an annual report to EPA on minority contractor utilization.

4.2.3 Efforts to Increase the Use of Minority Contractors by Superfund Prime Contractors

During FY89, OSDBU developed a list of all firms that have completed the EPA/NAMC hazardous waste cleanup training programs. The list contains statements from all firms about their specific capabilities to undertake Superfund work. Throughout the fiscal year, EPA's major Superfund prime contractors often contacted OSBDU to obtain the general list of firms or lists of firms capable of performing specific functions. Additionally, OSDBU and OERR sent letters to and met with prime contractors in an effort to encourage increased use of minority contractors as subcontractors.

4.2.4 Publications of Interest to Minority Contractors

EPA published the following two documents of interest to minority contractors:

- *Superfund: Getting into the Act - Contracting and Subcontracting Opportunities in the Superfund Program*, April 1989; and
- *A Guide to Help Small, Disadvantaged, and Women-Owned Firms - Identifying Subcontracting Opportunities Under EPA's Superfund Program*, April 1989.

4.3 Report on Facilities Subject to Review Under CERCLA Section 121(c)

EPA carefully monitors sites over the long-term to ensure that their remedies are fully protective of human health and the environment. CERCLA section 121(c) directs periodic review of sites where remedial action leaves any hazardous substances, pollutants, or contaminants on site. Under section 121(c), the review must take place at least every five years after the initiation of remedial action. CERCLA section 121(c) requires that a report be submitted to Congress that lists the facilities for which periodic reviews are required, the results of all the reviews, and any action taken as a result of the reviews. CERCLA section 301(h)(1)(E) requires EPA to report annually on progress made in reducing the number of facilities subject to review under section 121(c).

In response to 90-Day Study recommendations, EPA issued a policy that ensures that EPA will conduct five-year reviews at all sites where hazardous substances, pollutants, or contaminants remain above levels that allow for unlimited use and unrestricted exposure following completion of all remedial activities. EPA, therefore, will conduct reviews of a site unless it has been cleaned to at least health-protective levels that allow unlimited use and unrestricted exposure. Consequently, EPA will review all remedies requiring any access or land-use restrictions or controls, including remedies that attain health-

protective levels for current use, but that require restrictions on activities due to limits on exposure.

EPA is making progress toward the goal of minimizing the amount of untreated waste and, therefore, the number of facilities subject to review under CERCLA section 121(c). EPA analysis indicates that the number of RODs specifying the use of treatment for source control has increased from 54 percent in FY87 to 69 percent in FY88 to 72 percent in FY89. In addition, the number of RODs specifying the use of innovative treatment technologies has increased from 26 percent in FY87 to 40 percent in FY88 to 51 percent in FY89. Although there has been a progressive increase in the use of treatment, the overall goal is to use treatment to address the principal threats at a site. In accordance with this goal, EPA does not expect to use treatment on low level waste or at certain types of sites such as municipal landfills.

Although CERCLA section 121(c) applies only to actions resulting from RODs signed after the enactment of SARA, EPA believes that it is inappropriate to distinguish between pre- and post-SARA RODs in determining whether to conduct reviews. In addition, EPA will examine previously deleted sites to determine the appropriateness of conducting five-year reviews at any sites that were not cleaned up to health-protective levels allowing unlimited use and unrestricted exposure.

EPA generally will not delete a site from the NPL that requires a five-year review until the Agency conducts one such review at that site. If, upon completion of the review, the site remains protective of public health and the environment and meets EPA deletion criteria, the site may be deleted from the NPL. EPA, however, will continue to ensure that reviews are conducted no less often than every five years.

Exhibit 4.3-1 is a list of potential sites to be reviewed under CERCLA section 121(c). It should not be considered a complete list, and not all sites listed may receive a review. Considering the criteria for review, EPA anticipates that most sites where remedial action takes place will receive reviews. The list of sites presented in this Report consists of sites that EPA has either deleted or noticed for deletion from the NPL, sites where remedial action is complete but the deletion notice is pending, sites undergoing long-term response actions, or sites where remediation is complete but approval of the close-out report is pending. EPA is presently evaluating the sites to determine which sites meet the requirements for five-year review. When this evaluation is complete, a final list will be issued.

Exhibit 4.3-1
Potential Sites to be Reviewed Under CERCLA Section 121(c) as of September 30, 1989

Site Name	State	Region
A.L. Taylor (Valley of the Drums)	Kentucky	4
Beachwood/Berkeley Wells	New Jersey	2
Big River Sand	Kansas	7
Cecil Lindsay	Arkansas	6
Charlevoix Municipal Well	Michigan	5
Chem-Dyne	Ohio	5
Chemical Metals	Maryland	3
Chemical Minerals	Ohio	5
Cooper Road	New Jersey	2
Enterprise Avenue	Pennsylvania	3
Friedman Property	New Jersey	2
Galloway Pits	Tennessee	4
Gratiot County Golf Course	Michigan	5
Harris (Farley Steel)	Texas	6
IMC (Terre Haute)	Indiana	5
Independent Nail Company	South Carolina	4
Jibboom Junkyard	California	9
Krysowaty Farm	New Jersey	2
LaBounty Site	Iowa	7
Lee's Lane Landfill	Kentucky	4
Lehigh Electric and Engineering Company	Pennsylvania	3
Luminous Processes	Georgia	4
Matthews Electroplating	Virginia	3
Middletown Road Dump	Maryland	3
Mountain View Mobile Home Estates	Arizona	9
Morris Arsenic Dump	Minnesota	5
Mowbray Engineering Company	Alabama	4
New Castle Steel	Delaware	3
Newport Dump	Kentucky	4
Northern Engraving Company	Wisconsin	5
NL Industries/Taracorp/Golden	Minnesota	5
Oakdale Dump Sites	Minnesota	5
Parramore Surplus	Florida	4
PCB Spills	North Carolina	4
PCB Warehouse, Saipan	Mariana Islands	9
PCB Wastes	Pacific Islands	9
Peterson Sand and Gravel	Illinois	5
Poer Farm	Indiana	5
Presque Isle	Pennsylvania	3
Rose Park Sludge Pit	Utah	8

Exhibit 4.3-1
Potential Sites to be Reviewed Under CERCLA Section 121(c) as of September 30, 1989 (continued)

Site Name	State	Region
Sylvester	New Hampshire	1
Taputimu Farm	American Samoa	9
Tar Creek	Oklahoma	6
Taylor Borough Dump	Pennsylvania	3
Toftdahl Drums	Washington	10
Tri-City Oil Conservationist	Florida	4
Varsol Spill	Florida	4
Voortman Farm	Pennsylvania	3
Wade (ABM)	Pennsylvania	3
Walcott Chemical	Mississippi	4

SOURCE: *Completion and Deletion Status of National Priorities List Sites*, HSCD/OERR, September 1, 1989.

CHAPTER

5

Program Implementation and Support Activities

The Agency's progress in implementing the Superfund program is increased by the participation of States, Indian tribes, and other federal agencies and departments. Community groups, too, are playing a greater role in the clean-up process.

5.1 Community Relations and Public Information

The 90-Day Study and the revised NCP placed new emphasis on the role of community relations and community involvement in the Superfund process. Additionally, the Agency's recent shift toward a policy of "enforcement first" requires an aggressive effort to reach out and include affected communities as an integral part of the site clean-up process.

To facilitate a constructive exchange of ideas and suggestions in communities where response activities are occurring, EPA is continually revising its community relations and information programs. The changes to the programs described here reflect EPA's awareness of the importance of citizen involvement in the Superfund process. For example, the Agency has developed and will distribute an information kit explaining the Superfund program. The box on the next page lists the information and participation tools available to communities, groups, and individuals to encourage and improve participation in the Superfund process.

5.1.1 Community Relations Regulations

The revised NCP discusses the community relations requirements in conjunction with the relevant regulations for removal and remedial

Acronyms Introduced in Chapter 5

ARCS	-	Alternative Remedial Contract Strategy
CA	-	Cooperative Agreement
CAA	-	Clean Air Act
CAP	-	Capacity Assurance Plan
CLP	-	Contract Laboratory Program
CORAS	-	Contract Operations, Review, and Assessment Staff
CPCA	-	Core Program Cooperative Agreement
CRP	-	Community Relations Plan
CWA	-	Clean Water Act
EHS	-	Extremely Hazardous Substance
ERCS	-	Emergency Response Cleanup Services
ESAT	-	Environmental Services Assistance Team
IFR	-	Interim Final Rule
MCL	-	Maximum Contaminant Level
MCLG	-	Maximum Contaminant Level Goal
NPRM	-	Notice of Proposed Rulemaking
OECM	-	Office of Enforcement and Compliance Monitoring
OSW	-	Office of Solid Waste
PCMD	-	Procurement and Contracts Management Division
PIC	-	Public Information Center
RASs	-	Routine Analytical Services
REM	-	Remedial Planning Contracts
SACA	-	Support Agency Cooperative Agreement
SASs	-	Special Analytical Services
SDIC	-	Superfund Docket and Information Center
SMOA	-	Superfund Memorandum of Agreement
SSC	-	Superfund State Contract
TAG	-	Technical Assistance Grant
TAT	-	Technical Assistance Team
TES	-	Technical Enforcement Support
TIB	-	Toxics Integration Branch
TPQs	-	Threshold Planning Quantities

PUBLIC PARTICIPATION AND INFORMATION TOOLS

- NCP requirements
- Technical Assistance Grants
- RCRA/Superfund Hotline
- Superfund Docket
- Public Information Center
- Hazardous Waste Ombudsman Program

actions. This new format is distinct from past versions of the NCP, which explained in a single section the community relations requirements.

Removal Actions

The revised NCP, published in March 1990, requires that the lead agency appoint a spokesperson who will inform the community of the actions taken at the site and respond to inquiries from the public. At a minimum, the spokesperson is required to provide updates on the progress of the removal action to immediately affected citizens and state and local officials. The revisions to the NCP require that the lead agency publish a notice of availability of the administrative record supporting the removal action and provide the public with an opportunity to comment on the record and the supporting documents.

The rule requires a minimum public comment period of 30 days from the time the notice of availability of the administrative record is published. Because of the importance of public comments, and recognizing that the public may need more time to review complex documents, EPA has sought to clarify that the lead agency has discretion to extend the public comment period upon timely request. This clarification is now in the revised NCP.

In addition, the revisions to the NCP require that when a removal action will last longer than 120 days, the spokesperson must prepare a formal community relations plan (CRP). The CRP discusses citizen concerns about the site and lists the community relations activities that the lead agency expects to use during the action. The information for the CRP is gathered through interviews with members of the community, state and local officials, and other interested groups.

Remedial Actions

The revised NCP requires that the lead agency for a remedial action prepare a CRP containing information on citizen concerns and future communication activities. The lead agency must also establish an information repository. CERCLA, as amended by SARA, requires the publication of a notice and brief analysis of the proposed plan for a remedial action, followed by a public comment period. The final plan must also be published, along with a discussion of any significant changes from the proposed plan. As with removal actions, the final NCP explicitly provides the lead agency with the discretion to extend the public comment period for a remedial action upon timely request.

5.1.2 Technical Assistance Grants Under CERCLA Section 117(e)

CERCLA section 117(e), added by SARA, authorizes EPA to award technical assistance grants (TAGs) to citizens' groups affected by sites proposed for or listed on the NPL. Citizens' groups are to use the grants to employ technical advisors to interpret the problems and remedies associated with the NPL site. The TAG program was designed to help citizens become knowledgeable about the technical and scientific aspects of a Superfund site and thus, be better prepared to participate effectively in the remedial process. In FY89, 26 TAGs were awarded to 23 citizens' groups in all 10 regions, a substantial increase over the four TAGs awarded in FY88. The number of TAG program personnel has doubled from 10 to 20 and will be sustained through FY91.

The Agency may provide groups with TAGs up to $50,000 per site. Any group of citizens that may be affected by a release or a threatened release at a site is eligible to receive a TAG, although the Agency issues only one grant for each eligible site. As the program now exists, the community contributes 20 percent of the total cost of the TAG project (see a discussion of proposed amendments to TAG regulations below).

EPA grants waivers to the matching fund requirement only if the recipient demonstrates financial need and the grant is necessary to ensure public participation in selection of a remedial action. Citizens' groups may apply for grants at any time after a site is listed on the NPL, or proposed for listing, if a response action has begun. PRPs and certain other groups and organizations are not eligible to receive these grants.

EPA has in place the Interim Final Rule (IFR) for the TAG Program (53 *FR* 9736, March 24, 1988). The IFR allows EPA to process applications and award grants without delay, while simultaneously developing a final rule. EPA expects to operate the program under the IFR for at least two years before issuing a final rule.

During the first year of operation of the TAG program under the IFR, the Agency discovered several barriers inhibiting public participation. EPA, therefore, amended the IFR, and the revised IFR was issued December 1, 1989 (54 *FR* 49848). The existing TAG guidances will be revised to account for the new rule. In accordance with the recommendations of the 90-Day Study, the amendments address the following four areas of concern to the TAG program:

- *Matching funds requirements and administrative cap*: the 35 percent citizen match of the TAG project costs is reduced to 20 percent and the 15 percent cap on administrative costs is eliminated;

- *Group eligibility*: groups already incorporated as non-profit organizations and with a history of substantial involvement at the site can be eligible for a TAG without reincorporating;

- *Language clarification*: several phrases in the IFR will be modified, i.e., "disputes with the Agency," "challenge to Agency decisions," and "waiver only in exceptional circumstances," because the public was interpreting the language more narrowly than the Agency intended; and

- *Previously existing grants*: upon publication of the amendments in the Federal Register, current grant recipients will be able to amend their grants to meet the new requirements.

5.1.3 A Coordinated Approach to Public Information

During FY89, an initiative was begun by the Director of OERR to develop a coordinated approach to the management of public information and outreach. The system utilizes a simplified inventory management program for Superfund documents, as well as the services provided by the RCRA/Superfund Hotline, the Superfund Docket and Information Center, the Agency's Public Information Center, the Hazardous Waste Ombudsman Program, the EPA Library's national system of Hazardous Waste Data Collection, and the Center for Environmental Research Information. In addition, the Department of Commerce's National Technical Information Service is the public archive of choice for all Superfund documents. The Superfund Documents Coordinator and the communications staff strive to ensure that information is shared among all of these outreach entities.

The basic outreach concept is built on a system of documents coordination and management. Documents are assigned an inventory "home" according to type, and these are listed in an annually published catalog of Superfund Program Publications that is widely distributed. Agency policy with respect to these documents is that single copies are available upon request for a charge, if stock is available.

The Superfund Docket and Information Center (SDIC) was initially created as a records center for all CERCLA rulemaking actions and regulatory decisions. The docket provides the public with access to regulatory support materials for proposed and final rules, and receives and compiles public comments during the rulemaking process. In compliance with the Freedom of Information Act, the public is allowed access to docket materials after approval of the Office of General Counsel and announcement in the *Federal Register*. The SDIC also serves as the inventory "home" for an assigned inventory of Superfund program directives, and the staff is knowledgeable about the availability of documents assigned to other inventory locations.

The RCRA/Superfund Hotline addresses both technical and non-technical questions, and is a good general source of information about the Superfund program, including ongoing issues. During FY89, the Hotline received 173,458 calls, of which 16,118 addressed Superfund issues.

The Hazardous Waste Data Collection in the EPA Library is designed to provide reference information, including literature search functions, for the public on all aspects of hazardous waste technology. Current and superseded program documents are archived in these collections and may be viewed by the public.

Public Information Center

The Public Information Center (PIC), addressing nontechnical issues only, received 7,478 calls in FY89. Of this total, 4,797 addressed Superfund issues directly; 2,681 calls addressed the more general topic of hazardous waste.

The center distributes all EPA publications on Superfund and other major environmental topics to the public. In addition, the center refers the public to specific EPA offices that are able to provide the most useful information. When the public expresses an interest in a particular topic for which there are no resource materials, the center informs the appropriate EPA program office, so that the program office can develop the requested materials.

Hazardous Waste Ombudsman Program

The 10 regions and EPA headquarters have Ombudsman Offices that serve as an additional, impartial source of public information. In FY89, the regional and the headquarters offices combined received more than 1,000 calls and letters. The purpose of the Ombudsman Offices is to assist private citizens and members of the regulated community who have been unable to resolve hazardous waste issues through other channels. The program assists environmental and citizens' groups and trains regional representatives to serve as local ombudsmen. The program is intended to supplement existing channels of problem resolution, not to replace them.

5.2 EPA Partnership with States and Indian Tribes

Under CERCLA section 104(A), the President may allow states, political subdivisions, and federally recognized Indian tribes to participate in clean-up operations at Superfund sites. The Agency continued in FY89 to strengthen the relationship between the federal Superfund program and states and Indian tribes. Initiatives undertaken include a consolidation of regulations to facilitate the implementation of CERCLA requirements.

5.2.1 Subpart F of the Revised National Contingency Plan

The final revised NCP was published in March 1990, and includes the regulations required by CERCLA section 121(f) to provide for substantial and meaningful state involvement in the Superfund process.

The completely new Subpart F of the revised NCP combines concepts from various sections of the existing NCP concerning state involvement in Superfund operations into one subpart. In addition to a general section, Subpart F contains five additional sections that elaborate different aspects of the federal/state/tribe relationship.

Of these five sections, the first deals with Superfund Memoranda of Agreement (SMOAs). SMOAs are useful in documenting the roles and responsibilities of parties involved in Superfund operations, such as EPA oversight requirements, the specific nature of lead and support agency activities, and the schedules for respective review of Agency and state documents.

Another section of Subpart F documents the state assurance requirements under the NCP. CERCLA section 104 requires that EPA secure applicable assurances before remedial actions are pursued at Superfund sites. These assurances include cost-sharing, operation and maintenance responsibility, interest in real property, off-site disposal, and waste capacity.

The last three sections of Subpart F address the requirements for state and tribal involvement in removal, remedial, and enforcement

response, and state involvement in EPA-lead enforcement negotiations.

5.2.2 Cooperative Agreements and Superfund State Contracts for Superfund Response Actions

In January 1989, the Agency published an IFR, "Cooperative Agreements and Superfund State Contracts for Superfund Response Actions" (54 *FR* 4132, January 27, 1989). Added to 40 CFR Part 35 by this IFR is the completely new Subpart O, which describes in detail the uniform operating procedures for the establishment and cost-monitoring of all CERCLA-funded Cooperative Agreements (CAs) and Superfund State Contracts (SSCs). The rule covers all such agreements and contracts issued after January 27, 1989.

Subpart O describes two mechanisms for implementing Superfund remedial activities. SSCs are required when the EPA or political subdivision assumes the lead in a Superfund remedial action. CAs are required when states, political subdivisions, or Indian tribes, whether as the lead or support agency, require the financial support of the federal Superfund program.

Cooperative Agreements

Under a CA, EPA may authorize states, political subdivisions, or Indian tribes to perform the lead or support role for clean-up activities. States enter into CAs when they assume the lead in a Superfund clean-up operation to ensure the transfer of funds from the federal government. Indian tribes meeting certain minimum requirements enter into CAs through a process similar to that for states. A political subdivision can participate in a CERCLA remedial response action as the lead agency, the primary party planning and implementing the response action, or as a support agency furnishing data, reviewing documents, and assisting the lead agency as requested. To receive funds directly from EPA to lead a cleanup, a political subdivision must enter into a cooperative agreement with EPA. When this occurs, EPA, the state, and the political subdivision are required to enter into a three-party SSC to ensure compliance with statutory responsibilities assigned to EPA and states under CERCLA. A political subdivision can also receive CERCLA funds through the state to perform clean-up activities under the state's CA with EPA. In this case, the state remains accountable to EPA under 40 CFR Part 35 Subpart O for the successful completion of the task.

A specific type of CA may be used to clarify the support role of either a state, Indian tribe, or political subdivision. A Support Agency Cooperative Agreement (SACA), formalizes in a CA the arrangements for a state's participation in support agency activities.

Core Program Cooperative Agreements (CPCAs) may be secured by states or federally recognized Indian Tribes to conduct CERCLA implementation activities that are non site-specific. CPCAs are designed to allow states to receive funding to develop and maintain the ability to participate in CERCLA responses. Such activities may include developing appropriate state Superfund laws, hiring and training staff, establishing a central filing system, and providing management and clerical support.

In FY89, 43 CPCAs were awarded to States including one to the Navajo Indian Tribe. With the increased involvement by states in the Superfund clean-up process, it is expected that this program and the capabilities of states will continue to grow.

Superfund State Contracts

An SSC is always required in the event of an EPA-lead remedial action, and also may be required in the event of a political subdivision lead. An SSC documents a state's CERCLA section 104 assurances (operation and maintenance, cost-sharing, acquisition of interest in real property, and off-site storage, treatment and/or disposal and 20-year waste capacity) when the state is not the lead agency.

The SSC authorizes EPA to collect payments from states or political subdivisions, as described in CERCLA section 104. Federally recognized Indian tribes are exempt from providing most of the CERCLA section 104 assurances; Indian tribes are required to assure EPA that they will accept title to and acquire interest in real property. In the event that an Indian tribe enters into a CA with the federal government, this assurance may be documented in that CA. In addition to assurances, the SSC outlines statements

of work and lists in detail any site-specific program requirements. Among other requirements, Subpart O requires that an SSC also include cost-share provisions, a statement of contract purpose, sanctions for failure to comply with contract terms, and a site access provision.

In cases of EPA-lead remedial activity, a simple two-party SSC is required. In the event that a political subdivision is authorized to execute the lead role in a Superfund remedial activity, a three-party SSC may be entered into among EPA, the state, and the political subdivision. In this case, a party other than the state or the federal government is being authorized to act as the lead agency, and an SSC is therefore needed to ensure compliance with statutory responsibilities assigned to EPA and states under CERCLA. Guarantee of such compliance is a top priority in the remedial process, and therefore the SSC is required to be in place before a political subdivision is eligible to receive transfer funds from the Agency under a CA.

5.2.3 Other State Program Activities

The increasing number of CAs and SSCs between the federal government and the states make manifest a growth in state involvement in the federal Superfund program. This trend is perhaps most clearly illustrated by the increase in the number of state-lead, fund-financed remedial actions. These actions numbered 24 in FY87 and have increased to 39 in FY89. The degree of state participation in Superfund activities is also increasing in proportion to the expanding number of all Superfund activities (pre-remedial and remedial). State responsibilities increase in three ways: (1) sites evaluated for placement on the NPL that do not eventually get nominated for the NPL are turned over to the states, which are then responsible for cleaning up those sites to the satisfaction of their constituencies; (2) except in the case of federal facilities, states must share the costs of all remedial actions at NPL sites; and (3) states are always responsible for operation and maintenance activities at NPL sites after completion by the federal government of remedial activities at the site. Core Program Cooperative Agreements can be awarded to states to allow them to develop the capabilities to meet many of these added responsibilities.

Report on State Superfund Programs

In FY89 EPA also undertook a study of the clean-up capabilities of the 50 states. The resulting report includes descriptions of state laws, program structures, funding mechanisms, and clean-up procedures. The study and report represent the efforts of the state and Local Coordination Branch of the Superfund program to collect and organize information on state clean-up programs. This will help the Agency in its evaluation of a state's ability to contribute to or manage Superfund clean-up procedures.

The report found that 25 states are engaged in the management of removal and remedial actions at both NPL and non-NPL sites, through state funding or state enforcement activities. Of the remaining states, 14 are capable of managing state- or PRP-lead cleanups, but they as yet have not developed a Superfund program; six states have emergency response programs, but limited remedial action capabilities; and five states have yet to establish programs for addressing either emergency or remedial hazardous waste response actions.

The report documents the fact that many states have enacted CERCLA-type laws. For example, 19 states currently have priority lists for state sites, and many states have a system for the ranking of hazardous waste sites (some states use EPA's HRS).

The principal sources of funding for state program administrative and personnel costs are state clean-up funds, state general funds, and federal grant monies.

Waste Capacity Assurance

The Agency in FY89 intensified its efforts to secure waste capacity assurances from the states. Waste capacity assurances are one of the assurances required of the states by CERCLA section 104(c)(9). As mandated by CERCLA, no SSCs or CAs to fund remedial actions are to be entered into after October 17, 1989 without assurance from the states of adequate hazardous waste treatment or disposal facilities.

The Agency has chosen to implement this statutory mandate by requiring the states to submit

Capacity Assurance Plans (CAPs). CAPs form the basis for a reasonable assurance that a state has adequate capacity to manage its hazardous waste for a 20-year period. CAPs also must address issues of interstate or regional agreements for waste importing and exporting, as needed.

The responsibility for reviewing the CAPs is to be shared by EPA regional personnel, and the Office of Solid Waste (OSW). The regional personnel will use their detailed local knowledge to evaluate aspects of CAPs dealing with state laws, waste minimization programs, and state-specific data. The review recommendations of OSW will address issues of both national consistency and interstate waste management. In reviewing the CAPs, the Agency will place a strong emphasis on the component of waste minimization, which it views as a focal point for future hazardous waste capacity assurances.

Complete CAPs must address each of the following:

- The state's current hazardous waste management system;
- Hazardous waste minimization and recycling plans;
- Projected future hazardous waste generation, imports, and exports; and
- Projected future hazardous waste management systems.

If the submitted CAP is deficient in any of the above areas, the regional office will provide the state with suggestions for improving the plan, which must be subsequently resubmitted. As of November 20, 1989, 47 states and Puerto Rico had submitted CAPs. After review and approval, the states will be eligible to be assisted by the federal government in undertaking remedial actions. The submitted CAPs are currently undergoing Agency review.

5.3 Health-Related Research and Development

CERCLA authorizes EPA and the Department of Health and Human Services (HHS) to conduct health-related research programs. This research is conducted primarily by three organizations: EPA, the Agency for Toxic Substances and Disease Registry (ATSDR), and the National Institute of Environmental Health Sciences (NIEHS). The EPA program focuses on the development and evaluation of toxicological test methods, exposure assessment methodology, and risk assessment and characterization techniques. ATSDR continues to produce toxicological profiles for hazardous substances found at NPL sites, as required by CERCLA. Finally, NIEHS supports multidisciplinary biomedical research through grants to universities.

In FY89, a discussion group among EPA, ATSDR, and NIEHS was created to coordinate activities, prevent duplication of research, and develop new projects.

5.3.1 EPA Health-Related Research Programs

EPA health-related research is conducted primarily through two offices: the Office of Research and Development (ORD) and the Toxics Integration Branch (TIB) of OERR.

Office of Research and Development Activities

ORD health and risk assessment research addresses specific data needs and methods development and validation related to exposure assessment, toxic effects assessment, and risk characterization used in various CERCLA activities. The emphasis of the research is on applied research and the major activities are:

- *Exposure assessment*: the issues addressed include bioavailability, bioaccumulation, exposure to products of degradation and treatment residues, field method validation, and improved characterization of exposure via dermal and inhalation routes from soil, sludge, sediment, and drinking water;
- *Toxicity assessment*: addresses health and environmental effects documents, health effects assessments, and reportable quantities work on hazardous substances

or mixtures for cancer, neurotoxicity, reproduction, developmental and immunotoxic effects, and the establishment of inhalation reference doses or their default values; and

- *Risk characterization*: the issues include chemical mixtures response prediction and validation and application of method to actual scenarios, and development of risk assessment methods for short-term and intermediate-term exposures.

In addition to conducting health-related research, ORD provides technical support on an ad hoc and long-term basis to Fund-lead and enforcement-lead activities for monitoring, fate and transport, engineering and treatment technologies, modeling, and health and environmental risk assessment. Technical support is provided through funding of research projects and technical support centers. The emphasis of technical support is shifting towards increased usage of ORD personnel and equipment to support Superfund activities. This will be accomplished by increasing accessibility, providing quicker responses, distributing research results and applications efficiently, and training Superfund staff and contractors in new technologies. The principal activities are:

- *Monitoring*: aerial imagery and photography is used for site identification and assessment;

- *Fate and transport*: support activities in this area provide chemical-specific fate and transport data for a specific medium and related potentially exposed human populations and environmental receptors;

- *Engineering and treatment techniques*: activities in this category provide active site-specific support in the removal and remedial action process of technology selection;

- *Modeling*: advice and guidance is provided on the use and limitations of mathematical models including uncertainty analysis; and

- *Health and environmental risk assessment*: support activities in this category provide assistance on the development of advisories and clean-up levels for site-specific cases or for specific scenarios, including wetlands and mining sites, assistance to the regions for ecological evaluations, review of difficult risk assessments as requested by the program offices and regions, and increased efficiency and accessibility of the Integrated Risk Information System.

Toxics Integration Branch Activities

TIB was created in FY87 within OERR to consolidate the health and environmental risk assessment activities in one branch, and to act as the point of contact between EPA and ATSDR. TIB is responsible for identifying health and environmental research needs, developing policy and guidance documents for conducting health assessments and risk assessment at Superfund sites, providing training and assistance to regional offices on risk assessments, and maintaining a risk assessment quality assurance program.

In FY89, TIB published the revised and updated *Risk Assessment Guidance for Superfund*. The *Human Health Evaluation Manual* (Volume 1), published in September, provides guidance for developing health risk information at Superfund sites and replaces two previous EPA guidance documents: the *Superfund Public Health Evaluation Manual* (1986) and the *Draft Endangerment Assessment Handbook* (1985). The *Environmental Evaluation Manual* (Volume II), published in March, provides guidance for environmental assessment at Superfund sites.

5.3.2 The Agency for Toxic Substances and Disease Registry

The ATSDR research program focuses on assessing the relationship between exposure to toxic substances and the resulting human health effects. Specifically, CERCLA section 101(i) requires ATSDR, in consultation with EPA, to produce toxicological profiles for hazardous substances commonly found at NPL sites. EPA and ATSDR identified the first 200 substances for

which profiles have been or will be developed in the *Federal Register* in two notices on April 17, 1987 and October 20, 1988 and a list of 25 additional chemicals on October 26, 1989. Additional lists of 25 substances will be published annually through 1991.

A toxicological profile involves an analysis of available toxicological and epidemological data to determine health effects from exposure to a substance. The profile determines if adequate data exist to establish exposure levels that cause health risks, and if not, it identifies the toxicological tests necessary to determine these levels.

The development of a toxicological profile occurs in two stages. First, an announcement of the availability of the draft of a profile appears in the *Federal Register*, followed by a 90-day public comment period. After the comment period, all comments are considered for incorporation into the profile. The profile is then finalized and published.

Fifteen of the first 25 chemical profiles were made available in final form (54 *FR* 14037, April 6, 1989; 54 *FR* 26417, June 23, 1989; 54 *FR* 49816, December 1, 1989), and the remaining final profiles are presently being prepared. Drafts of the profiles for the 25 chemicals in the second group were made available for public comment in the first quarter of 1989, and are being revised to reflect the additional information provided during the public comment period.

In addition to the development of toxicological profiles, ATSDR conducted 592 health assessments in FY89, bringing the total number of health assessments completed to 1,154. Over 2,200 health consultations were provided at remedial sites, and approximately 1,000 health consultations were conducted for private and public health care providers in the provision of medical care and testing of exposed individuals. Two pilot studies/investigations on selected populations were completed during FY89, and nine health studies were initiated.

The policy and procedures manual for the National Exposure Registry was completed during FY88. To develop a chemical sub-registry, ATSDR first identifies a population that has potentially been exposed to the chemical. The individuals identified are then asked to complete a health questionnaire every year. The results will be analyzed in an attempt to document long-term health effects resulting from exposure to the chemical. In FY89, ATSDR initiated a trichloroethylene sub-registry comprised of seven sites with a population base of approximately 5,000. In addition, a dioxin sub-registry was established during FY89. ATSDR continued discussions with other agencies regarding toxicological profiles and health assessment research.

ATSDR's health education activities during FY89 included the continuation of training for state and local health officials on the use of Toxnet and other on-line systems operated by the National Library of Medicine, the development of environmental health care studies for use by the medical community, and education activities through the environmental and occupational health clinic network.

5.3.3 The National Institute of Environmental Health Sciences

CERCLA section 311(a) authorizes NIEHS to conduct research in the development of advanced techniques for the detection and evaluation of the effects of hazardous substances on human health. In FY89, nine universities received funding from NIEHS to conduct 78 separate basic research studies in a grants program designed to fulfill the requirements of a Superfund Basic Research and Professional Training Plan. The Plan was developed by NIEHS and approved by the HHS Advisory Council on Hazardous Substances Research and Training as required by Section 311(a) of CERCLA.

The worker safety training program also became fully operational in FY89. Complete training programs were put in place by 11 grantee organizations at centers across the United States. A clearinghouse was established by and for the NIEHS grantees to assure communication and coordination of a nationwide training effort in Superfund worker training. Technical advice and assistance was provided during the emergency response to the Alaska oil spill.

5.4 Major Superfund Rulemakings

During the fiscal year, the Agency reached significant milestones in the development of major

rulemakings in direct response to CERCLA statutory requirements: EPA published proposed revisions to the NCP and the HRS. The Agency also proposed rules designating SARA extremely hazardous substances as CERCLA hazardous substances and adjusting reportable quantities for CERCLA hazardous substances. These and other key rulemakings initiated by EPA are discussed in this section; additional rulemakings are discussed, as appropriate, in other sections of the Report.

5.4.1 National Contingency Plan

On December 21, 1988, pursuant to section 105 of CERCLA, EPA published a proposal to revise the NCP (53 *FR* 51394). Final revisions to the NCP were published on March 8, 1990 (55 FR 8666). The NCP is the primary regulation directing government and PRP cleanup of releases of hazardous substances, pollutants, and contaminants, and discharges of oil. It outlines the steps that must be followed in responding to a situation in which hazardous substances or oil are released or are likely to be released into the environment. The NCP was first promulgated under section 311 of the Clean Water Act (CWA) and was last revised, under CERCLA, on November 20, 1985. The proposed and final revisions to the NCP include the following.

Proposed NCP Revisions

The primary purpose of the proposed revisions was to incorporate new statutory requirements. The revisions also set forth EPA's revised approach to responding to the release of hazardous substances. Important changes in this approach have been suggested by EPA's experience in implementing the response program since 1980. The revised NCP reflects more accurately the sequence in which response actions are taken, and clarifies the roles, responsibilities, and activities of all parties involved in a response action.

The proposed revisions to the NCP addressed the following four key issues pertaining to the response program.

- *Remedy Selection*

For the remedial program, the proposed revisions outlined a process whereby site problems and threats are identified and defined and a range of remedial alternatives is developed and screened. Promising alternatives are then analyzed against nine criteria. After considering state and public comments and reevaluating the proposed remedial alternative relative to the same criteria, EPA selects the response action.

- *Early Action/Streamlining*

The proposed NCP also encouraged and provided the opportunity for taking "early action," i.e., undertaking response activity before or during the RI/FS process. Early actions are initiated to contain and/or reduce the level of contamination, or to bring hazards at a site under control. Related to early action is the principle of "streamlining." This principle encourages the tailoring of activities conducted during the RI/FS and selection of remedy to the scope and complexity of the site problem.

- *Applicable or Relevant and Appropriate Requirements*

Section 121(d)(2)(A) of CERCLA, as amended, requires that all remedial response actions at least attain state and federal applicable or relevant and appropriate requirements (ARARs). The proposed NCP provided an extensive explanation of the circumstances under which provisions of RCRA, as well as other federal and state standards or regulations, are potential ARARs. The proposal described points in the RI/FS process when certain types of ARARs should be identified and provided details regarding the identification and communication of state ARARs.

- *Administrative Record*

The proposed revisions also incorporated the statutory requirement for an administrative record that consists of documents that form the

basis for the selection of a CERCLA response action. New Subpart I states that the record shall include all documents that form the basis of the Agency's decision when it selects the response action for a site. Subpart I also specifies when new documents may be added to the record after a decision document is signed. The rule proposed that the record for remedial actions shall be available at the commencement of the RI/FS. The NCP further proposed that the record shall be available for review at a location at or near the site and at an office of the lead agency or at another central location.

Other important provisions of the proposed NCP are discussed in relevant sections of the Report.

Final NCP Revisions

Following publication of proposed revisions to the NCP, the Agency received more than 100 letters containing approximately 2,800 individual comments from state and local governments, other federal agencies, industry, environmental groups, and the general public. During the year, EPA analyzed these comments in an effort to develop final revisions to the NCP. The proposed issues discussed above were incorporated into the final NCP revisions. In addition, the final NCP includes the following key revisions.

- *Program Goal, Expectations, and Management Principles*

The preamble to the proposed NCP described program expectations regarding the types of remedies likely to result from the selection of remedy process and principles on which EPA intends to manage the Superfund program. In the final regulatory text, the Agency establishes as its goal remedial actions that protect human health and the environment, maintain protection over time, and minimize untreated waste. The program expectations and management principles have been included as well.

- *Risk Range for Superfund Cleanups*

This section of the proposed rule stated that for known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk of between 10^{-4} and 10^{-7}. The lower boundary of the risk range has been changed to 10^{-6} in the final rule. The point of departure remains 10^{-6} and is cited as a goal for all remedies.

- *Use of Maximum Contaminant Levels and Goals*

This section of the proposed rule reflected the Agency's determination that, except in high risk situations, maximum contaminant levels (MCLs) rather than maximum contaminant level goals (MCLGs) generally shall be considered relevant and appropriate standards when determining acceptable exposure for ground water and surface water that is or may be a source of drinking water. The final rule has been modified to provide for the use of MCLGs as potentially relevant and appropriate standards where they are set at levels above zero. When an MCLG is zero it is not relevant and appropriate, and the corresponding MCL will be considered.

- *Use of the Nine Criteria*

In the proposed NCP, the detailed analysis of alternatives involved an assessment of each alternative against each of nine criteria categorized into three groups: threshold, primary balancing, and modifying criteria. The first step of remedy selection involves an evaluation of the major tradeoffs among the alternatives in terms of the nine criteria. The final rule removes the threshold, balancing, and modifying labels from the discussion of the nine evaluation criteria during the detailed analysis of alternatives where these criteria are given equal weight. This hierarchy of criteria has been placed in the selection of remedy regulatory text, where the criteria are actually used as threshold, balancing, and modifying criteria. Among the balancing criteria, additional emphasis is placed on long-term effectiveness and permanence, and reduction of toxicity, mobility, or volume through treatment. Cost is among the factors considered in the development and screening of remedial alternatives; the role of cost has been revised in the final rule to indicate that costs must be grossly excessive compared to the effectiveness they provide before an alternative may be eliminated.

5.4.2 Hazard Ranking System

On December 23, 1988, the Agency published proposed revisions to the HRS, the Superfund tool used to identify sites warranting consideration for inclusion on the NPL (53 *FR* 51962). The proposed changes to the HRS will make it a more comprehensive ranking system. Major changes include the incorporation of an on-site exposure "pathway," a new exposure pathway that considers among other factors, direct contact with soils. Proposed changes also include adding new threat categories, including the human food chain, to the surface water pathway, and making the definition of "sensitive environments" more inclusive. In addition, the revised HRS will consider both acute and chronic health effects. The revisions will result in a ranking system that more accurately assesses potential for exposure, contaminant concentration, and contaminant toxicity. As a result, the HRS will be a better tool for identifying the most problematic sites. The HRS is expected to be published in final form in 1990.

Field Testing Program

During the year, EPA undertook a field testing program to assist in finalizing the HRS. The nationwide field testing had several objectives: (1) to test the feasibility of implementing the proposed HRS factors; (2) to determine resources required (e.g., cost, technical hours) for specific tasks under the proposed HRS; and (3) to assess the availability of information needed for the evaluation of sites with the proposed HRS and to identify difficulties with its use.

To meet these objectives, EPA Headquarters and all 10 EPA Regional offices performed site inspections at 29 sites nationwide. The sites were selected either because the regions had planned work at the site or because the sites had specific features EPA wanted to test using the proposed HRS revisions, such as potential human food chain exposures, direct contact threats, and potential air releases. Because sites were not randomly selected, the ability to extrapolate these results to the greater universe of CERCLA sites is limited. Nonetheless, EPA believes that the field test results provide a useful measure of how the proposed HRS revisions may affect site scoring. The Agency published a summary of the field test results in the *Federal Register* on September 14, 1989 (54 *FR* 37949) and has made the report available for public review and comment. Additional field tests are continuing.

Potential to Release Component

A major change to the HRS is the addition of a "potential to release component" when calculating the risk of exposure via the air pathway. This addition is the result of statutory requirements, EPA experience, public comments, and the Science Advisory Board's recommendations.

On-Site Exposure

The proposed revisions include risks associated with the possibility of being exposed while on the site. Potential on-site risks were not originally included when developing the HRS because the Agency assumed that threats from direct contact would be mitigated through emergency removal actions. EPA's experience at NPL sites such as Times Beach, Missouri, and Mountain View Mobile Homes in Globe, Arizona, however, has shown that at some sites risks associated with direct contact or on-site exposure still exist after removal actions are completed.

Surface-Water Contamination

EPA also proposed to change the method by which a score is determined for the threat posed by surface-water contamination. The revision amends the surface-water pathway score to include threats posed by contamination of the human food chain and contamination of water that is used for recreational purposes. The updated HRS will evaluate the possible effects on the aquatic food chain of an actual or potential release.

Human Exposure to Contaminants

The original HRS evaluates the potential for human exposure to contaminants at sites, but it does not give additional consideration when actual human exposure is documented. Also, the

current HRS does not differentiate among different levels of human exposure. It is oriented toward overall population risk as opposed to individual risk. CERCLA section 105(c) requires EPA to assure that to the maximum extent feasible, the HRS assesses accurately the relative degree of risk to human health and the environment posed by sites that are evaluated. Thus, the revised HRS will reflect the potential risk to individuals and to populations exposed to actual contamination. This will be accomplished by attaching more importance to the ground- and surface-water pathways at sites where there is documented proof of the contamination of wells or drinking water.

5.4.3 Extremely Hazardous Substances Designation Proposed Rule

EPA published on January 23, 1989 a proposed rule designating 232 extremely hazardous substances (EHSs), as defined in section 302 of SARA, as hazardous substances pursuant to section 102 of CERCLA (54 *FR* 3388).

Although 134 substances listed as EHSs under SARA Title III were already CERCLA hazardous substances, 232 EHSs were not designated as CERCLA hazardous substances. Currently, only releases of those EHSs that are also CERCLA hazardous substances are required to be reported to the National Response Center. With the proposed rule, EPA intends to reduce potential confusion concerning the different SARA Title III and CERCLA requirements by ensuring consistent procedures for reporting releases of all EHSs. In addition, the proposal facilitates an expedited determination of the need for a federal response to such releases. Final action on this rule is expected during November 1990.

In a related rulemaking on August 30, 1989, the Agency proposed reportable quantity (RQ) adjustments for the 232 EHSs (54 *FR* 35988). By adjusting the one-pound reporting triggers, EPA will reduce the reporting and response burdens on the regulated community and on the government. In addition, EPA proposed RQ adjustments for 19 EHSs that are already listed as CERCLA hazardous substances, but which have RQs greater than their threshold planning quantities (TPQs). To adjust the RQs of these 251 substances, EPA proposed to apply the methodology used to establish TPQs as part of the RQ adjustment methodology for those CERCLA hazardous substances meeting the EHS screening criteria. EPA plans to finalize the adjusted RQs for the 232 substances concurrent with the promulgation of the final rule on designation.

5.4.4 Reportable Quantities

The Agency published three final rulemakings during the fiscal year adjusting the RQs for specific CERCLA hazardous substances. Two rules adjust reporting levels for 264 CERCLA hazardous substances, the majority of which are carcinogens. A third rule adjusts the reporting levels of 1500 radionuclides, including 757 specific radioisotopes.

Section 102(b) of CERCLA sets an RQ of one pound for hazardous substances, except those substances for which different RQs have been established pursuant to section 311(b)(4) of the CWA. Section 102(a) of CERCLA authorizes EPA to adjust RQs for hazardous substances and to designate as hazardous those substances that, when released into the environment, may present substantial danger to the public health or welfare or the environment. Currently, there are 724 CERCLA hazardous substances. Radionuclides are also considered CERCLA hazardous substances because EPA designated them as hazardous air pollutants under Section 112 of the Clean Air Act (CAA).

RQ adjustments enable the Agency to focus its resources on those releases that are most likely to pose potential threats to public health or welfare or the environment. These adjustments also relieve the regulated community and emergency response personnel from the burden of making and responding to reports of releases that are unlikely to pose such threats.

Reportable Quantity Adjustment Final Rules

EPA published in the *Federal Register* on March 16, 1987 a Notice of Proposed Rulemaking (NPRM) to adjust RQs for 273 CERCLA hazardous substances (52 *FR* 8140). Two final rules adjusting the RQs of 260 of the 273 hazardous substances were published during this

fiscal year, on August 14, 1989 (54 *FR* 33418, 54 *FR* 33426). RQs for four additional hazardous substances that were not proposed for adjustment in the March 16, 1987 NPRM were also included in these final rules. Because the Science Advisory Board is currently reviewing the classification of lead metal, lead compounds, and lead-containing waste streams as potential carcinogens, the Agency will adjust RQs for these substances in a future rulemaking. The RQ adjustment for the final substance, methyl isocyanate, also will be addressed in a future rule after EPA receives human health effects data related to the Bhopal, India release.

The Agency published the final rule adjusting the statutory reportable quantity of one pound for all radionuclides in the *Federal Register* on May 24, 1989 (54 *FR* 22524). In the rulemaking, the Agency finalized RQs for 1,500 radionuclides, including 757 specific radioisotopes. Radionuclide RQs are expressed in units of curies rather than pounds because curies are a more common unit of measurement for radiation protection, allowing for more timely reporting and response, if necessary.

5.4.5 Other Rulemakings

EPA published on June 23, 1989 a final rule requiring the application of worker protection standards for employees engaged in hazardous waste operations pursuant to section 126(f) of SARA (54 *FR* 26654). These standards will apply to state and local government employees in states without approved state plans under section 18(b) of the Occupational Safety and Health Act.

On January 26, 1989, the Agency published a proposed rule prescribing the manner in which notice of citizen suits is to be provided as required by section 310 of CERCLA (54 *FR* 3918). The rule prescribes the manner of service of the notice, the contents of the notice, and the timing of the notice. CERCLA, as amended by SARA, authorizes persons to commence citizen suits under CERCLA after providing notice in the manner prescribed by regulations. Final action on this rulemaking is expected during 1990.

On July 19, 1988, the Agency published a proposed rule clarifying the federally permitted release exemption from CERCLA release reporting and liability provisions (53 *FR* 27268). Section 101(10) of CERCLA defines the term "federally permitted release" by specifically enumerating certain releases subject to permits or authorizations under other federal environmental laws. On July 11, 1989, EPA published a supplemental notice clarifying the first of three proposed options for defining the scope of the CERCLA exemption for releases permitted under the CAA and soliciting comments on the clarification (54 *FR* 29306). Final action on this rulemaking is expected in late 1990.

On June 21, 1989, EPA published a final rule prescribing criteria for awarding up to $10,000 to any individual for information leading to the successful prosecution of any person for a criminal violation of CERCLA (54 *FR* 26142). Pursuant to section 109(d) of CERCLA, the Agency has established regulations which set forth who is eligible for an award and who within EPA shall make the determination of eligibility. The rule also establishes the criteria for payment of an award, and provides assurance of confidentiality to those who provide information.

The Agency published a proposed regulation on September 13, 1989 to establish the procedures for filing, evaluating, and resolving claims for costs incurred for responding to releases of hazardous substances, pollutants, or contaminants asserted against the Fund (54 *FR* 37892). The regulation is intended for use by any individual, private entity, PRP, or foreign entity eligible to submit a claim pursuant to sections 111(a)(2) or 122(b)(1) of CERCLA. Final action on this rulemaking is expected in Summer 1990.

EPA promulgated a final rule on May 30, 1989, that establishes and governs the procedures for EPA's arbitration of small CERCLA section 107(a) cost recovery claims (54 *FR* 23174). Section 122(h)(2) of CERCLA authorizes the head of any department or agency with authority to undertake a response action under CERCLA to use arbitration when response costs do not exceed $500,000 at a facility (excluding interest) and when the case has not been referred to the Department of Justice for civil action.

The Agency issued an IFR establishing procedures for the administrative assessment of civil penalties on May 16, 1989 (54 *FR* 21174). This IFR applies formal Administrative Procedure Act hearing procedures to all EPA administrative penalty authorities under CERCLA section 109. The rule provides that the administrative

assessment of CERCLA section 109 penalties will be governed by EPA's Consolidated Rules of Practice Governing the Administrative Assessment of Civil Penalties and Revocation or Suspension of Permits (40 CFR Part 22) and by supplemental rules relating specifically to penalty assessments under section 109 of CERCLA.

5.5 Resource Utilization and Contracting

This section presents data and information on the utilization of resources from the Hazardous Substance Trust Fund for Superfund implementation activities by EPA and other Executive branch departments and agencies in FY89. The data and information included in this section were obtained primarily from EPA Superfund budget documents and the EPA Budget Analysis Resource System. Superfund resource requirements of EPA and other Executive branch departments and agencies for fiscal 1990 and 1991, and beyond FY91, are discussed in Chapter 3.

5.5.1 Distribution of Resources Among Program Areas and to Regions

EPA uses Superfund resources in four major areas:

- Hazardous Substance Response;
- Enforcement;
- Management and Support; and
- Research and Development.

Both EPA Headquarters and the Regional offices perform these Superfund activities. Regional activities are funded by monies transferred to the Regions. Fiscal year and historical transfers to Regional offices are shown in Exhibits 5.5-1 and 5.5-2. In addition, EPA transfers resources to other federal departments and agencies to assist them in meeting their responsibilities under CERCLA. The Agency also transfers funds from the Superfund appropriation to state governments and other private sector organizations (e.g., the National Governors Association) to assist EPA in the implementation of CERCLA.

In FY89, the Agency utilized a total of $1,543,719,500 from the Hazardous Substance Superfund appropriation for CERCLA implementation, including SARA Title III activities. As part of this total, EPA utilized $101,341,800 for Superfund general interagency support to other federal departments and agencies, including Superfund Interagency Budget transfers and site-specific interagency agreements. CERCLA activities in FY89 were supported by a total of 2,850.8 workyears at both EPA Headquarters and in the Regional offices. Exhibits 5.5-3, 5.5-4, and 5.5-5 illustrate current and historical resource utilization.

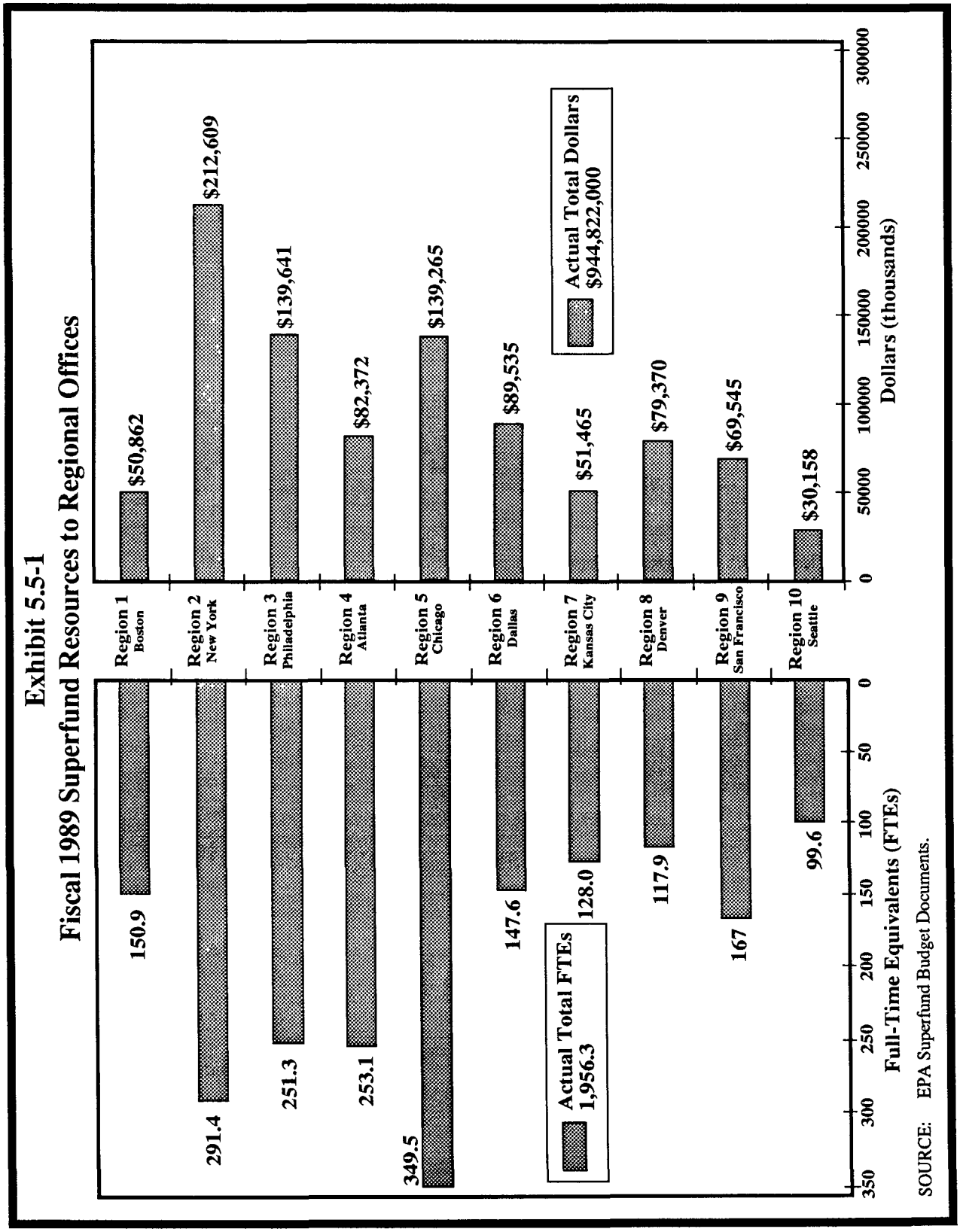
Hazardous Substance Response

The two Hazardous Substance Response programs -- Spill and Site Response and Hazardous Substance Response Support -- are responsible for protecting public health and the environment from dangers associated with releases of hazardous substances into the environment. These programs provide the necessary funding and support to undertake short-term emergency responses and long-term site cleanups. Activities include responding to spills and emergency releases of hazardous substances, conducting remedial work at abandoned hazardous waste sites, and providing training and technical support to Agency, state, and local government personnel.

Enforcement

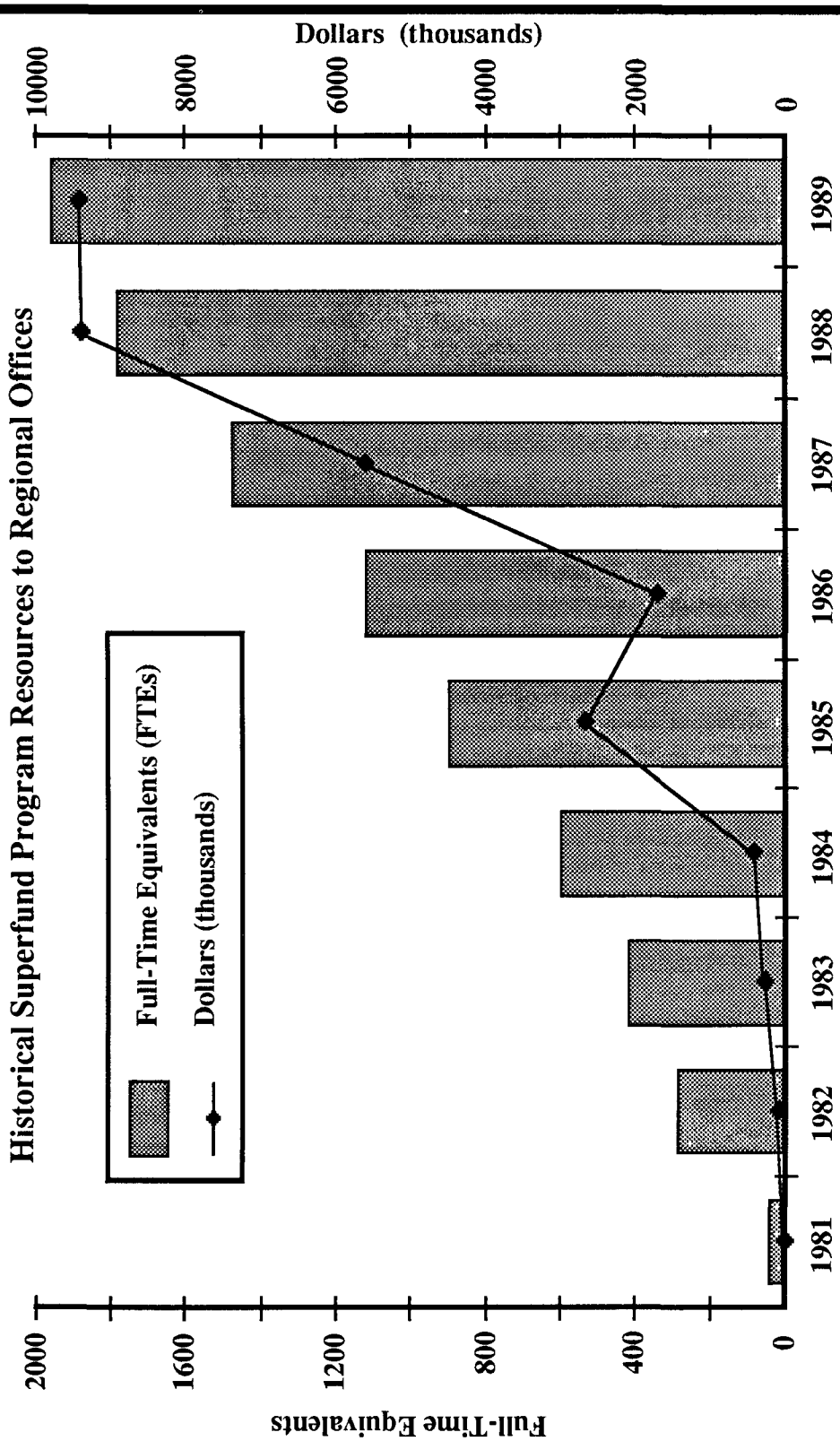
The primary goal of Superfund enforcement activities is to achieve the maximum possible response from potentially responsible parties. Superfund enforcement activities are conducted through four programs: Technical Support - Office of Enforcement and Compliance Monitoring (OECM), Technical Enforcement, Legal Enforcement, and Criminal Investigations.

The OECM program supports the Superfund activities of the National Enforcement Investigations Center (NEIC), including special environmental monitoring work, evidence audit control processes to ensure proper chain-of-custody procedures, cleanup of federal facility sites, and nonbinding preliminary allocations of responsibility. The Technical Enforcement program develops the technical documentation for Superfund enforcement and initiates enforcement



SOURCE: EPA Superfund Budget Documents.

Exhibit 5.5-2
Historical Superfund Program Resources to Regional Offices



	1981	1982	1983	1984	1985	1986	1987	1988	1989
FTEs	44.9	289.4	421.0	602.0	904.3	1,125.5	1,476.5	1,783.3	1,956.3
Dollars (thousands)	2,362.4	11,801.4	29,221.1	42,953.4	267,485.9	173,596.6	562,312.6	940,376.2	944,822.0

NOTE: Dollar amounts are funds obligated as of September 30 of the fiscal year; they include funds appropriated in each fiscal year and funds carried over from previous fiscal-year appropriations.

SOURCE: EPA Superfund Budget Documents.

Exhibit 5.5-3
Fiscal 1989 Superfund Resources by Program Function

Program Function	Dollars (in thousands)	Full-Time Equivalents
Hazardous Substance Response *	1,221,012.7	1,238.9
Enforcement	151,044.7	987.6
Management and Support	99,724.4	521.0
Research and Development	71,937.7	103.3
TOTAL	**$ 1,543,719.5**	**2,850.8**

* Includes funds used for interagency support and SARA Title III activities.

SOURCE: EPA Superfund Budget Analysis Resource System.

actions. The Legal Enforcement program provides the legal staff for CERCLA enforcement. The basic purpose of Criminal Investigation, under the direction of NEIC, is to initiate and conduct criminal investigations under CERCLA.

Management and Support

Superfund management and support activities provide the financial, administrative, and support services necessary to manage and implement the Superfund program. This includes financial management to track and report on the use of the Hazardous Substance Superfund; administrative management of contract personnel, information systems, office and laboratory services, and safety training; and services for space, utilities, and other non-personnel support needs, which include computer services.

Management and support also includes legal services, auditing services, policy analysis and program evaluation, budget development and oversight, effective communication with interested parties outside the Agency, and laboratory support for Superfund research. The Agency performs its Superfund management and support activities under the following nine program areas: Financial Management; Administrative Management; Support Services; Computer Services; Legal Services; Office of the Inspector General; Office of Policy, Planning, and Evaluation; Office of the Comptroller; and Office of Research and Development.

Research and Development

Superfund research and development activities support the Agency, states, and industry in resolving technical problems that inhibit the effective implementation of removal and remedial actions. Much research focuses on adapting existing technologies and scientific information for the purpose of controlling hazardous waste.

Superfund research and development activities are designed to provide the program with (1) methods for sampling and analyzing hazardous waste materials needed for quality assurance protocols; (2) techniques for field response personnel to use in evaluating potential sites; and (3) engineering and other technical guidance for federal, state, and local officials to use when responding to releases at uncontrolled hazardous waste sites. Superfund research also includes evaluation of personal protective devices and engineering controls to protect hazardous waste workers and improve their efficiency. Superfund research and development activities are conducted through the following seven programs: Scientific

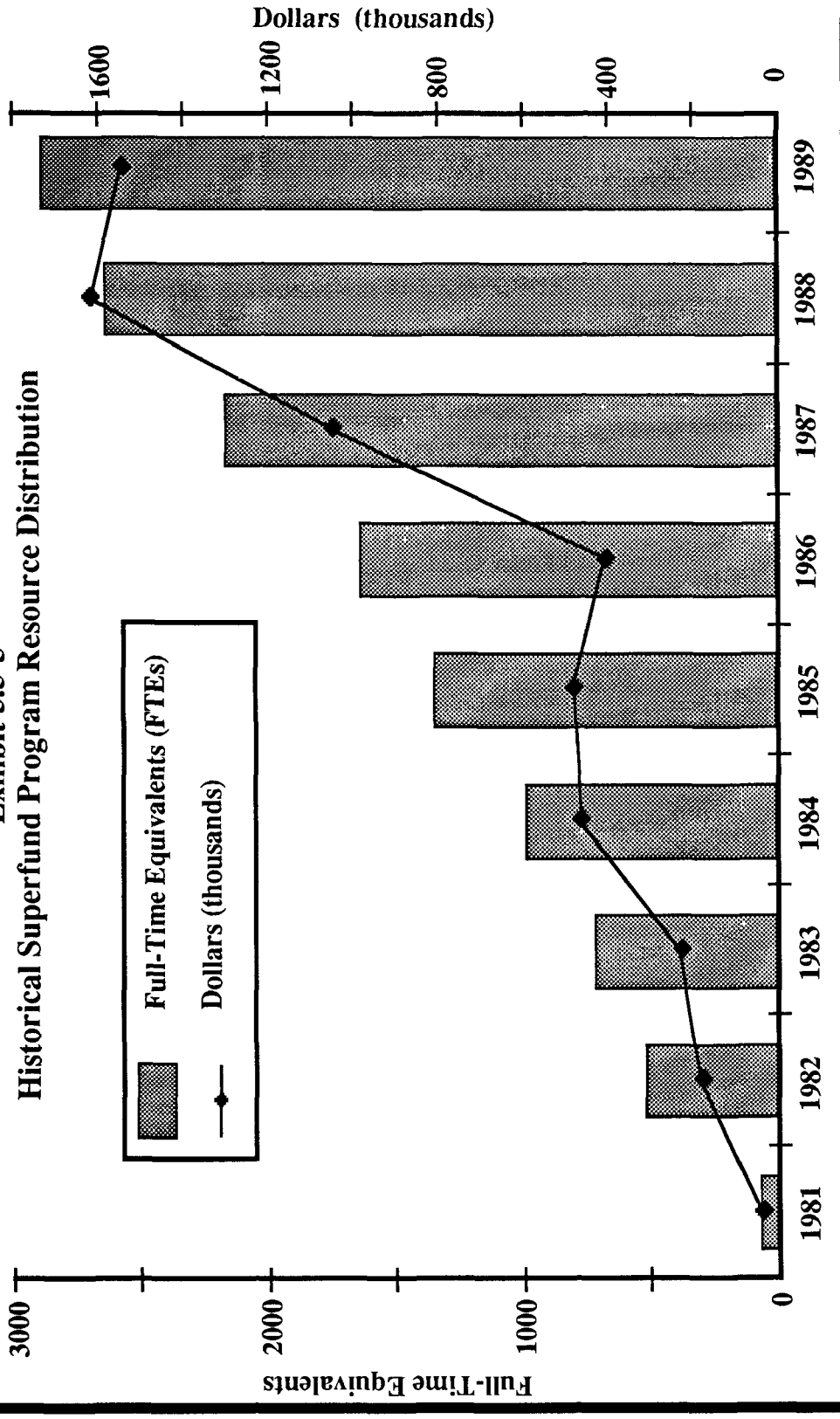
Exhibit 5.5-4
Fiscal 1989 Superfund Resources by EPA Office and Function

EPA Office and Function	Dollars (in thousands)	Full-Time Equivalents
Hazardous Substance Response *	**1,221,012.7**	**1,238.9**
AA Solid Waste and Emergency Response	392,759.9	242.3
AA Air and Radiation	444.3	6.0
AA Water	1,427.5	3.0
AA Pesticides and Toxic Substances	- -	- -
AA Research and Development	1,912.6	- -
Regions Total	824,468.4	987.6
Enforcement	**151,044.7**	**987.6**
AA Solid Waste and Emergency Response	- -	- -
AA Enforcement and Compliance Monitoring	- -	- -
Regions Total	- -	- -
Management and Support	**99,724.4**	**521.0**
AA Policy, Planning, and Evaluation	3,332.8	11.5
AA Research and Development	215.9	- -
AA Externtal Affairs	409.4	1.1
AA Administration and Resources Management	59,138.7	216.1
Inspector General	6,612.3	53.4
General Counsel	792.7	10.3
Regions Total	29,222.6	228.6
Research and Development	**71,937.7**	**103.3**
AA Resarch and Development	71,937.7	103.3
SUPERFUND TOTAL	**$1,543,719.5**	**2,850.8**

* Includes resources utilized for interagency support and SARA Title III activities.

SOURCES: EPA Superfund Budget Documents; EPA Budget Analysis Resource System.

Exhibit 5.5-5
Historical Superfund Program Resource Distribution



	1981	1982	1983	1984	1985	1986	1987	1988	1989
FTEs	75.3	527.7	724.8	996.3	1,350	1,642.8	2,174.3	2,642.2	2,850.8
Dollars (thousands)	40,283.1	180,743.6	230,233.4	465,619.4	483,116.0	406,268.8	1,050,748.9	1,614,747.4	1,543,719.5

NOTE: Dollar amounts are funds obligated as of September 30 of the fiscal year; they include funds appropriated in each fiscal year and funds carried over from previous fiscal-year appropriations.

SOURCE: EPA Superfund Budget Documents.

Assessment; Monitoring and Quality Assurance; Health Effects; Environmental Engineering and Technology; Environmental Processes and Effects; Exploratory Research; and Technical Information and Liaison.

5.5.2 Activities of Other Executive Branch Departments and Agencies

EPA manages an interagency budget process the results of which are incorporated in a consolidated budget request for the entire Superfund program under the requirements of Executive Order 12850 (signed by the President in January 1987). The activities of other Executive Branch departments and agencies are divided into two basic categories. The first category includes activities taken in response to spills or actions taken that support specific site remediation. The second category is support for ongoing activities that are generally not incident-specific. These activities are related to each agency's specific area of expertise and include developing program policies and guidance, conducting health research, training response personnel, litigating civil and criminal cases, and providing scientific and technical advice to EPA on-scene coordinators. This subactivity includes the following interagency Superfund programs. (Exhibit 5.5-6 presents the FY89 interagency agreements with other Executive Branch departments and agencies.)

Department of Health and Human Services

The Agency for Toxic Substances Disease Registry was established under CERCLA, and its health authorities were significantly expanded in 1986 under SARA. ATSDR investigates complaints of illness or disease related to exposure to hazardous substances, conducts health studies and surveys, develops appropriate testing for exposed individuals, and develops and maintains information on the health effects of toxic substances. ATSDR is statutorily mandated to perform health assessments for new sites within one year from the date the site is listed in an NPL update. ATSDR is also required to undertake the following additional and expanded activities:

Exhibit 5.5-6
Fiscal 1989 Interagency Agreements with Other Federal Departments and Agencies

Federal Department or Agency	Dollars (in thousands)
Health and Human Services	
- ATSDR	$44,499.0
- NIEHS	21,900.0
Transportation	
- USCG	4,948.2
Justice	25,100.0
FEMA	1,439.6
Commerce	
- NOAA	1,907.5
Interior	1,062.2
Labor	
- OSHA	485.3
TOTAL	**$101,341.8**

SOURCE: EPA Budget Analysis Resource System.

- performing health assessments by citizen petition;
- ensuring that studies and research results undergo peer review;
- distributing health education information; and
- reporting to Congress on health-related activities.

The National Institute of Environmental Sciences carries out other Superfund responsibilities. NIEHS manages a university-based program of basic research grants directed towards unsolved environmental and human-health problems related to hazardous substances. The Institute also manages grants to non-profit organizations for training and education of workers who are, or may be, engaged in activities related to hazardous substance removal and containment at remedial or emergency response sites. The basic research grants span the areas of basic biomedical studies in epidemiology, biomedicine, and human

health exposure and integrated non-biomedical studies in engineering, geosciences and analytical chemistry. Worker protection grants provide training to workers in preventing health problems caused by exposure to hazardous substances.

United States Coast Guard

The United States Coast Guard (USCG) has been delegated the authority under CERCLA to respond to any release or threatened release of hazardous substances involving coastal zones, Great Lakes waters, ports, and harbors. The USCG also provides training to maintain this response capability, conducts necessary enforcement activities in its areas of responsibility, and maintains the National Response Center.

Department of Justice

The Attorney General has responsibility to conduct and control judicial litigation arising under CERCLA. EPA prepares the required technical and legal documentation, assists the Department of Justice (DOJ) in the negotiation of consent decrees for privately financed response actions, and has the prime role in administrative matters. When DOJ receives a referral from EPA, it reviews the referral package and files a complaint with the court. After filing, DOJ goes through an intensive process of litigation, which includes:

- completion of the discovery process;
- motion practice;
- support of on-going negotiations; and
- work with expert witnesses and program staff.

DOJ will ultimately bring matters to trial, prevail on motions (e.g., summary judgments), or settle cases to the satisfaction of all parties with court approval.

Federal Emergency Management Agency

Under CERCLA, the Federal Emergency Management Agency (FEMA) has been delegated the authority to conduct controlled evacuation and relocation activities at Superfund sites when necessary. FEMA supports federal, state, and local government efforts to respond safely and expeditiously to releases of hazardous substances in order to protect public health and preserve the environment. This is accomplished by providing relocation assistance in removal and remedial operations, assisting the NRT and RRTs in their preparedness activities, and developing training courses for state and local officials. EPA supports FEMA in establishing core staff in both headquarters and regions to effectively perform delegated functions such as working with the states to develop state relocation capabilities.

National Oceanic and Atmospheric Administration

The National Oceanic and Atmospheric Administration's (NOAA) Superfund program has three principal goals:

- to strengthen and accelerate development of technologies;
- to plan for, and respond to, hazardous substance releases in coastal and marine areas; and
- to assist EPA in identifying, evaluating, and mitigating the adverse effects of hazardous substances on natural resources in coastal and marine ecosystems.

NOAA ensures that Fund-financed response actions in coastal and marine areas are conducted in full compliance with CERCLA. Also, NOAA provides for the purchase, development, and field testing of state-of-the-art sampling and analytical equipment necessary for efficient and safe response operations associated with implementing the Superfund program.

Department of Interior

The goals of the Department of Interior's (DOI) Superfund activities are to:

- ensure that the Department maintains a state of readiness to support EPA and Coast Guard responses;
- protect natural resources from the effects of hazardous substance releases; and

- assure appropriate consideration of natural resource concerns throughout all phases of CERCLA implementation.

DOI is a participating agency in the NRT and RRTs under the guidance of the National Contingency Plan. Executive Order 12580 and the NCP designate DOI as Federal Trustee for certain natural resources lost or damaged as a result of hazardous waste or substance releases.

Occupational Safety and Health Administration

The Occupational Safety and Health Administration (OSHA) is responsible for ensuring that employees at Superfund sites are provided safe and healthful working conditions. In cooperation with the states, OSHA issues occupational safety and health standards and enforces those standards through a program of on-site inspections. OSHA conducts inspections on its own initiative and also in response to reports of imminent danger, fatalities and catastrophes, employee complaints, or referrals from other agencies. Finally, OSHA administers training and technical assistance programs to encourage and assist employers' voluntary compliance with the requirements of the Occupational Safety and Health Act.

5.5.3 Fiscal 1989 Superfund Contracting

EPA manages ongoing contracts in five major categories to implement the Superfund program:

- *Headquarters/regional policy implementation analysis and support*: eight contracts with a potential value of $86,383,898 over the lifetime of the contract supported EPA Headquarters and regional management, analytical, and technical development and implementation programs. Under these contracts, contractors provided both technical and non-technical assistance.

- *Contract laboratory services*: 160 contracts with a potential value of $217,850,751 were active in FY89 (these figures do not include subcontracts for special analytical services). The Contract Laboratory Program (CLP) provides laboratory support for both removal and remedial actions. The greatest number of Superfund contracts fall into this category.

- *Removal action support*: 17 contracts with a potential value of $823,141,863 supported the removal program. Removal program contracts provide EPA with support services in emergency response, other (non-emergency) removal actions, spill prevention, and analytical services.

- *Remedial action support*: 61 remedial action contracts provided EPA technical assistance during RI/FS, remedial design, and construction stages of response. These contracts have a potential value of $7,430,003,073.

- *Enforcement support*: 14 enforcement contracts assisted EPA in cost recovery and litigation support operations. Combined they have a potential value of $1,003,523,537.

The potential value of a contract is the total potential dollar value of that contract throughout the potential performance period of the contract. In some cases, the potential performance period of currently active Superfund contracts extends beyond the existing Superfund appropriation period.

Exhibit 5.5-7 lists FY89 contract awards and their potential value. There were no contracts awarded in FY89 in the headquarters/ regional policy implementation analysis and support category. The following section describes contracts awarded in the other four categories and initiatives that were taken during the fiscal year to improve Superfund contracting.

Contract Laboratory Program

EPA's CLP has worked with increasing success to build up the nation's laboratory capacity and simultaneously to ensure that the quality control and chain-of-custody procedures required to yield analyses that will hold up in court are in place. The CLP was established in 1980 to provide large volume, low-cost analyses. The CLP provides

Exhibit 5.5-7
Fiscal 1989 Contract Awards

Contract	Number of Contracts	Total Potential Value ($) *
Laboratory	40	*56,242,713*
Removal	4	*47,334,528*
Remedial (ARCs)	27	*3,959,764,860*
Enforcement Support	10	*935,078,854*

* Figures represent the total potential value over the life of the contract.

SOURCE: Active Superfund Contracts Listing, FY 1988-1989, U.S. EPA Office of Administration.

laboratory services for removal, pre-remedial, and remedial actions. Depending on capacity needs, the Agency awards multi-year contracts for organic, inorganic, and dioxin analytical services.

In FY89, 123 laboratories had CLP contracts in place. Forty contracts were awarded during the fiscal year. During FY89, the CLP was able to meet regional demand for analytical services. The CLP performed a total of 67,778 routine analytical services (RASs) and 38,288 special analytical services (SASs). RASs are contracts which specify the procedures a particular laboratory will follow, while SASs are contracts which include unique sampling work (e.g., a quick turn-around analysis). Total expenditures by the CLP for these services in FY89 were $27,764,181 for RASs and $8,539,428 for SASs.

Overall, the Agency's management of analytical services has improved and streamlined the clean-up process. The CLP maintains three data bases on Superfund analyses. Each data base serves a unique purpose, allowing the CLP to monitor analytical activities over the course of the Superfund program. In addition, the CLP integrates these data bases into four data support systems that ensure that the program controls the quality of work performed.

During FY89, support of the laboratory program through the Environmental Services Assistance Team (ESAT) contracts also continued. Two ESAT contracts provide assistance to EPA's Regional offices in laboratory, analytical, and review services. The ESAT contracts are worth approximately $35 million each and cover different geographical zones (the eastern zone includes Regions 1-3 and 5 and the western zone includes Regions 4, 6-10, and headquarters).

Removal Support Contracts

The removal program has traditionally been supported by Emergency Response Cleanup Services (ERCS) contracts. Under the ERCS contracts, contractors perform removal actions on a zone basis: Zone I consists of Regions 1-3; Zone II consists of Region 4; Zone III consists of Region 5; and Zone IV consists of Regions 6-10. In addition, EPA has developed and begun implementation of a strategy for awarding smaller removal contracts on a regional basis, i.e., "mini-ERCS."

The removal program also is supported by Technical Assistance Team (TAT) contracts, which serve as adjuncts to the ERCS contracts. The TAT contracts provide for initial site response support, determinations of the size and nature of the site, and support for on-scene coordinators during actual cleanup. These contracts are performed on a zone basis. The eastern zone covers Regions 1-5, the Environmental Response Team in Edison, New Jersey, and headquarters; the western zone covers Regions 6-10. The TAT contracts have a combined potential value of $219 million over a five-year period of performance.

Remedial Support Contracts

In FY88, EPA began the implementation of the Alternative Remedial Contract Strategy (ARCS), a substantial change in its remedial contracting program. The ARCS concept is aimed at maximizing competition in the remedial program, providing additional incentive for improved performance, injecting more contractors into the remedial contracting program, and promoting project continuity. Under ARCS, numerous smaller remedial response contracts are

awarded continuously in each region or, in some cases, in several regions combined. Work is assigned to these contracts based on quality of performance. The program will emphasize keeping the same contractor involved in all phases of the clean-up process. The regions have complete responsibility for management of the ARCS contracts.

EPA awarded the first ARCS contracts in Regions 3 and 5 in January 1988. By the end of FY88, EPA had awarded 18 of the anticipated 45 ARCS contracts. In FY89, the Agency awarded the remaining 27 ARCS contracts. The ARCS contracts range from $60 million to $289 million in potential value for 10-year periods of performance. ARCS contracts contain large subcontracting pools to maximize the numbers of contractors participating.

Prior to the use of the ARCS contracts, EPA used Remedial Planning (REM) contracts to support the activities of the remedial program. There are presently two large REM contracts (III and IV) and two smaller minority firm REM contracts that are active. The REM III and IV contracts are scheduled to terminate during 1990. Thereafter, the majority of EPA projects will be assigned to ARCS contractors. In addition, EPA maintains Interagency Agreements with the U.S. Army Corps of Engineers and the U.S. Bureau of Reclamation to provide technical support in the areas of engineering design, construction, and construction management.

Enforcement Support Contracts

During FY89, EPA phased out enforcement support contracting under the Technical Enforcement Support (TES) 3 and 4 contracts. In place of the TES contracts, EPA awarded eight zone-based enforcement support contracts in FY89. Six of these contracts were awarded in December 1988 and two were awarded in March 1989.

Under these contracts, the country is divided into four geographical zones: Zone 1 consists of Regions 1 and 2; Zone 2 consists of Regions 3 and 4; Zone 3 consists of Regions 5, 6, and 7; and Zone 4 consists of Regions 8, 9, and 10. Each zone was awarded two of the eight enforcement support contracts. These new contracts do not restrict enforcement support activities to a particular region, but allow EPA personnel flexibility in determining which Regions within a specific zone enforcement activities should be initiated in.

Initiatives to Improve Superfund Contracting

During the fiscal year, OERR in conjunction with the Procurement and Contracts Management Division (PCMD), undertook a number of initiatives to improve contracting under the Superfund program. In December 1988, OERR created the Contract Operations, Review, and Assessment Staff (CORAS) to oversee and to work to improve Superfund contract management. This staff performs assessments of current practices, makes recommendations for improvement, and assists in implementing such improvements. In addition, CORAS conducts a great number of information transfer activities, including a Bulletin, a regional forum, and various meetings and seminars. CORAS also provides tools to assist contract managers such as training courses, guidances, and handbooks.

OERR also created two specialized training courses for contract managers. The first is a work assignment management course for headquarters personnel who are responsible for managing contractors. All headquarters work assignment managers have taken this course and it will be given on a continuous basis in the future. The second course is similar to the first and was designed for RPMs to improve their management of contractor personnel. This course has been given in all 10 regions and is now part of the RPM/OSC Academy.

In FY89, PCMD decentralized some of the contracting officer functions by placing staff directly in the regional offices. This change greatly improved the coordination and communication between Superfund program and contracts personnel and created significant benefits for program staff.

Pursuant to the Superfund Management Review, PCMD also began addressing the issue of conflict of interest under Superfund contracts. PCMD is currently addressing this issue in several ways:

- Precluding headquarters support contractors from also holding response action contracts;

- Requiring contractors to report potential conflicts;
- Improving guidance to EPA staff and contractors; and
- Sending out review teams to assess contractors' conflict of interest prevention systems.

In addition to these efforts, OERR initiated a conflict of interest review process within the Superfund program that must be performed before work assignments are sent to PCMD.

Also pursuant to the Superfund Management Review, OERR established a task force to take the lead in preparing a long-term contracting strategy for the Superfund program. The task force will review all aspects of Superfund contracting. The goal of the task force will be to recommend contracting alternatives that will serve the program's needs for the next decade and beyond. The long-term contracting strategy for the Superfund program should be developed by the summer of 1990.

APPENDIX

A

Status of Remedial Investigations, Feasibility Studies, and Remedial Actions at Sites on the National Priorities List in Progress on September 30, 1989

Appendix A satisfies the combined statutory requirements of CERCLA sections 301(h)(1)(B) and (F). This appendix provides a report on the status and estimated completion date of all remedial investigation/feasibility study (RI/FS) and remedial action (RA) Title I projects in progress at the end of FY89. This appendix also provides notice of RI/FSs that EPA presently believes will not meet its previously published schedule for completion, as well as the new estimated dates of completion, as required by section 301(h)(1)(C). Estimated completion dates for these projects were previously published in Appendix A of the FY88 Report entitled *Progress Toward Implementing Superfund: Fiscal Year 1988.* In addition to the statutory requirements, this appendix lists remedial projects begun in FY89 that were ongoing at the end of FY89. Activities at multiple operable units, as well as first and subsequent activities, are listed.

- **Region** -- EPA region in which the site is located.
- **State** -- State in which the site is located.
- **Site Name** -- Name of the site, as listed on the *NPL, Supplementary Lists and Supporting Materials*, June 1988 and October 1989, OERR.
- **Location** -- Location of the site, as listed on the NPL.
- **Operable Unit** -- Operable unit at which the corresponding remedial activity is occurring.
- **Activity** -- Type of project in progress on September 30, 1989.
- **Lead** -- The entity leading the activity, as follows:

  EP: Fund-financed with EPA employees performing the project, not contractors;

  F: Fund-financed and federal-lead by the Superfund remedial program;

  FE: EPA Enforcement program-lead;

  FF: Federal Facility-lead;

MR: Mixed funding; monies from both the Fund and PRPs;

PRP: PRP-financed and conducted;

PS: PRP-financed work performed by the PRP under a state order (may include federal financing or federal oversight under an enforcement document);

S: State-lead and Fund-financed; and

SE: State enforcement-lead (may include federal financing).

O (Other), SN (State-lead and -financed, no Fund money), and SR (State-ordered PRP response) activities are excluded from this status report because they do not include federal financing.

- **Funding Start** -- The date on which funds were allocated for the activity.

- **Previously Published Completion Schedule** -- For projects ongoing at the end of FY88 that continued into FY89, the quarter of the planned completion date for the activity, as of 9/30/88, the end of FY88. This column is blank for projects that were not begun until FY89.

- **Present Quarter Estimated Completion** -- The quarter of the planned completion date for the activity, as of 9/30/89. CERCLIS compiled this information on October 20, 1989. To complete some gaps in the data, CERCLIS compiled additional planned completion dates on April 3, 1990, and April 6, 1990. An asterick (*) next to the completion date indicates that the date was taken from the later date. Some activities were not updated in the April 4, 1990 data, so a few activities with estimated completion dates in FY89 or earlier still remain.

- **Status** -- Status of the project, as of the end of FY89, as follows:

On-schedule projects are designated by a zero (0).

Projects that are **behind schedule** are designated by a numeral indicating the number of quarters that the project is behind schedule and a minus sign (e.g., -4).

Projects that are **ahead of schedule** are designated by a numeral indicating the number of quarters that the project is ahead of schedule (e.g., 4).

Projects for which EPA **has not estimated a completion date** are designated by an asterisk (*) in the Present Quarter Estimated Completion column.

Projects that were begun in FY88 are described as **new** in the status column.

Projects described as DNE, for **date newly entered**, have funding starts in previous fiscal years and no date in the Previously Published Completion Schedule column. These sites, for numerous reasons, were not entered into CERCLIS during the fiscal year of the funding start, or a change in the status of the site or activity now requires that the activity be published in the FY89 Report. For example, several activities with the status of DNE were state enforcement-lead or state-lead and financed before FY89 and therefore, did not fall under the requirements of CERCLA section 301(h)(1)(B). During FY89, a lead change resulted in Fund money being used in the clean-up activities. Therefore, they are now included in this appendix.

The sites designated by R, Montco Research Products, Inc., FL, was removed from the NPL on March 31, 1989. Investigation subsequent to listing on the NPL revealed that the level of contamination does not warrant inclusion on the NPL. It is included in this

appendix to clarify the change in status from FY88, is not counted in remedial activity totals.

Progress Toward Implementing Superfund: Fiscal Year 1989

APPENDIX A

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES,
AND REMEDIAL ACTIONS IN PROGRESS ON SEPTEMBER 30, 1989

	RG	ST	SITE NAME	LOCATION	OPER-ABLE UNIT	ACTIVITY	LEAD	FUNDING START	PREVIOUS COMPLETION SCHEDULE		PRESENT COMPLETION SCHEDULE		STATUS
1.	1	CT	Laurel Park, Inc. (once listed as Laurel Park Landfill)	Naugatuck Borough	1	RA	PRP	09/05/89			4	90	new
2.	1	CT	Linemaster Switch Corp.	Woodstock	1	RI/FS	PRP	07/10/89			3	91	new
3.	1	CT	Old Southington Landfill	Southington	1	RI/FS	PRP	09/29/87	2	91	2	91	0
4.	1	CT	Revere Textile Prints Corp.	Sterling	1	RI/FS	F	09/18/89			4	91	new
5.	1	CT	Solvents Recovery Service of New England	Southington	1	RA	PRP	01/07/86	4	91	4	91	0
					2	RA	PRP	10/29/86	4	91	4	91	0
					3	RI/FS	F	08/12/88	4	91	4	91	0
6.	1	MA	Atlas Tack Corp.	Fairhaven	1	RI/FS	F	09/18/89			4	91	new
					1	RA	F	09/05/89			3	91	new
7.	1	MA	Baird & McGuire	Holbrook	1	RA	F	09/05/89			3	91	DNE
					4	RI/FS	F	05/21/87	2	90	2	90	0
8.	1	MA	Charles-George Reclamation Trust Landfill	Tyngsborough	2	RA	F	08/19/87	3	90	3	90	0
9.	1	MA	Groveland Wells	Groveland	1	RI/FS	F	08/18/83	3	90	1	91	-2
10.	1	MA	Hocomonco Pond	Westborough	1	RA	PRP	09/28/89			3	90	new
11.	1	MA	Iron Horse Park	Billerica	2	RI/FS	F	08/08/85	4	89	2	90	-2
12.	1	MA	New Bedford Site	New Bedford	1	FS	F	02/15/85	4	89	4	90	-4
					1	RI/FS	F	08/18/83	4	89	3	90	-3
13.	1	MA	Nyanza Chemical Waste Dump	Ashland	1	RA	F	12/31/87	1	90	2	91	-5
					2	RI/FS	F	05/21/87	2	90	1	91	-3
					3	RI/FS	F	05/21/87	1	91	4	91	-3
14.	1	MA	Plymouth Harbor/Cannon Engineering Corp. (once listed as Plymouth Harbor/Cordage) (This site was erroneously listed in the FY88 Report as "Cannon Engineering Corp. (CEC).")	Plymouth	2	RI/FS	F	09/04/87	2	89	4	89	-2
15.	1	MA	PSC Resources	Palmer	1	RI/FS	S	09/29/87	3	90	1	91	-2
16.	1	MA	Salem Acres	Salem	1	RI/FS	PRP	06/15/87	2	90	4	90	-2
17.	1	MA	Silresim Chemical Corp.	Lowell	1	RI/FS	PRP	06/30/85	2	90	1	91	-3

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	RG	ST	SITE NAME	LOCATION	OPER-ABLE UNIT	ACTIVITY	LEAD	FUNDING START	PREVIOUS COMPLETION SCHEDULE		PRESENT COMPLETION SCHEDULE		STATUS
18.	1	MA	Sullivan's Ledge	New Bedford	2	RI/FS	F	06/29/89			1	91	new
19.	1	MA	W.R. Grace & Co., Inc. (Acton Plant)	Acton	1	RI/FS	PRP	10/21/80	*	*	*	*	*
20.	1	ME	Brunswick Naval Air Station	Brunswick	1	RI/FS	FF	02/22/88	1	91	1	91	0
21.	1	ME	Union Chemical Co., Inc.	South Hope	1	RI/FS	PRP	09/15/87	4	90	3	90	1
22.	1	ME	Winthrop Landfill	Winthrop	1	RA	PRP	11/19/86	3	92	3	92	0
23.	1	NH	Coakley Landfill	North Hampton	1	RI/FS	S	08/12/85	3	89	3	90	-4
24.	1	NH	Dover Municipal Landfill	Dover	1	FS	PRP	07/22/88	3	90	1	91	-2
25.	1	NH	Holton Circle Ground Water Contamination	Londonderry	1	RI/FS	F	09/05/89			2	92	new
26.	1	NH	Kearsarge Metallurgical Corp. (once listed as Kearsage Metallurgical Corp.)	Conway	1	FS	S	07/22/88	4	90	4	90	0
27.	1	NH	Mottolo Pig Farm	Raymond	1	RI/FS	PRP	05/20/88	1	91	1	90	4
28.	1	NH	Savage Municipal Water Supply	Milford	1	RI/FS	PRP	08/10/87	4	90	2	91	-2
29.	1	NH	Somersworth Sanitary Landfill	Somersworth	1	RI/FS	PRP	04/28/89			1	91	new
30.	1	NH	Tibbets Road	Barrington	1	RI/FS	F	08/31/89			4	91	new
31.	1	RI	Central Landfill	Johnston	1	RI/FS	PRP	04/03/87	2	91	2	91	0
32.	1	RI	Davis Liquid Waste	Smithfield	1	RA	F	04/27/88	4	90	4	90	0
33.	1	RI	Peterson/Puritan, Inc.	Lincoln/Cumberland	1	RI/FS	PRP	05/29/87	3	90	1	91	-2
34.	1	RI	Picillo Farm	Coventry	2	RI/FS	F	11/09/87	4	91	4	91	0
35.	1	RI	Stamina Mills, Inc. (once listed as Forestdale-Stamina) Mills, Inc.)	North Smithfield	1	RI/FS	F	04/26/85	2	90	3	90	-1
36.	1	RI	Western Sand & Gravel	Burrillville	1	RA	F	09/25/87	2	90	4	90	-2
					3	RI/FS	PRP	06/03/87	2	90	2	90	0
37.	1	VT	Darling Hill Dump	Lyndon	1	RI/FS	PRP	09/29/89			2	92	new

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	RG	ST	SITE NAME	LOCATION	OPER-ABLE UNIT	ACTIVITY	LEAD	FUNDING START	PREVIOUS COMPLETION SCHEDULE		PRESENT COMPLETION SCHEDULE		STATUS
38.	1	VT	Old Springfield Landfill	Springfield	2	RI/FS	PRP	03/10/89			4	90	new
39.	1	VT	Pine Street Canal	Burlington	1	RI/FS	F	06/27/88	3	91	3	91	0
40.	2	NJ	A. O. Polymer	Sparta Township	1	RI/FS	S	09/27/85	4	90	1	91	-1
41.	2	NJ	Asbestos Dump	Millington	2	RI/FS	PRP	12/13/88			1	91	new
42.	2	NJ	Bog Creek Farm	Howell Township	1	RA	F	07/29/88	1	91	1	91	0
43.	2	NJ	Bridgeport Rental & Oil Services	Bridgeport	1	RA	F	04/19/88	4	92	4	92	0
					2	RI/FS	F	09/29/88	1	93	1	90	12
44.	2	NJ	Brook Industrial Park	Bound Brook	1	RI/FS	F	03/30/89			2	91	new
45.	2	NJ	Burnt Fly Bog	Marlboro Township	1	RA	S	12/07/83	4	89	1	90	-1
					3	RI/FS	S	09/30/88	4	90	1	91	-1
46.	2	NJ	Caldwell Trucking Co.	Fairfield	1	RA	F	04/21/89			3	90 *	new
47.	2	NJ	Chemical Control	Elizabeth	1	RA	F	02/23/89			4	90	new
48.	2	NJ	Chemical Leaman Tank Lines, Inc. (once listed as Chemical Leaman Tank Liners, Inc.)	Bridgeport	1	RI/FS	PRP	07/15/85	2	89	3	90 *	-5
					2	RI/FS	F	07/15/85			3	90 *	DNE
49.	2	NJ	Chemsol, Inc.	Piscataway	1	RI/FS	PS	07/09/84	3	90	3	90	0
50.	2	NJ	Ciba-Geigy Corp. (once listed as Toms River Chemical)	Toms River	1	RA	F	09/14/89			1	91	new
					2	RI/FS	F	07/05/89			1	91	new
51.	2	NJ	Cinnaminson Township (Block 702) Ground Water Contamination	Cinnaminson Township	1	RI/FS	F	03/29/85	4	89	2	90	-2
52.	2	NJ	Combe Fill North Landfill	Mount Olive Township	1	RA	S	09/30/88	1	91	1	91	0
53.	2	NJ	Cosden Chemical Coatings Corp.	Beverly	1	RI/FS	F	04/14/88	1	91	1	91	0
54.	2	NJ	CPS/Madison Industries	Old Bridge Township	1	RI/FS	PS	01/15/83	4	89	2	90	-2
55.	2	NJ	Curcio Scrap Metal, Inc.	Saddle Brook Township	1	RI/FS	PRP	04/29/88	2	91	2	91	0
56.	2	NJ	Delilah Road	Egg Harbor Township	1	RI/FS	S	03/30/84	4	89	2	90	-2

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	RG	ST	SITE NAME	LOCATION	OPER-ABLE UNIT	ACTIVITY	LEAD	FUNDING START	PREVIOUS COMPLETION SCHEDULE		PRESENT COMPLETION SCHEDULE		STATUS
57.	2	NJ	Denzer & Schafer X-Ray Co.	Bayville	1	RI/FS	S	06/26/87	1	91	1	91	0
58.	2	NJ	Ellis Property	Evesham Township	1	RI/FS	S	09/26/84	1	91	1	91	0
59.	2	NJ	Federal Aviation Administration Technical Center	Atlantic County	2	RI/FS	FF	06/01/87			2	90	DNE
					3	RI/FS	FF	06/01/87			2	90	DNE
					4	RI/FS	FF	06/01/87			3	90	DNE
60.	2	NJ	Florence Land Recontouring Landfill	Florence Township	1	RA	S	09/29/89			3	92	new
61.	2	NJ	Fort Dix (Landfill Site)	Pemberton Township	1	FS	FF	11/15/86	3	89	1	90	-2
62.	2	NJ	Fried Industries	East Brunswick Township	1	RI/FS	FE	06/28/85	1	91	1	91	0
63.	2	NJ	Garden State Cleaners Co.	Minotola	1	RI/FS	F	09/20/88	1	91	1	91	0
64.	2	NJ	GEMS Landfill	Gloucester Township	1	RA	PS	06/05/89			3	93	new
65.	2	NJ	Glen Ridge Radium Site	Glen Ridge	1	RA	F	09/15/89			3	92	new
66.	2	NJ	Helen Kramer Landfill	Mantua Township	1	RA	F	09/23/88	1	92	4	92	-3
67.	2	NJ	Hercules, Inc. (Gibbstown Plant)	Gibbstown	1	RI/FS	PS	07/02/86	2	90	2	90	0
					2	RI/FS	PS	07/02/86			4	91	DNE
68.	2	NJ	Higgins Farm	Franklin Township	1	RI/FS	F	07/17/89			4	91	new
69.	2	NJ	Hopkins Farm	Plumstead Township	1	RI/FS	PS	02/03/87	1	91	3	90	2
70.	2	NJ	Imperial Oil Co., Inc./Champion Chemcials	Morganville	1	RI/FS	S	09/28/84	1	91	1	91	0
71.	2	NJ	Industrial Latex Corp.	Wallington Borough	1	RI/FS	F	09/20/88	2	91	2	91	0
72.	2	NJ	Kauffman & Minteer, Inc.	Jobstown	1	RI/FS	F	04/11/89			4	91	new
73.	2	NJ	Kin-Buc Landfill	Edison Township	2	RI/FS	PRP	2/14/89			1	91	new
74.	2	NJ	King of Prussia	Winslow Township	1	RI/FS	PRP	04/17/85	4	89	2	90	-2
75.	2	NJ	Lipari Landfill	Pitman	2	RA	F	09/23/88	2	91	2	91	0
76.	2	NJ	Lodi Municipal Well	Lodi	1	RI/FS	F	06/19/87	3	90	1	91	-2
77.	2	NJ	Lone Pine Landfill	Freehold Township	1	RA	F	09/23/88	3	91	1	90	6

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					2	RI/FS	PRP	09/30/85	3	89	1	90	-2
78.	2	NJ	M&T Delisa Landfill	Asbury Park	1	RI/FS	PRP	03/31/88	2	90	2	90	0
79.	2	NJ	Mannheim Avenue Dump	Galloway Township	1	RI/FS	PRP	05/09/88	4	90	4	90	0
80.	2	NJ	Maywood Chemical Co.	Maywood/Rochelle Park	1	RI/FS	PRP	09/21/87	2	91	2	91	0
81.	2	NJ	Metaltec/Aerosystems	Franklin Borough	1	RA	F	07/03/89			3	90	new
					2	RI/FS	F	03/26/87	1	91	1	91	0
82.	2	NJ	Monitor Devices/Intercircuits, Inc.	Wall Township	1	RI/FS	S	06/01/86	4	91	4	91	0
83.	2	NJ	Montclair/West Orange Radium Site	Montclair/West Orange	1	RA	F	09/15/89			3	92	new
84.	2	NJ	Montgomery Township Housing Development	Montgomery Township	1	RA	F	09/13/88			1	90	DNE
85.	2	NJ	Myers Property	Franklin Township	1	RI/FS	F	09/26/85	2	90	2	90	0
86.	2	NJ	Nascolite Corp.	Millville	2	RI/FS	F	04/01/88	1	91	3	91	-2
87.	2	NJ	Naval Air Engineering Center	Lakehurst	1	RI/FS	FF	09/25/89			1	91	new
					2	RI/FS	F	09/25/89			1	91	new
					3	RI/FS	F	09/25/89			3	91	new
					4	RI/FS	F	09/25/89			3	91	new
					5	RI/FS	F	09/25/89			2	92	new
					6	RI/FS	F	09/25/89			2	92	new
					7	RI/FS	F	09/25/89			3	92	new
88.	2	NJ	NL Industries	Pedricktown	1	RI/FS	PRP	04/25/86	1	91	1	91	0
89.	2	NJ	Pohatcong Valley Ground Water Contamination	Warren County	1	RI/FS	F	09/30/88	4	91	4	91	0
90.	2	NJ	Pomona Oaks Residential Wells	Galloway Township	1	RI/FS	F	12/24/86	3	90	3	90	0
91.	2	NJ	Renora, Inc.	Edison Township	1	RA	PRP	09/06/88	3	90	4	90	-1
92.	2	NJ	Rockaway Borough Well Field	Rockaway Township	2	RI/FS	F	09/07/88	2	91	2	91	0
93.	2	NJ	Roebling Steel Co.	Florence	1	RI/FS	F	06/19/84	3	89	1	90	-2
					2	RI/FS	F	06/19/84			1	91	DNE
94.	2	NJ	Scientific Chemical Processing	Carlstadt	1	RI/FS	PRP	09/30/85	3	89	2	90	-3
					2	RI/FS	PRP	12/19/88			1	91	new

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95.	2	NJ	Sheild Alloy Corp.	Newfield Borough	1	RI/FS	PS	09/05/84			1	91	DNE
					2	RI/FS	PS	10/05/88			4	91	new
96.	2	NJ	South Jersey Clothing Co.	Minotola	1	RI/FS	F	09/20/88	1	91	1	91	0
97.	2	NJ	Swope Oil & Chemical Co.	Pennsauken	1	RA	PRP	09/07/88	4	90	4	90	0
					2	RI/FS	PRP	08/18/86	3	90	1	91	2
98.	2	NJ	Syncon Resins	South Kearny	1	RA	S	05/23/89			2	91	new
99.	2	NJ	Universal Oil Products (Chemical Division)	East Rutherford	1	RI/FS	PS	05/28/86	3	90	1	91	-2
100.	2	NJ	Upper Deerfield Township Sanitary Landfill	Upper Deerfield Township	1	RI/FS	F	09/30/87	3	90	2	91	-3
101.	2	NJ	U.S. Radium Corp.	Orange	1	RI/FS	F	09/28/84	1	91	1	91	0
102.	2	NJ	Ventron/Velsicol	Wood Ridge Borough	1	RI/FS	PS	11/01/85			1	93	DNE
103.	2	NJ	Vineland State School	Vineland	1	RI/FS	PS	09/15/86			4	89	DNE
104.	2	NJ	Waldick Aerospace Devices, Inc.	Wall Township	2	RI/FS	F	12/31/87	2	90	2	90	0
105.	2	NJ	Wilson Farm	Plumstead Township	1	RI/FS	PS	02/03/87			3	90	DNE
106.	2	NJ	Witco Chemical Corp. (Oakland Plant)	Oakland	1	RI/FS	PRP	08/25/89			1	91	new
107.	2	NY	Action Anodizing, Plating, & Polishing Corp.	Copiague	1	RI/FS	F	07/17/89			2	91	new
108.	2	NY	*American Thermostat Co.*	*South Cairo*	2	RI/FS	F	12/14/87	2	90	2	90	0
109.	2	NY	Anchor Chemicals	Hicksville	1	RI/FS	PRP	06/02/89			3	91	new
110.	2	NY	Batavia Landfill	Batavia	1	RI/FS	PRP	08/09/84	3	90	3	90	0
111.	2	NY	BioClinical Laboratories, Inc.	Bohemia	1	RI/FS	F	03/31/88	3	90	1	91	-2
112.	2	NY	Brewster Well Field	Putnam County	1	RA	F	09/23/87	3	90	3	90	0
					2	RA	F	09/26/89			1	91	new
113.	2	NY	C & J Disposal Leasing Co. Dump	Hamilton	1	RI/FS	FE	09/29/88	1	91	1	91	0
114.	2	NY	Carrol & Dubies Sewage Disposal	Port Jervis	1	RI/FS	F	03/31/89			2	91	new

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115.	2	NY	Circuitron Corp.	East Farmingdale	1	RI/FS	F	09/27/88	2	91	2	91	0
116.	2	NY	Claremont Polychemical	Old Bethpage	1	RI/FS	F	03/31/88	1	91	1	91	0
					2	RA	F	09/25/89			2	91	new
117.	2	NY	Colesville Municipal Landfill	Town of Colesville	1	RI/FS	PS	04/13/87			4	90	DNE
118.	2	NY	Cortese Landfill	Vil. of Narrowsburg	1	RI/FS	PS	04/11/85			1	91	DNE
119.	2	NY	Endicott Village Well Field	Village of Endicott	1	RA	PRP	09/21/88	3	90	1	91	-2
					2	RI/FS	PRP	09/19/88	4	91	4	91	0
120.	2	NY	Facet Enterprises, Inc.	Elmira	1	RI	PRP	04/08/83	4	89	1	90	-1
					1	RI/FS	PRP	05/22/86	3	90	2	91	-3
121.	2	NY	Forest Glen Mobile Home Subdivision	Niagara Falls	1	RI/FS	EP	07/31/89			2	90	new
122.	2	NY	GE Moreau Site	South Glen Falls	1	RA	PRP	09/23/87	3	89	1	90	-2
123.	2	NY	General Motors (Central Foundry Division)	Massena	1	RI/FS	PRP	04/16/85	3	89	3	90	-4
124.	2	NY	Genzale Plating Co.	Franklin Square	1	RI/FS	F	03/31/88	2	91	2	91	0
125.	2	NY	Goldisc Recordings, Inc.	Holbrook	1	RI/FS	PS	12/20/85	3	90	4	90	-1
126.	2	NY	Haviland Complex	Town of Hyde Park	1	RA	F	09/29/88	4	89	2	90	-2
127.	2	NY	Hertel Landfill	Plattekill	1	RI/FS	F	03/31/89			2	91	new
128.	2	NY	Hooker Chemical/Ruco Polymer Corp.	Hicksville	1	RI/FS	PRP	09/21/88	4	91	4	91	0
129.	2	NY	Hooker (102nd Street)	Niagara Falls	1	RI/FS	PRP	06/26/84	4	90	4	90	0
130.	2	NY	Hooker (Hyde Park)	Niagara Falls	1	RA	PRP	08/15/87	1	90	1	92	-8
131.	2	NY	Hooker (South Area)	Niagara Falls	1	RI/FS	PRP	01/10/84	2	90	2	90	0
					2	RI/FS	PRP	01/10/84	1	91	4	91	-3
132.	2	NY	Hudson River PCBs	Hudson River	1	RA	S	09/28/84	1	92	1	92	0
133.	2	NY	Islip Municipal Sanitary Landfill	Islip	1	RI/FS	PS	11/15/87			3	91	DNE
134.	2	NY	Johnstown City Landfill	Town of Johnstown	1	RI/FS	PS	10/03/88			4	91	new

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135.	2	NY	Kenmark Textile Corp.	Farmingdale	1	RI/FS	PS	10/21/87			2	91	DNE
136.	2	NY	Kentucky Avenue Well Field	Horseheads	1	RA	S	09/30/88	2	90	2	90	0
					1	RA	F	09/30/88	2	90	2	90	0
					2	RI/FS	F	09/23/87	2	90	2	90	0
137.	2	NY	Love Canal	Niagara Falls	2	RA	S	06/26/87	1	89	1	90	-4
					7	RA	S	02/09/87	2	89	3	92	-13
					8	RA	S	06/26/87	4	89	2	91	-6
138.	2	NY	Ludlow Sand & Gravel	Clayville	2	RI/FS	F	09/30/88	1	91	2	91	-1
139.	2	NY	Marathon Battery Corp.	Cold Springs	3	RA	PRP	08/30/89			2	92	new
140.	2	NY	Mattiace Petrochemical Co., Inc.	Glen Cove	1	RI/FS	F	09/29/88	1	91	1	91	0
					2	RI/FS	F	09/29/88	1	90	3	90	-2
141.	2	NY	Niagara County Refuse	Wheatfield	1	RI/FS	PRP	03/30/89			2	91	new
142.	2	NY	Niagara Mohawk Power Corp. (Saratoga Springs Plant)	Saratoga Springs	1	RI/FS	PRP	09/27/89			2	91	new
143.	2	NY	North Sea Municipal Landfill	North Sea	2	RI/FS	PRP	07/27/89			4	91	new
144.	2	NY	Olean Well Field	Olean	1	RA	PRP	01/27/88	4	89	1	90	-1
					2	RI/FS	FE	09/23/87	2	91	2	91	0
145.	2	NY	Pasley Solvents & Chemicals, Inc.	Hempstead	1	RI/FS	PRP	08/19/88	2	91	2	91	0
146.	2	NY	Pollution Abatement Services	Oswego	2	RA	S	03/29/85	3	90	3	90	0
147.	2	NY	Richardson Hill Road Landfll/Pond	Sidney Center	1	RI/FS	PRP	07/22/87	3	91	3	91	0
148.	2	NY	Robintech, Inc./National Pipe Co.	Town of Vestal	1	RI/FS	PRP	10/08/87	2	91	2	91	0
149.	2	NY	Rowe Industries Ground Water Contamination	Noyack/Sag Harbor	1	RI/FS	PRP	09/30/88	2	91	2	91	0
150.	2	NY	Sarney Farm	Amenia	1	RI/FS	F	06/29/85	3	90	2	90	1
151.	2	NY	Sidney Landfill	Sidney	1	RI/FS	F	09/19/89			1	92	new
152.	2	NY	Sinclair Refinery	Wellsville	2	RI/FS	PRP	07/28/88	3	90	3	90	0
153.	2	NY	Solvent Savers	Lincklaen	1	RI/FS	F	09/02/87	3	90	3	90	0

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2	NY	Syossset Landfill	Oyster Bay	1	RI/FS	PRP	07/01/86	2	90	3	90	-1
2	NY	Tronic Plating Co., Inc.	Farmingdale	1	RI/FS	PRP	06/07/88	4	91	4	91	0
2	NY	Vestal Water Supply Well 1-1	Vestal	1	RA	F	09/30/87	3	90	3	90	0
		(once listed with Well 4-2 as one site)		2	RI/FS	F	04/24/87	3	89	1	90	-2
2	NY	Volney Municipal Landfill	Town of Volney	2	RI/FS	F	12/30/87	1	91	1	91	0
2	NY	Warwick Landfill	Warwick	1	RI/FS	F	04/19/88	4	90	2	91	-2
2	NY	Wide Beach Development	Brant	1	RA	F	12/30/88			1	91	new
2	NY	York Oil Co.	Moira	2	RI/FS	F	09/06/88	3	89	1	91	-6
2	PR	Barceloneta Landfill	Florida Afuera	1	RI/FS	F	08/30/88	3	91	3	91	0
2	PR	Fibers Public Supply Wells	Jobos	1	RI/FS	PRP	12/27/85	1	91	1	91	0
2	PR	Frontera Creek	Rio Abajo	1	RI/FS	PRP	10/03/86	2	91	2	91	0
2	PR	Juncos Landfill	Juncos	1	RI/FS	PRP	10/09/84	1	91	1	91	0
2	PR	RCA Del Caribe	Barceloneta	1	RI/FS	PRP	03/31/88	3	92	3	92	0
2	PR	Upjohn Facility	Barceloneta	1	RA	PRP	04/19/89			4	91	new
2	PR	Vega Alta Public Supply Wells	Vega Alta	2	RI/FS	F	09/20/88	3	91	3	91	0
3	DE	Army Creek Landfill (once listed as Deleware Sand & Gravel-Llangollen Army Creek Landfills)	New Castle County	2	RI/FS	FE	05/08/89			1	90	new
3	DE	Chem-Solv, Inc.	Cheswold	1	RI/FS	PS	09/27/88	2	91	2	91	0
3	DE	Coker's Sanitation Service Landfills	Kent County	1	RI/FS	PRP	12/31/87	3	90	3	90	0
3	DE	Delaware City PVC Plant	Delaware City	1	RA	PRP	03/31/88	2	90	2	90	0
		(once listed as Stauffer Chemical Co.)		2	RA	PRP	09/29/89			1	91	new
3	DE	Delaware Sand & Gravel Landfill (once listed as Delaware Sand & Gravel-Llangollen Army Creek Landfills)	New Castle County	1	RA	F	06/30/89			3	90	new

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173.	3	DE	Dover Air Force Base	Dover	1	RI/FS	FF	06/29/89			4	90	new
174.	3	DE	E.I. Du Pont de Nemours & Co., Inc. (Newport Pigment Plant Landfill)	Newport	1	RI/FS	PRP	08/12/88	2	90	2	91	-4
175.	3	DE	Halby Chemical Co.	New Castle	1	RI/FS	F	03/06/87	2	90	3	90	-1
176.	3	DE	Harvey & Knott Drum, Inc.	Kirkwood	1	RA	MR	12/22/88			2	90	new
177.	3	DE	NCR Corp. (Millsboro Plant)	Millsboro	1	RI/FS	PS	03/10/88	1	91	1	91	0
178.	3	DE	Sealand Limited	Mount Pleasant	1	RI/FS	PRP	12/30/88			2	91	new
179.	3	DE	Standard Chlorine of Delaware, Inc.	Delaware City	1	RI/FS	PS	11/30/87	2	91	2	91	0
180.	3	MD	Kane & Lombard Street Drums	Baltimore	1	RA	F	09/29/88	3	90	3	90	0
					2	RI/FS	S	12/27/88			3	91	new
181.	3	MD	Limestone Road Site	Cumberland	2	RI/FS	F	03/28/87			4	89	DNE
					2	RI/FS	PRP	06/20/88			4	91	DNE
182.	3	MD	Mid-Atlantic Wood Preservers, Inc.	Harmans	1	RI/FS	PRP	07/11/86	1	91	2	90	3
183.	3	MD	Sand, Gravel & Stone	Elkton	2	RI/FS	PRP	01/16/86	3	89	4	89	-1
184.	3	MD	Southern Maryland Wood Treating	Hollywood	1	RA	F	06/30/89			3	90	new
185.	3	MD	Woodlawn County Landfill	Woodlawn	1	RI/FS	PRP	12/28/88			1	92	new
186.	3	PA	Aladdin Plating, Inc.	Scott Township	1	RA	F	09/29/88	3	90	3	90	0
187.	3	PA	Ambler Asbestos Piles	Ambler	2	RI/FS	PRP	12/30/87	4	89	4	89	0
188.	3	PA	AMP, Inc. (Glen Rock Facility)	Glen Rock	1	RI/FS	PRP	03/01/89			4	92	new
189.	3	PA	Avco Lycoming (Williamsport Division)	Williamsport	1	RI/FS	PRP	06/27/88	4	89	2	91	-6
190.	3	PA	Blosenski Landfill	West Caln Township	1	RA	F	03/24/87	1	89	4	89	-3
191.	3	PA	Brown's Battery Breaking	Shoemakersville	1	RI/FS	F	09/29/88	3	90	4	90	-1
192.	3	PA	Bruin Lagoon	Bruin Borough	2	RA	F	06/28/88	2	91	2	91	0
193.	3	PA	Butler Mine Tunnel	Pittston	1	RI/FS	PRP	03/30/87	4	91	4	91	0

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194.	3	PA	Butz Landfill	Stroudsburg	1	RI/FS	F	12/22/88			2	91	new
195.	3	PA	C & D Recycling	Foster Township	1	RI/FS	PRP	08/31/87	2	90	2	90	0
196.	3	PA	Centre County Kepone	State College Boro	1	RI/FS	PRP	11/07/88			2	91	new
197.	3	PA	Commodore Semiconductor Group	Lower Providence Township	1	RI/FS	PRP	07/29/88	3	91	3	91	0
198.	3	PA	Croydon TCE	Croydon	1	RA	F	09/11/89			4	91	new
					2	RI/FS	F	09/30/88	1	90	2	90 *	-1
199.	3	PA	Delta Quarries & Disposal, Inc./ Stotler Landfill	Antis/Logan Townships	1	RI/FS	PRP	10/09/87	2	91	2	91	0
200.	3	PA	Dorney Road Landfill	Upper Macungie Township	2	RI/FS	F	08/17/88	3	89	4	90	-5
201.	3	PA	Douglassville Disposal	Douglassville	2	RA	F	06/08/89			1	91	new
202.	3	PA	Drake Chemical	Lock Haven	2	RA	F	06/20/87	3	89	3	89	0
203.	3	PA	East Mount Zion	Springettsbury Township	1	RI/FS	S	02/09/84	3	89	3	90 *	-4
204.	3	PA	Eastern Diversified Metals	Hometown	1	RI/FS	PRP	10/19/87	3	90	3	90	0
205.	3	PA	Hebelka Auto Salvage Yard	Weisenberg Township	2	RI/FS	F	01/23/89	2	89	4	90	-6
206.	3	PA	Heleva Landfill	North Whitehall Township	1	RA	F	03/28/88	1	90	3	90	-2
					2	RI/FS	F	09/28/88	1	90	1	90	0
207.	3	PA	Hellertown Manufacturing Co.	Hellertown	1	RI/FS	PRP	02/22/88	2	91	2	91	0
208.	3	PA	Henderson Road	Upper Merion Township	1	RA	PRP	08/28/89			1	90	new
					2	RI/FS	PRP	04/01/88	2	90	2	90	0
209.	3	PA	Hranica Landfill	Buffalo Township	1	RI/FS	PRP	03/06/87	3	91	3	90	4
210.	3	PA	Hunterstown Road	Straban Township	1	RI/FS	PRP	03/10/87	3	91	3	91	0
211.	3	PA	Industrial Lane	Williams Township	2	RI/FS	F	03/06/87	1	90	4	90	-3
212.	3	PA	Keyser Avenue Borehole	Scranton	1	RI/FS	F	12/22/88			1	91	new

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213.	3	PA	Keystone Sanitation Landfill	Union Township	1	RI/FS	F	06/30/87	4	90	4	90	0
214.	3	PA	Lackawanna Refuse	Old Forge Borough	1	RA	F	06/02/87	4	89	1	91	-5
215.	3	PA	Lansdowne Radiation Site	Lansdowne	1	RA	F	03/26/87	1	90	1	90	0
216.	3	PA	Letterkenny Army Depot (Property Disposal Office Area)	Franklin County	1	RI/FS	FF	02/03/89			1	90	new
217.	3	PA	Malvern TCE	Malvern	1	RI/FS	PRP	12/16/88			4	91	new
218.	3	PA	Middletown Air Field	Middletown	1	RA	PRP	06/15/88	2	90	2	90	0
					2	RI/FS	F	03/15/88	2	90	4	90	-2
219.	3	PA	Millcreek Dump	Erie	1	RA	F	06/30/89			4	90	new
220.	3	PA	Moyers Landfill	Eagleville	1	RA	F	09/29/88	1	90	4	91	-7
221.	3	PA	MW Manufacturing (once listed as Domino Salvage Yard)	Valley Township	1	RI/FS	F	03/06/87	2	89	2	90	-4
222.	3	PA	North Penn-Area 1 (once listed as Gentle Cleaners, Inc./Granite Knitting Mills, Inc.)	Souderton	1	RI/FS	F	06/30/88	2	90	1	92	-7
223.	3	PA	North Penn-Area 2 (once listed as Ametek, Inc. (Hunter Spring Division))	Hatfield	1	RI/FS	F	06/30/88	2	90	3	91	-5
224.	3	PA	North Penn-Area 5 (once listed as American Electronics Laboratories)	Montgomery Township	1	RI/FS	F	06/30/88	2	90	4	92	-10
225.	3	PA	North Penn-Area 6 (once listed as J.W. Rex Co./Allied Paint Manufacturing Co., Inc./Keystone Hydraulics)	Lansdale	1	RI/FS	F	06/30/88	2	90	4	92	-10
226.	3	PA	North Penn-Area 7 (once listed as Spra-Fin, Inc.)	North Wales	1	RI/FS	F	06/30/88	2	90	4	92	-10
227.	3	PA	Novak Sanitary Landfill	South Whitehall Twp	1	RI/FS	PRP	12/30/88			2	91	new
228.	3	PA	Old City of York Landfill	Seven Valleys	1	RI/FS	PRP	10/21/87	4	89	4	90	-4
229.	3	PA	Osborne Landfill	Grove City	1	RI/FS	FE	09/25/87	4	89	2	90 *	-2
230.	3	PA	Palmerton Zinc Pile	Palmerton	1	RA	PRP	07/31/88	4	90	4	90	0
					3	RI/FS	PRP	09/24/85	4	90	4	90	0

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					4	RI/FS	FE	12/21/87	3	91	3	91	0
231.	3	PA	Paoli Rail Yard	Paoli	1	RI/FS	PRP	05/27/87	4	91	4	91	0
232.	3	PA	Publicker Industries Inc.	Philadelphia	1	RA	F	09/26/89			4	90	new
					2	RI/FS	F	09/21/89			2	91	new
233.	3	PA	Raymark	Hatboro	1	RI/FS	F	12/20/88			4	90	new
234.	3	PA	Resin Disposal	Jefferson Borough	1	RI/FS	PS	10/26/87			2	91	DNE
235.	3	PA	Revere Chemical Co.	Nockamixon Township	1	RI/FS	PRP	12/16/88			2	91	new
236.	3	PA	Route 940 Drum Dump (once listed as Pocono Summit)	Pocono Summit	1	RI/FS	PS	12/21/87			2	91	DNE
237.	3	PA	Salford Quarry	Salford Township	1	RI/FS	PRP	03/22/88	2	90	4	90	-2
238.	3	PA	Shriver's Corner	Straban Township	1	RI/FS	PRP	03/10/87	4	89	4	90	-4
239.	3	PA	Stanley Kessler	King of Prussia	1	RI/FS	F	09/06/89			3	91	new
240.	3	PA	Strasburg Landfill	Newlin Township	1	RI/FS	F	02/15/89			2	91	new
					2	RA	F	09/08/89			1	90	new
241.	3	PA	Tonolli Corp.	Nesquehoning	1	RI/FS	PRP	09/19/89			3	91	new
242.	3	PA	Transicoil, Inc.	Worcester	1	RI/FS	PRP	06/26/89			4	91	new
243.	3	PA	Tysons Dump	Upper Merion Township	1	RA	PRP	06/03/88	4	90	4	90	0
					2	RI/FS	PRP	10/01/88			3	91	new
					2	RA	PRP	09/11/89			1	91	new
244.	3	PA	Walsh Landfill	Honeybrook Township	1	RI/FS	S	02/09/84	3	89	2	90	-3
245.	3	PA	Westinghouse Elevator Co. Plant	Gettysburg	1	RI/FS	PRP	03/10/87	3	91	4	90	3
246.	3	PA	Westinghouse Elevator Co. (Sharon Plant)	Sharon	1	RI/FS	PS	09/20/88			1	92	DNE
247.	3	PA	Whitmoyer Laboratories	Jackson Township	1	RI/FS	F	11/01/87	2	90	3	90	-1
248.	3	PA	William Dick Lagoons	West Caln Township	1	RI/FS	PRP	09/14/88	3	91	3	91	0
249.	3	VA	Arrowhead Associates/Scovill Corp.	Montross	1	RI/FS	F	07/14/89			2	91	new

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250.	3	VA	Atlantic Wood Industries, Inc.	Portsmouth	1	RI/FS	PRP	07/23/87	1	91	1	91	0
251.	3	VA	Avtex Fibers, Inc.	Front Royal	2	RI/FS	PRP	09/30/88	2	91	2	91	0
252.	3	VA	C & R Battery Co., Inc.	Chesterfield County	1	RI/FS	F	02/15/88	2	90	1	90	1
253.	3	VA	Chisman Creek	York County	2	RA	PRP	01/25/89			1	90	new
254.	3	VA	Defense General Supply Center	Chesterfield County	1	RI/FS	FF	08/15/87	1	90	2	90	-1
255.	3	VA	Dixie Caverns County Landfill	Salem	1	RI/FS	F	08/29/89			3	91	new
256.	3	VA	First Piedmont Corp. Rock Quarry (Route 719) (once listed as First Piedmont Corp. Rock Quarry)	Pittsylvania County	1	RI/FS	PRP	12/31/87	4	90	4	90	0
257.	3	VA	Greenwood Chemical Co.	Newtown	1	RI/FS	F	04/03/87	4	89	1	90 *	-1
					2	RI/FS	F	11/08/88			1	91	new
258.	3	VA	H & H Inc., Burn Pit	Farrington	1	RI/FS	F	06/30/88	4	90	4	90	0
259.	3	VA	L.A. Clarke & Son	Spotsylvania	1	RA	PRP	09/08/89			3	96	new
					2	RI/FS	PRP	09/06/89			1	91	new
260.	3	VA	Rentokil, Inc. (Virginia Wood Preserving Divison)	Richmond	1	RI/FS	PRP	12/31/87	3	91	3	91	0
261.	3	VA	Rinehart Tire Fire Dump	Frederick County	1	RA	F	09/29/89			4	90	new
					2	RI/FS	F	09/28/88	2	90	1	91	-3
262.	3	VA	Saltville Waste Disposal Ponds	Saltville	2	RI/FS	PRP	09/15/88	1	91	3	91	-2
					3	RI/FS	PRP	09/15/88			1	93	DNE
263.	3	VA	Saunders Supply Co.	Chuckatuck	1	RI/FS	F	09/18/87	3	90	4	90	-1
264.	3	VA	Suffolk City Landfill	Suffolk	1	RI/FS	PS	06/30/89			2	92	new
265.	3	VA	U.S. Titanium	Piney River	1	RI/FS	PS	06/30/86			1	90 *	DNE
266.	3	WV	Fike Chemical	Nitro	1	RA	F	01/11/89			1	90	new
					2	RI/FS	F	05/17/89			3	90	new
267.	3	WV	Leetown Pesticide	Leetown	1	RA	F	06/03/88	2	91	2	91	0
268.	3	WV	West Virginia Ordnance	Point Pleasant	1	RA	PRP	02/22/88	1	90	1	90	0

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269.	4	AL	Alabama Army Ammunition Plant	Childersburg	1	RA	FF	08/31/86	1	88	3	91	-14
					1	RI/FS	FF	04/01/86			4	92 *	DNE
					2	RA	FF	03/31/87	1	94	1	94	0
					2	RI/FS	FF	02/28/86			2	90	DNE
270.	4	AL	Anniston Army Depot	Anniston	2	RA	FF	09/30/86	1	92	1	92	0
271.	4	AL	Ciba-Geigy Corp. (McIntosh Plant)	McIntosh	1	RA	PRP	09/28/89			3	94	new
					2	RI/FS	FE	01/02/87	4	94	2	90	18
272.	4	AL	Interstate Lead Co. (ILCO)	Leeds	1	RI/FS	FE	05/30/86	2	89	4	90	-6
					2	RI/FS	F	09/18/89			2	92	new
273.	4	AL	Stauffer Chemical Co. (Cold Creek Plant)	Bucks	1	RA	PRP	09/27/89			1	93	new
274.	4	AL	Stauffer Chemical Co. (LeMoyne Plant)	Axis	1	RA	PRP	09/27/89			1	93	new
275.	4	FL	Agrico Chemical Co.	Pensacola	1	RI/FS	PRP	09/29/89			3	91	new
276.	4	FL	Airco Plating Co.	Miami	1	RI/FS	PRP	03/30/89			1	91	new
277.	4	FL	Alpha Chemical Corp.	Galloway	1	RA	PRP	03/15/89			2	90	new
278.	4	FL	B&B Chemical Corp.	Hialeah	1	RI/FS	F	09/13/89			3	91	new
279.	4	FL	Cabot/Koppers	Gainesville	1	RI/FS	PRP	11/17/87	4	89	2	90	-2
280.	4	FL	City Industries, Inc.	Orlando	1	RI/FS	PRP	09/20/84	1	90	1	90	0
281.	4	FL	Davie Landfill (once listed as Broward County Solid Waste Disposal Facility)	Davie	1	RA	S	06/30/88	1	90	1	90	0
282.	4	FL	Dubose Oil Products Co.	Cantonment	2	RI/FS	SE	10/26/87	2	90	2	90	0
283.	4	FL	Gold Coast Oil Corp.	Miami	1	RA	PRP	02/06/89			4	91	new
284.	4	FL	Harris Corp. (Palm Bay Plant) (once listed as Harris Corp./General Development Utilities)	Palm Bay	1	RI/FS	PRP	03/31/88	3	89	1	90	-2
285.	4	FL	Hipps Road Landfill	Duval County	1	RA	PRP	05/22/89			1	91	new
286.	4	FL	Hollingsworth Solderless Terminal	Fort Lauderdale	1	RA	F	12/10/87	2	90	2	91	-4
287.	4	FL	Kassauf-Kimerling Battery Disposal	Tampa	2	RI/FS	FE	02/28/89			1	90	new

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		(once listed as Timber Lake Battery Disposal)								
288. 4	FL	Miami Drum Services (once listed as part of Biscayne Aquifer)	Miami	1	RA	F	09/30/88	1 90	4 90	-3
289. 4	FL	Montco Research Products, Inc.	Hollister	1	RI/FS	FE	11/20/87	1 90		R
290. 4	FL	Munisport Landfill	North Miami	1	FS	FE	03/15/88	2 89	2 89	0
				1	RI/FS	FE	02/24/87		2 90	DNE
291. 4	FL	Peak Oil Co./Bay Drum Co.	Tampa	1	RI/FS	PRP	03/01/88	4 90	3 91	-3
292. 4	FL	Pepper Steel & Alloys, Inc.	Medley	1	RA	PRP	03/26/87	2 89	1 90	-3
293. 4	FL	Petroleum Products Corp.	Pembroke Park	1	RI/FS	S	04/01/86	3 90	3 90	0
294. 4	FL	Pickettville Road Landfill	Jacksonville	1	RI/FS	PRP	09/30/84	4 89	1 90	-1
295. 4	FL	Reeves Southeast Galvanizing Corp.	Tampa	1	RI/FS	PRP	02/18/88	4 90	3 91	-3
296. 4	FL	Sapp Battery Salvage	Cottondale	1	RA	F	09/30/88	1 91	1 92	-4
297. 4	FL	Sherwood Medical Industries	Deland	1	RI/FS	PRP	04/30/87	1 91	3 91	-2
298. 4	FL	Sixty-Second Street Dump	Tampa	1	RI/FS	S	04/17/84	4 89	2 90	-2
299. 4	FL	Standard Auto Bumper Corp.	Hialeah	1	RI/FS	PRP	11/15/88		4 90	new
300. 4	FL	Sydney Mine Sludge Ponds	Brandon	1	RA	PRP	09/29/89		1 92	new
301. 4	FL	Tower Chemical Co.	Clermont	1	RA	F	09/29/89		2 91	new
302. 4	FL	Yellow Water Road Dump	Baldwin	1	RI/FS	PRP	09/24/87	2 90	4 90	-2
303. 4	GA	Hercules 009 Landfill	Brunswick	1	RI/FS	PRP	07/15/88	1 91	1 91	0
304. 4	GA	Mathis Brothers Landfill (South Marble Top Road)	Kensington	1	RI/FS	PRP	11/02/88		3 91	new
305. 4	GA	Monsanto Corp. (Augusta Plant)	Augusta	1	RI/FS	PRP	04/27/89		2 91	new
306. 4	GA	Robins Air Force Base (Landfill #4/ Sludge Lagoon) (once listed as Robins Air Force Base)	Houston County	1	RI/FS	FF	12/31/86	3 90	3 90	0
				2	RI/FS	FF	02/17/89		3 91	new

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307.	4	KY	Distler Brickyard	West Point	1	RA	F	09/28/88	4	89	2	90	-2
308.	4	KY	Distler Farm	Jefferson County	1	RA	F	09/28/88	4	89	1	90	-1
309.	4	KY	Fort Hartford Coal Co. Stone Qurry	Olaton	1	RI/FS	PRP	09/20/89			4	91	new
310.	4	KY	Howe Valley Landfill	Howe Valley	1	RI/FS	PRP	04/15/88	2	90	2	90	0
311.	4	KY	Maxey Flats Nuclear Disposal	Hillsboro	1	RI/FS	PRP	03/24/87	3	89	1	90	-2
312.	4	KY	Red Penn Sanition Co. Landfill	Peewee Valley	1	RI/FS	F	08/18/89			3	91	new
313.	4	KY	Smith's Farm	Brooks	2	RI/FS	F	07/17/89			1	92	new
314.	4	KY	Tri-City Disposal Co.	Shepherdsville	1	RI/FS	F	02/07/89			2	91	new
315.	4	NC	ABC One Hour Cleaners	Jacksonville	1	RI/FS	F	09/25/89			1	92	new
316.	4	NC	Aberdeen Pesticide Dumps	Aberdeen	1	RI/FS	F	06/30/87	1	91	1	91	0
317.	4	NC	Bypass 601 Ground Water Contamination	Concord	1	RI/FS	F	04/09/87	1	90	3	90	-2
318.	4	NC	Camp Lejeune Marine Corps Base	Onslow County	1	RI/FS	FF	09/25/89			4	92	new
319.	4	NC	Carolina Transformer Co.	Fayetteville	1	RI/FS	EP	04/07/88	1	91	1	91	0
320.	4	NC	Celanese Corp. (Shelby Fiber Operations)	Shelby	1	RA	PRP	10/24/88	2	89	4	91	-10
321.	4	NC	Charles Macon Lagoon & Drum Storage	Cordova	1	RI/FS	PRP	04/13/88	3	90	1	91	-2
322.	4	NC	Geigy Chemical Corp. (Aberdeen Plant)	Aberdeen	1	RI/FS	PRP	12/16/88			3	91	new
323.	4	NC	Jadco-Hughes Facility	Belmont	1	RI/FS	PRP	09/30/86	2	90	3	90	-1
324.	4	NC	JFD Electronics/Channel Master	Oxford	1	RI/FS	F	09/25/89			1	92	new
325.	4	NC	Koopers Co., Inc (Morrisville Plant)	Morrisville	1	RI/FS	PRP	03/14/89			1	92	new
326.	4	NC	Martin-Marietta, Sodyeco, Inc.	Charlotte	1	RA	PRP	09/25/89			2	99	new
327.	4	NC	North Carolina State University (Lot 86, Farm Unit #1)	Raleigh	1	RI/FS	FE	04/18/87	4	90	2	91	-2
328.	4	NC	Potter's Septic Tank Service Pits	Maco	1	RI/FS	F	09/16/88	3	90	3	91	-4

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329.	4	SC	Carolawn, Inc.	Fort Lawn	1	RI/FS	PRP	07/01/85	3	89	1	90	-2
330.	4	SC	Elmore Waste Disposal	Greer	1	RI/FS	F	09/25/89			4	91	new
331.	4	SC	Golden Strip Septic Tank Service	Simpsonville	1	RI/FS	PRP	06/30/88	4	90	1	91	-1
332.	4	SC	Helena Chemical Co. Landfill	Fairfax	1	RI/FS	PRP	03/31/89			1	91	new
333.	4	SC	Kalama Specialty Chemicals	Beaufort	1	RI/FS	PRP	01/13/88	4	90	1	91	-1
334.	4	SC	Koopers Co., Inc (Florence Plant)	Florence	1	RI/FS	PRP	02/29/88			1	91	DNE
335.	4	SC	Medley Farm Drum Dump	Gaffney	1	RI/FS	PRP	01/29/88	3	90	4	90	-1
336.	4	SC	Palmetto Wood Preserving	Dixiana	1	RA	F	09/08/89			4	90	new
					2	RA	F	09/25/89			2	90	new
337.	4	SC	Sangamo Weston, Inc./Twelve-Mile Creek/ Lake Hartwell PCB Contamination	Pickens	1	RI/FS	PRP	06/18/87	3	90	3	90	0
338.	4	SC	Savannah River Site (USDOE)	Aiken	1	RI/FS	FF	09/25/89			4	91	new
339.	4	SC	SCRDI Bluff Road	Columbia	1	RI/FS	PRP	04/21/88	2	90	2	90	0
340.	4	SC	SCRDI Dixiana	Cayce	1	RA	F	09/29/89			4	92	new
341.	4	TN	American Creosote Works, Inc. (Jackson Plant) (once listed as American Creosote Works)	Jackson	1	RA	F	06/12/89			1	92	new
342.	4	TN	Arlington Blending & Packaging	Arlington	1	RI/FS	EP	04/14/88	3	90	3	90	0
343.	4	TN	Carrier Air Conditioning Co.	Collierville	1	RI/FS	PRP	09/29/89			1	92	new
344.	4	TN	Lewisburg Dump	Lewisburg	1	RI/FS	PRP	12/31/87	1	90	2	90	-1
345.	4	TN	Mallory Capacitor Co.	Waynesboro	1	RI/FS	PRP	02/18/88	3	90	2	91	-3
346.	4	TN	Milan Army Ammunition Plant	Milan	1	RI/FS	FF	09/22/87	3	90	3	90	0
					2	RI/FS	FF	02/17/89			3	91	new
347.	4	TN	Oak Ridge Reservation (USDOE)	Oak Ridge	1	RI/FS	FF	09/15/89			3	92	new
348.	4	TN	Vesicol Chemical Corp. (Hardeman County)	Toone	1	RI/FS	PRP	02/17/89			2	91	new
349.	4	TN	Wrigley Charcoal Plant	Wrigley	1	RI/FS	F	02/15/89			2	91	new

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350. 5	IL	Acme Solvent Reclaiming, Inc.	Morristown	2	RI/FS	PRP	09/26/86	3	90	4	90	-1
351. 5	IL	DuPage County Landfill/ Blackwell Forest Preserve	Warrenville	1	RI/FS	PRP	09/29/89			4	92	new
352. 5	IL	Ilada Energy Co.	East Cape Girardeau	1	RI/FS	PRP	06/19/89			2	92	new
353. 5	IL	Johns-Manville Corp.	Waukegan	1	RA	PRP	10/21/88			2	91	new
354. 5	IL	Joliet Army Ammunition Plant (Load-Assembly-Packing Area)	Joliet	1	RI/FS	FF	06/09/89			1	93	new
355. 5	IL	Joliet Army Ammunition Plant (Manufacturing Area)	Joliet	1	RI/FS	FF	06/09/89			1	93	new
356. 5	IL	Kerr-McGee (Kress Creek/West Branch of DuPage River	DuPage County	1	RI/FS	FE	11/18/83	4	91	4	91	0
357. 5	IL	Kerr-McGee (Reed-Keppler Park)	West Chicago	1	RI/FS	FE	11/18/83	4	91	4	91	0
358. 5	IL	Kerr-McGee (Residential Areas)	West Chicago/ DuPage County	1	RI/FS	FE	11/18/83	4	91	4	91	0
359. 5	IL	Kerr-McGee (Sewage Treat Plant)	West Chicago	1	RI/FS	FE	11/18/83	4	91	4	91	0
360. 5	IL	LaSalle Electric Utilities	LaSalle	1	RA	S	07/27/87	1	90	2	90	-1
				2	RA	S	03/31/89			2	93	new
361. 5	IL	Lenz Oil Service, Inc.	Lemont	1	RI/FS	PRP	09/29/89			2	92	new
362. 5	IL	NL Industries/Taracorp Lead Smelter	Granite City	1	RI/FS	PRP	03/11/85	2	90	2	90	0
363. 5	IL	Pagel's Pit	Rockford	1	RI/FS	PRP	08/27/86	3	90	3	90	0
				1	RI/FS	FE	08/27/86			3	90	DNE
364. 5	IL	Parsons Casket Hardware Co.	Belvidere	1	RI/FS	S	09/29/88	1	91	2	91	-1
365. 5	IL	Sangamo Electric Dump/Crab Orchard National Wildlife Refuge (USDOI)	Carterville	1	RI/FS	FF	02/26/86	4	89	2	90	-2
				2	RI/FS	FF	02/26/86			3	90	DNE
366. 5	IL	Savanna Army Depot Activity	Savanna	1	RI/FS	FE	09/28/89			3	92	new
367. 5	IL	Sheffield (U.S. Ecology, Inc.)	Sheffield	1	RI/FS	PRP	10/14/85	1	91	*	*	*

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368.	5	IL	Southeast Rockford Groundwater Contamination	Rockford	1	RI/FS	S	06/30/89			2	92	new
369.	5	IL	Tri-County Landfill Co./Waste Management of Illinois, Inc.	South Elgin	1	RI/FS	F	04/22/88	3	91	3	91	0
370.	5	IL	Vesicol Chemical (Illinois)	Marshall	1	RA	PRP	05/19/89			4	91	new
371.	5	IL	Woodstock Municipal Landfill	Woodstock	1	RI/FS	PRP	09/29/89			2	92	new
372.	5	IN	American Chemical Service, Inc.	Griffith	1	RI/FS	PRP	06/29/88	1	91	3	92	-6
373.	5	IN	Columbus Old Municipal Landfill #1	Columbus	1	RI/FS	PRP	09/15/87	1	91	2	91	-1
374.	5	IN	Conrail Rail Yard (Elkhart)	Elkhart	1	RI/FS	F	09/29/88	3	91	3	91	0
375.	5	IN	Douglas Road/Uniroyal, Inc., Landfill	Mishawaka	1	RI/FS	PS	08/24/89			3	91	new
376.	5	IN	Fisher-Calo	LaPorte	1	RI/FS	FE	09/29/84	2	90	3	90	-1
377.	5	IN	Galen Meyer's Dump/Drum Salvage	Osceola	1	RI/FS	S	03/31/89			4	91	new
378.	5	IN	Himco, Inc., Dump	Elkhart	1	RI/FS	F	09/21/89			3	92	new
379.	5	IN	Lake Sandy Jo (M & M Landfill) (once listed as Lake Sandy Jo)	Gary	1 1	RA RA	F F	09/28/87 08/29/88	2 1	91 90	2 1	91 90	0 0
380.	5	IN	Lakeland Disposal Service, Inc.	Claypool	1	RI/FS	PRP	03/30/89			4	91	new
381.	5	IN	Main Street Well Field	Elkhart	2	RI/FS	F	09/29/86	3	90	3	90	0
382.	5	IN	Marion (Bragg) Dump	Marion	1	RA	MR	08/07/89			1	91	new
383.	5	IN	McCarthy's Bald Knob Landfill	Mt. Vernon	1	RI/FS	PRP	05/04/89			*	*	new
384.	5	IN	Neal's Landfill (Bloomington)	Bloomington	1	RA	PRP	07/07/88	2	89	2	89	0
385.	5	IN	Prestolite Battery Division	Vincennes	1	RI/FS	F	12/31/88			3	91	new
386.	5	IN	Reilly Tar & Chemical Corp. (Indianapolis Plant)	Indianapolis	1	RI/FS	PRP	03/31/87	2	91	2	91	0
387.	5	IN	Seymour Recycling Corp.	Seymour	1 2	RA RA	PRP PRP	08/17/87 09/08/89	2	94	2 3	94 95	0 new
388.	5	IN	Southside Sanitary Landfill	Indianapolis	1	RI/FS	PS	09/29/89			2	92	new

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389.	5	IN	Tri-State Plating	Columbus	1	RI/FS	F	07/08/87	2	90	2	90	0
390.	5	IN	Waste, Inc. Landfill	Michigan City	1	RI/FS	PRP	03/31/87	3	91	2	92	-3
391.	5	IN	Wayne Waste Oil	Columbia City	1	RI/FS	PRP	08/14/87	2	90	2	90	0
392.	5	IN	Wedzeb Enterprises, Inc.	Lebanon	1	RA	F	09/20/89	4	89	2	90	-2
393.	5	IN	Whiteford Sales & Service/Nationalease	South Bend	1	RI/FS	F	09/29/89			1	92	new
394.	5	MI	Adam's Plating	Lansing	1	RI/FS	F	09/28/88	4	91	1	92	-1
395.	5	MI	American Anodco, Inc.	Ionia	1	RI/FS	PRP	10/23/87	2	90	2	90	0
396.	5	MI	Anderson Development Co.	Adrian	1	RI/FS	PRP	05/23/86	2	91	3	90	3
397.	5	MI	Bendix Corp./Allied Automotive	St. Joseph	1	RI/FS	PRP	02/13/89			1	92	new
398.	5	MI	Berlin & Farro	Swartz Creek	2	RI/FS	PRP	02/27/86	4	89	2	90	-2
399.	5	MI	Bofors Nobel, Inc.	Muskegon	1	RI/FS	S	06/07/88	1	91	3	90	2
400.	5	MI	Burrows Sanitation	Hartford	1	RA	F	09/30/88	4	90	4	90	0
401.	5	MI	Butterworth #2 Landfill	Grand Rapids	1	RI/FS	PRP	04/22/87	3	90	3	90	0
402.	5	MI	Cannelton Industries, Inc.	Sault Sainte Marie	1	RI/FS	F	09/27/88	2	91	2	91	0
403.	5	MI	Cemetery Dump	Rose Center	1	RA	S	06/19/87	2	89	2	90 *	-4
404.	5	MI	Chem Central	Wyoming Township	1	RI/FS	PRP	06/30/87	4	90	4	90	0
405.	5	MI	Clare Water Supply	Clare	1	RI/FS	PRP	09/27/85	4	90	4	90	0
406.	5	MI	Duell & Gardner Landfill	Dalton Township	1	RI/FS	S	04/08/87	4	90	4	90	0
407.	5	MI	Electrovoice	Buchanan	1	RI/FS	PRP	10/08/87	1	91	3	91	-2
408.	5	MI	Folkertsma Refuse	Grand Rapids	1	RI/FS	FE	05/16/88	4	91	2	90	6
409.	5	MI	Forest Waste Products	Otisville	1 2	RA RA	PRP F	06/28/88 09/29/89	3	89	2 2	90 90	-3 new
410.	5	MI	G&H Landfill	Utica	1	RI/FS	F	07/01/83	4	90	4	90	0

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411. 5	MI	Grand Traverse Overall Supply Co.	Greilickville	1	RI/FS	F	03/05/87	3	91	3	91	0
412. 5	MI	Hi-Mill Manufacturing Co.	Highland	1	RI/FS	PRP	09/23/88	3	91	3	91	0
413. 5	MI	H. Brown Co., Inc.	Grand Rapids	1	RI/FS	F	08/19/88	1	91	3	91	-2
414. 5	MI	J & L Landfill	Rochester Hills	1	RI/FS	F	03/31/89			2	91	new
415. 5	MI	K&L Avenue Landfill	Oshtemo Township	1	RI/FS	FE	09/26/84	1	90	2	90	-1
416. 5	MI	Kentwood Landfill	Kentwood	1	RI/FS	PRP	12/13/85	4	89	3	90	-3
417. 5	MI	Mason County Landfill	Pere Marquette Township	2	RI/FS	F	09/28/88	2	92	2	92	0
418. 5	MI	Metal Working Shop	Lake Ann	1	RI/FS	F	09/30/88	2	91	2	91	0
419. 5	MI	Metamora Landfill	Metamora	1	RA	S	02/17/88	4	92	4	92	0
				2	RI/FS	S	09/30/86	1	90	1	90	0
420. 5	MI	Michigan Disposal Service (Cork Street Landfill)	Kalamazoo	1	RI/FS	PRP	12/03/87	4	90	1	91	-1
421. 5	MI	Motor Wheel, Inc.	Lansing	1	RI/FS	PRP	08/07/87	1	91	1	91	0
422. 5	MI	North Bronson Industrial Area	Bronson	1	RI/FS	S	06/24/87	4	91	2	92	-2
423. 5	MI	Northernaire Plating	Cadillac	1	RA	S	06/23/87	2	89	3	90 *	-5
424. 5	MI	Organic Chemicals, Inc.	Grandville	1	RI/FS	F	04/22/88	2	91	2	91	0
425. 5	MI	Ossineke Ground Water Contamination	Ossineke	1	RI/FS	F	09/21/87	4	90	4	90	0
426. 5	MI	Ott/Story/Cordova Chemical Co.	Dalton Township	1	RI/FS	FE	08/19/83	1	90	1	90	0
427. 5	MI	Packaging Corp. of America	Filer City	1	RI/FS	PRP	05/02/85	3	89	1	91	-6
428. 5	MI	Parsons Chemical Works, Inc.	Grand Ledge	1	RI/FS	F	09/29/89			4	91	new
429. 5	MI	Peerless Plating Co.	Muskegon	1	RI/FS	F	06/03/89			1	92	new
430. 5	MI	Petoskey Municipal Well Field	Petoskey	1	RI/FS	PRP	06/08/87	2	90	2	91	-4
431. 5	MI	Rasmussen's Dump	Green Oak Township	1	RI/FS	S	05/30/84	3	89	1	90	-2

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432. 5	MI	Rockwell International Corp. (Allegan Plant)	Allegan	1	RI/FS	PRP	06/07/88	2	91	2	91	0
433. 5	MI	Roto-Finish Co., Inc.	Kalamazoo	1	RI/FS	PRP	12/18/87	1	91	1	91	0
434. 5	MI	Shiawassee River	Howell	1	RI/FS	S	06/19/87	4	90	2	91	-2
435. 5	MI	South Macomb Disposal Authority (Landfills #9 and #9a)	Macomb Township	1	RI/FS	FE	09/01/87	2	91	2	91	0
436. 5	MI	Spiegelberg Landfill	Green Oak Township	1	RA	PRP	05/30/89			3	90	new
				2	RI/FS	S	06/26/87	3	89	1	90	-2
437. 5	MI	Springfield Township Dump	Davisburg	1	RI/FS	F	03/11/88	2	89	4	89	-2
438. 5	MI	Sturgis Municipal Wells	Sturgis	1	RI/FS	S	06/24/87	4	90	4	90	0
439. 5	MI	Tar Lake	Mancelona Township	1	RI/FS	PRP	01/29/86	1	91	1	91	0
440. 5	MI	Thermo-Chem, Inc.	Muskegon	1	RI/FS	PRP	09/21/87	4	91	4	91	0
441. 5	MI	Torch Lake	Houghton County	1	RI/FS	F	09/28/88	1	92	1	92	0
442. 5	MI	Verona Well Field	Battle Creek	1	RA	F	09/29/86	4	91	4	91	0
				2	RI/FS	F	05/30/85	3	90	3	90	0
443. 5	MI	Wash King Laundry	Pleasant Plains Twp	1	RI/FS	S	09/10/87	1	91	1	91	0
444. 5	MI	Willow Run Sludge		1	RI/FS	PRP	09/28/88			3	91	DNE
445. 5	MN	Burlington Northern (Brainerd/ Baxter Plant)	Brainerd/Baxter	1	RA	PRP	05/15/86	1	92	1	92	0
				2	RA	PRP	05/15/86	1	92	1	92	0
				4	RA	PRP	05/15/86	1	92	1	92	0
446. 5	MN	Kummer Sanitary Landfill	Bemidji	1	RA	S	07/11/85			3	90 *	DNE
				3	RI/FS	S	12/30/88			3	90	new
				4	RI/FS	S	06/30/89			4	90 *	new
447. 5	MN	Kurt Manufacturing Co.	Fridley	1	RA	PS	12/15/86	*	*	*	*	*
448. 5	MN	LaGrand Sanitary Landfill	LaGrand Township	1	RI/FS	S	06/30/87	1	91	4	91	-3
449. 5	MN	Lehillier/Mankato Site	Lehillier/Mankato	1	RA	S	03/31/88	4	91	4	91	0

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450.	5	MN	MacGillis & Gibbs Co./Bell Lumber & Pole Co.	New Brighton	1	RI/FS	S	09/29/87	1	91	1	90	4
451.	5	MN	New Brighton/Arden Hills	New Brighton	3	RA	S	09/30/88	4	89	1	90	-1
					4	RI	S	06/17/83			4	90	DNE
					5	RA	F	09/30/87	1	90	1	90	0
					7	FS	FF	08/12/87	1	91	1	91	0
					9	RI/FS	FF	08/15/88			2	90	DNE
452.	5	MN	Oak Grove Sanitary Landfill	Oak Grove Towsnship	2	RI/FS	S	06/13/85	1	90	3	90	-2
453.	5	MN	Perham Arsenic	Perham	1	RI/FS	S	09/29/89			*	*	new
454.	5	MN	Reilly Tar & Chemical Corp. (St. Louis Park Plant)	St. Louis Park	2	RA	PRP	09/30/87	4	88	4	99 *	-44
					3	RI/FS	PRP	09/04/86	1	91	1	91	0
					4	RI/FS	PRP	09/04/86	3	90	3	90	0
455.	5	MN	Ritari Post & Pole	Sebeka	1	RI/FS	S	06/30/87	1	91	2	91	-1
456.	5	MN	South Andover (once listed as Andover Sites)	Andover	2	RI/FS	F	09/25/89			1	91	new
457.	5	MN	St. Louis River Site	St. Louis County	1	RI/FS	S	09/30/85	4	90	4	90	0
458.	5	MN	St. Regis Paper Co.	Cass Lake	1	RA	S	04/20/87			4	99 *	DNE
459.	5	MN	Union Scrap Iron & Metal Co.	Minneapolis	1	RI/FS	S	03/30/87			1	90	DNE
460.	5	MN	Washington County Landfill	Lake Elmo	1	RA	PRP	10/24/84	4	99	4	99	0
461.	5	MN	Windom Dump	Windom	1	RA	PS	09/20/89			4	91	new
462.	5	OH	Allied Chemical & Ironton Coke	Ironton	2	RI/FS	PRP	04/12/84	3	90	3	90	0
463.	5	OH	Buckeye Reclamation	St. Clairsville	1	RI/FS	PRP	10/31/85	4	89	2	90	-2
464.	5	OH	Fields Brook	Ashtabula	2	RI/FS	PRP	03/22/89			4	91	new
					3	RI/FS	PRP	09/26/89			3	91	new
465.	5	OH	Fultz Landfill	Jackson Township	1	RI/FS	F	09/24/84	4	90	1	91	-1
466.	5	OH	General Electric Co. (Coshocton Plant)	Coshocton	1	RI/FS	PRP	08/28/87	1	91	*	*	*
467.	5	OH	Industrial Excess Landfill	Uniontown	1	RA	F	09/14/89			4	90	new
					2	RA	PRP	08/17/89			4	90	new
468.	5	OH	Nease Chemical	Salem	1	RI/FS	PRP	01/27/88	4	90	2	91	-2

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469. 5	OH	New Lyme Landfill	New Lyme	1	RA	F	04/11/88	4 89	4 90 *	-4
470. 5	OH	Old Mill (once listed as Rock Creek/Jack Webb)	Rock Creek	1	RA	F	09/21/87	1 90	1 90	0
471. 5	OH	Ormet Corp.	Hannibal	1	RI/FS	PRP	03/27/87	3 90	4 90	-1
472. 5	OH	Powell Road Landfill	Dayton	1	RI/FS	PRP	11/12/87	3 90	3 90	0
473. 5	OH	Reilly Tar & Chemical Corp. (Dover Plant)	Dover	1	RI/FS	PRP	03/29/89		1 91	new
474. 5	OH	Republic Steel Corp. Quarry	Elyria	1	RA	F	09/21/89		2 90	new
475. 5	OH	Sanitary Landfill Co. (Industrial Waste Disposal Co., Inc.)	Dayton	1	RI/FS	PRP	12/16/87	1 91	1 91	0
476. 5	OH	Skinner Landfill	West Chester	1 1	RI/FS RI/FS	F F	09/26/84 01/04/89	2 90	3 90 3 90	-1 new
477. 5	OH	South Point Plant	South Point	1	RI/FS	PRP	03/31/87	4 90	1 91	-1
478. 5	OH	Van Dale Junkyard	Marietta	1	RI/FS	PRP	07/24/87	3 90	1 91	-2
479. 5	OH	Zanesville Well Field	Zanesville	1	RI/FS	PRP	08/03/88	3 90	4 90	-1
480. 5	WI	Algoma Municipal Landfill	Algoma	1	RI/FS	PRP	01/28/88	3 90	3 90	0
481. 5	WI	City Disposal Corp. Landfill	Dunn	1	RI/FS	PRP	05/22/87	4 91	4 91	0
482. 5	WI	Eau Claire Municipal Well Field	Eau Claire	1	RA	S	06/03/89		1 90	new
483. 5	WI	Fadrowski Drum Disposal	Franklin	1	RI/FS	PRP	05/11/87	1 91	1 91	0
484. 5	WI	Hagen Farm	Stoughton	1	RI/FS	PRP	07/27/87	3 91	3 91	0
485. 5	WI	Hunts Disposal Landfill	Caledonia	1	RI/FS	FE	09/17/87	4 90	4 90	0
486. 5	WI	Janesville Ash Beds	Janesville	1	RI/FS	PRP	09/30/86	4 89	1 90	-1
487. 5	WI	Janesville Old Landfill	Janesville	1	RI/FS	PRP	09/30/86	4 89	1 90	-1
488. 5	WI	Kohler Co. Landfill	Kohler	1	RI/FS	PRP	09/30/85	4 90	1 92	-5
489. 5	WI	Lemberger Landfill, Inc. (once	Whitelaw	1	RI/FS	F	06/30/87	3 90	3 90	0

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		listed as Lemberger Fly Ash Landfill)										
490. 5	WI	Lemberger Transport & Recycling	Franklin Township	1	RI/FS	F	06/30/87	3	90	3	90	0
491. 5	WI	Master Disposal Service Landfill	Brookfield	1	RI/FS	PRP	06/19/86	2	90	4	90	-2
492. 5	WI	Moss-American (Kerr-McGee Oil Co.)	Milwaukee	1	RI/FS	F	09/30/85	3	90	1	91	-2
493. 5	WI	Muskego Sanitary Landfill	Muskego	1	RI/FS	PRP	08/14/87	4	90	4	90	0
494. 5	WI	National Presto Industries, Inc.	Eau Claire	1	RI/FS	PRP	06/04/86	2	90	2	91	-4
				1	RA	PRP	05/05/89			1	95	new
				3	RA	PRP	05/05/89			3	91	new
495. 5	WI	N.W. Mauth Co., Inc.	Appleton	1	RI/FS	S	09/30/88	2	91	2	91	0
496. 5	WI	Oconomowoc Electroplating Co., Inc.	Ashippin	1	RI/FS	F	03/30/87	2	90	2	90	0
497. 5	WI	Onalaska Municpal Landfill	Onalaska	1	RI/FS	F	04/08/88	4	90	4	90	0
498. 5	WI	Schmalz Dump	Harrison	1	RA	F	09/29/88			2	91	DNE
				1	RA	F	09/29/88	2	90	4	90	-2
499. 5	WI	Sheboygan Harbor & River	Sheboygan	1	RI/FS	PRP	04/11/86	4	91	4	91	0
500. 5	WI	Spickler Landfill	Spencer	1	RI/FS	PRP	07/07/88	1	92	1	92	0
501. 5	WI	Stoughton City Landfill	Stoughton	1	RI/FS	PRP	04/15/88	1	91	1	91	0
502. 5	WI	Wheeler Pit	La Prarie Township	1	RI/FS	PRP	11/25/87	3	91	3	91	0
503. 6	AR	Arkwood, Inc.	Omaha	1	RI/FS	PRP	05/15/86	3	90	4	90	0
504. 6	AR	Gurley Pit	Edmondson	1	RA	F	03/29/89			4	91	new
505. 6	AR	Industrial Waste Control	Fort Smith	1	RA	PRP	07/25/89			4	90	new
506. 6	AR	Jacksonville Municipal Landfill	Jacksonville	1	RI/FS	F	04/15/88	4	90	4	90	0
507. 6	AR	Rogers Road Municipal Landfill	Jacksonville	1	RI/FS	F	04/15/88	4	90	4	90	0
508. 6	AR	Vertac, Inc.	Jacksonville	2	RI/FS	F	09/23/83	3	89	4	90	-5
				3	RI/FS	PRP	07/12/89			3	91	new
				4	FS	F	04/19/88	3	89	1	90	-2
				5	RI/FS	PRP	07/12/89			4	90	new

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509. 6	LA	Bayou Bonfouca	Slidell	2	RA	F	06/30/89			2	92	new
510. 6	LA	Bayou Sorrel Site	Bayou Sorrel	1	RA	PRP	07/11/88	3	91	3	91	0
511. 6	LA	Combustion, Inc.	Denham Springs	1	RI/FS	PS	10/25/88			2	92	new
512. 6	LA	Dutchtown Treatment Plant	Ascension Parish	1	RI/FS	PRP	08/07/89			3	91	new
513. 6	LA	Louisiana Army Ammunition Plant	Doyline	1	RA	FF	01/31/89			2	91	new
				2	RI/FS	FF	01/31/89			2	92	new
514. 6	LA	Old Inger Oil Refinery	Darrow	1	RA	S	04/25/86	2	94	2	94	0
515. 6	LA	Petro-Processors of Louisiana, Inc.	Scotlandville	1	RA	PRP	06/30/87	4	91	4	92	-4
516. 6	NM	AT & SF (Clovis)	Clovis	1	RA	PRP	08/07/89			4	92	new
517. 6	NM	Cimarron Mining Corp.	Carrizozo	1	RI/FS	F	03/29/89			2	91	new
518. 6	NM	Prewitt Abandoned Refinery	Prewitt	1	RI/FS	PRP	07/03/89			3	91	new
519. 6	NM	United Nuclear Corp.	Church Rock	1	RA	PRP	09/12/89			3	92	new
520. 6	OK	Compass Industries (Avery Drive) (once listed as Compass Industries)	Tulsa	1	RA	PRP	06/30/89			2	91	new
521. 6	OK	Hardage/Criner (once listed as Criner/ Hardage Waste Disposal)	Criner	2	RI/FS	PRP	02/20/88	2	90	2	90	0
522. 6	OK	Mosley Road Sanitary Landfill	Oklahoma City	1	RI/FS	PRP	07/28/89			1	92	new
523. 6	OK	Oklahoma Refining Corp.	Cyril	1	RI/FS	S	03/31/89			4	91	new
524. 6	OK	Tenth Street Dump/Junkyard	Oklahoma City	1	RI/FS	EP	09/29/88	4	90	4	90	0
525. 6	OK	Tinker Air Force Base (Soldier Creek/Building 3001)	Oklahoma City	1	RI/FS	FF	12/09/88			4	90	new
				2	RI/FS	FF	12/09/88			3	91	new
526. 6	TX	Bio-Ecology Systems, Inc.	Grand Prairie	1	RA	S	05/12/86			4	90	DNE
527. 6	TX	Brio Refining Co., Inc.	Friendswood	1	RA	PRP	06/29/89			4	95	new
528. 6	TX	Crystal Chemical Co.	Houston	1	RI/FS	PRP	04/28/87	3	90	3	90	0

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529. 6	TX	Crystal City Airport	Crystal City	1	RA	S	12/28/88		4 90	new
530. 6	TX	French, Ltd.	Crosby	1	RA	PRP	06/28/89		2 95	new
531. 6	TX	Geneva Industries/Fuhrmann Energy	Houston	1	RA	S	12/18/87	4 90	4 90	0
				1	RA	S	03/31/89		3 91	new
532. 6	TX	Highlands Acid Pit	Highlands	1	RA	S	09/24/84		1 91	DNE
533. 6	TX	Motco, Inc.	La Marque	1	RA	MR	12/30/88		1 94	new
534. 6	TX	Odessa Chromium #1	Odessa	2	RA	S	09/27/89		4 95	new
535. 6	TX	Petro-Chemical Systems, Inc. (Turtle Bayou)	Liberty County	2	RI/FS	S	09/26/88	1 91	1 91	0
536. 6	TX	Rio Grande Oil Refinery	Sour Lake	1	RI/FS	PRP	06/30/89		3 91	new
537. 6	TX	Sikes Disposal Pits	Crosby	1	RA	S	05/04/89		2 97	new
538. 6	TX	Texarkana Wood Preserving Co.	Texarkana	1	RI/FS	S	03/31/87	2 90	4 90	-2
539. 6	TX	Triangle Chemical Co.	Bridge City	1	RA	S	06/26/85		4 90	DNE
540. 6	TX	United Creosoting Co.	Conroe	1	RA	F	04/16/87	4 89	1 90	-1
				1	RA	S	06/28/88	3 90	3 90	0
541. 7	IA	Aidex Corp.	Council Bluffs	1	RA	S	11/29/88		2 90	new
542. 7	IA	Des Moines TCE (once listed as DICO)	Des Moines	1	RA	F	09/30/87	1 90	1 90	0
				1	RA	PRP	09/30/87	4 94	4 94	0
				2	RI/FS	PRP	08/08/89		4 91	new
				3	RI/FS	F	08/24/88	4 90	1 91	-1
543. 7	IA	E.I. Du Pont de Nemours & Co., Inc. (County Road)	West Point	1	RI/FS	PRP	07/03/89		2 91	new
544. 7	IA	Electro-Coatings, Inc.	Cedar Rapids	1	RI/FS	PS	09/29/89		1 91	new
545. 7	IA	Fairfield Coal Gasification Plant	Fairfield	1	RI/FS	PRP	03/31/89		4 90	new
546. 7	IA	Farmers' Mutual Cooperative	Hospers	1	RI/FS	PS	08/01/89		4 90	new
547. 7	IA	John Deere (Ottumwa Works Landfill)	Ottumwa	1	RA	PRP	01/31/88		* *	DNE

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548.	7	IA	Lawrence Todtz Farm	Camanche	1	RA	PRP	09/27/89			4	91	new
549.	7	IA	Lehigh Portland Cement Co.	Mason City	1	RI/FS	PS	06/30/89			1	91	new
550.	7	IA	Midwest Manufacturing/North Farm	Kellogg	2	RI/FS	F	09/23/88	1	90	4	90	-3
551.	7	IA	Northwestern States Portland Cement Co.	Mason City	1	RI/FS	PS	09/29/89			1	91	new
552.	7	IA	Peoples Natural Gas Co.	Dubuque	1	RI/FS	PRP	04/19/89			1	91	new
553.	7	IA	Red Oak City Landfill	Red Oak	1	RI/FS	F	04/24/87	4	89	1	90 *	-1
554.	7	IA	Shaw Avenue Dump	Charles City	1	RI/FS	PRP	05/26/88	4	89	1	91	-5
555.	7	IA	White Farm Equipment Co. Dump	Charles City	1	RI/FS	PRP	04/14/89			4	90	new
556.	7	KS	29th & Mead Ground Water Contamination	Wichita	1	RI/FS	PS	09/25/89			4	91	new
557.	7	KS	Cherokee County (once listed as Tar Creek, Cherokee County)	Cherokee County	1	RA	F	07/13/89			2	91	new
					3	RI/FS	F	03/23/88	1	91	1	92	-4
					4	RI/FS	F	12/17/87	1	91	1	92	-4
558.	7	KS	Pester Refinery Co.	El Dorado	1	RI/FS	S	09/27/89			2	91	new
559.	7	MO	Bee Cee Manufacturing Co.	Malden	1	RI/FS	S	09/30/88	3	90	2	91	-3
560.	7	MO	Conservation Chemical Co.	Kansas City	1	RA	PRP	05/26/89			1	91	new
561.	7	MO	Lake City Army Ammunition Plant (Northwest Lagoon)	Independence	1	RI/FS	FF	03/19/87	1	91	1	91	0
562.	7	MO	Lee Chemical	Liberty	1	RI/FS	PS	12/06/88			4	90	new
563.	7	MO	Minker/Stout/Romaine Creek (once listed as Area 2: Fills 1 and 2)	Imperial	2	RA	F	06/08/88	4	89	1	90	-1
					4	RA	F	05/10/83	3	89	3	89	0
564.	7	MO	Missouri Electric Works	Cape Girardeau	1	RI/FS	PRP	12/31/88			3	90	new
565.	7	MO	North-U Drive Well Contamination	Springfield	1	RI/FS	S	09/27/85	1	91	1	91	0
566.	7	MO	Quality Plating	Sikeston	1	RI/FS	S	12/30/88			2	91	new
567.	7	MO	Shenandoah Stables (once listed as Arena 1: Shenandoah Stables)	Moscow Mills	1	RA	F	08/18/88	2	89	4	89	-2

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568.	7	MO	Times Beach Site	Times Beach	3	RA	F	03/14/83	3	89	4	90	-5
569.	7	MO	Valley Park TCE	Valley Park	1	RI/FS	PS	12/31/87	1	91	2	91	-1
570.	7	MO	Weldon Spring Quarry (USDOE/Army)	St. Charles County	1	RI/FS	FF	08/22/86	3	91	3	91	0
					2	FS	FF	07/15/88	3	90	3	90	0
571.	7	MO	Wheeling Disposal Service Co. Landfill	Amazonia	1	RI/FS	PRP	09/29/88	3	90	3	90	0
572.	7	NE	Hastings Ground Water Contamination	Hastings	0	RI	F	03/12/85	3	99	3	99	0
					1	RI/FS	F	10/15/86	1	91	1	91	0
					2	RI/FS	F	09/26/89			1	91	new
					4	RI/FS	FF	06/15/86	2	90	3	90	-1
					6	FS	F	12/29/88			1	91	new
					10	RI/FS	PRP	09/26/89			1	91	new
					11	RI/FS	F	12/30/88			4	90	new
573.	7	NE	Lindsay Manufacturing Co.	Lindsay	1	RI/FS	PS	12/31/88			4	90	new
574.	7	NE	Waverly Ground Water Contamination	Waverly	1	RI	FF	01/01/89			3	90 *	new
575.	8	CO	Broderick Wood Products	Denver	2	RI/FS	PRP	01/16/89			1	91	new
576.	8	CO	California Gulch	Leadville	1	RA	PRP	09/07/88	2	89	1	90	-3
					2	RI/FS	PRP	04/07/87	3	90	2	92	-7
577.	8	CO	Central City-Clear Creek	Idaho Springs	2	RA	F	03/27/89			2	90	new
					2	RA	F	03/27/89			4	91	new
					3	FS	S	09/01/86	2	91	2	91	0
578.	8	CO	Chemical Sales Co.	Commerce City	1	RI/FS	PRP	09/30/89			2	91	new
					2	RI/FS	F	03/30/89			1	91	new
579.	8	CO	Denver Radium Site	Denver	1	RA	F	03/16/89			3	90	new
					1	RA	F	03/17/89			3	90	new
					2	RA	F	03/31/89			4	90	new
					2	RA	F	03/17/89			4	90	new
					2	RA	F	03/17/89			4	90	new
					3	RA	F	03/17/89			3	90	new
					3	RA	F	03/31/89			1	91	new
					4	RA	F	03/29/88	4	89	3	90	-3
					4	RI/FS	F	03/29/89			1	90	new
					4	RA	F	03/31/89			1	90	new
					5	RA	F	03/31/88	1	90	1	90	0
					5	RA	F	03/31/89			4	90	new

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				6	RA	F	03/31/89			4	90	new
				6	RA	F	03/17/89			3	90	new
				8	FS	FE	06/24/88			4	90	DNE
580. 8	CO	Lowry Landfill	Arapahoe County	1	RI	FE	06/01/87	4	89	4	90	-4
				1	RI/FS	PRP	12/07/87			2	92	DNE
				6	RI/FS	PRP	09/27/89			2	92	new
581. 8	CO	Marshall Landfill	Boulder County	1	RA	PRP	09/16/89			1	90	new
582. 8	CO	Martin-Marietta (Denver Aerospace)	Waterton	1	RI/FS	PRP	06/12/86	2	90	*	*	*
583. 8	CO	Rocky Flats Plant (USDOE)	Golden	1	RI/FS	FF	07/31/86	4	89	4	90	-4
				2	RI	FF	12/31/87			4	90	DNE
584. 8	CO	Rocky Mountain Arsenal	Adams County	1	RA	S	07/01/87	3	89	1	90	-2
				2	RI	FE	10/27/87	3	89	3	90	-4
				3	RI/FS	FF	02/15/85	2	93	2	93	0
				4	RI/FS	FF	02/15/85	3	90	4	91	-5
				8	RA	FF	09/20/88	2	90	2	90	0
				11	RA	FF	07/31/89			2	90	new
				15	RA	FF	06/28/88	4	89	2	90	-2
				16	RI/FS	FF	02/15/85			2	90	DNE
				17	RI/FS	FF	02/15/85			2	90	DNE
585. 8	CO	Smuggler Mountain	Pitkin County	1	FS	F	09/01/89			3	90	new
586. 8	MT	Anaconda Co. Smelter	Anaconda	11	RI/FS	PRP	09/28/88	1	91	2	91	-1
				14	RI/FS	PRP	09/28/88	2	93	2	93	0
587. 8	MT	East Helena Site (once listed as East Helena Smelter)	East Helena	1	RI	PRP	11/15/84	3	89	1	90	-2
				1	FS	PRP	06/23/87	2	91	1	90	5
				2	RI/FS	PRP	06/23/87	2	91	2	91	0
588. 8	MT	Idaho Pole Co.	Bozeman	1	RI/FS	S	09/25/87	1	92	1	92	0
589. 8	MT	Milltown Reservoir Sediments	Milltown	2	RI	S	03/11/85	3	89	3	91	-8
				2	FS	PRP	12/07/87	1	91	3	91	-2
				3	RI/FS	FE	12/07/87	3	91	3	91	0
590. 8	MT	Montana Pole and Treating	Butte	1	RI/FS	S	03/23/88	2	92	2	92	0
				2	RI/FS	S	03/23/88	2	92	2	92	0
				3	RI/FS	S	03/23/88	2	92	2	92	0
591. 8	MT	Silver Bow Creek/Butte Area	Silver Bow/	1	RI/FS	S	09/29/83	2	92	2	92	0

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		(once listed as Silver Bow Creek)	Deer Lodge	2	RI/FS	S	05/27/88	2	92	2	92	0
				3	RI/FS	FE	06/27/88	2	92	2	92	0
				4	RI/FS	S	01/29/87	3	89	2	90	-3
				5	RI/FS	S	05/27/88	2	92	2	92	0
				7	RI/FS	S	09/07/88	1	92	1	92	0
				8	RI/FS	F	03/31/89			1	93	new
592. 8	ND	Arsenic Trioxide Site	Southeastern ND	1	RA	S	08/11/89			1	93	new
				2	RA	S	03/31/89			3	90	new
				2	RA	S	03/09/89			3	90	new
593. 8	SD	Whitewood Creek	Whitewood	1	RI/FS	PRP	12/12/88			1	90	new
594. 8	UT	Hill Air Force Base	Ogden	1	RI/FS	FF	02/14/86	2	92	2	92	0
				2	RI/FS	FF	08/15/87	3	91	3	91	0
				3	RI/FS	FF	02/24/87	2	91	2	91	0
				4	RI/FS	FF	11/13/87	1	92	3	92	-2
				5	RI/FS	FF	03/23/89			1	92	new
595. 8	UT	Midvale Slag	Midvale	1	RI/FS	F	08/07/89			2	91	new
596. 8	UT	Monticello Mill	Monticello	1	RI/FS	FF	12/22/88			4	90	new
597. 8	UT	Monticello Radioactively Contaminated Properties	Monticello	1	RA	PRP	09/06/84	4	89	3	94	-19
598. 8	UT	Ogden Defense Depot	Ogden	1	RI/FS	FF	06/30/86	3	90	3	90	0
				2	RI/FS	FF	06/30/86			3	91	DNE
599. 8	UT	Portland Cement (Kiln Dust 2 & 3)	Salt Lake City	1	RI/FS	PS	11/21/85	4	89	1	90	-1
600. 8	UT	Richardson Flat Tailings	Summit County	1	RI/FS	S	09/29/88	3	91	3	91	0
601. 8	UT	Sharon Steel Corp. (Midvale Tailings)	Midvale	1	RI/FS	FE	12/31/84	4	89	1	90	-1
		(once listed as Sharon Steel Corp. (Midvale Smelter))		2	FS	F	03/28/89			3	90	new
602. 8	UT	Tooele Army Depot (North Area)	Tooele	1	RI/FS	FF	05/01/89			3	91	new
603. 8	UT	Wasatch Chemical Co.	Salt Lake City	1	RI/FS	PS	09/28/88	2	90	4	90	-2
604. 8	WY	Mystery Bridge Rd./U.S. Highway 20	Evansville	1	RI/FS	FE	07/01/88	2	90	2	90	0
605. 9	AZ	Apache Powder Co.	St. David	1	RI/FS	F	06/13/88	2	91	2	92	-4

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606.	9	AZ	Hassayampa Landfill	Hassayampa	1	RI/FS	PRP	02/19/88	4	91	4	91	0
607.	9	AZ	Indian Bend Wash Area	Scottsdale/ Tempe/Phoenix	1	RI/FS	F	02/22/84	2	90	4	90	-2
					3	RI/FS	F	11/29/88			1	92	new
					4	RI/FS	F	02/22/84			4	90	DNE
					5	RI/FS	PRP	02/22/84			4	90	DNE
					6	RI/FS	PRP	07/08/89			4	90	new
608.	9	AZ	Mesa Area Gound Water Contamination	Mesa	1	RI/FS	PRP	10/01/86	3	90	1	90	2
609.	9	AZ	Motorola, Inc. (52nd Street Plant)	Phoenix	2	RI/FS	PS	06/20/89			3	91	new
610.	9	AZ	Phoenix-Goodyear Airport (once listed as Litchfield Airport Area)	Goodyear/Avondale	2	RA	PRP	02/22/89			4	90	new
611.	9	CA	Advanced Micro Devices (Building 915)	Sunnyvale	1	RI/FS	PS	05/17/89			2	91	new
612.	9	CA	Advanced Micro Devices, Inc.	Sunnyvale	1	RI/FS	PS	04/19/89			2	91	new
613.	9	CA	Aerojet General Corp.	Rancho Cordova	1	RI/FS	PRP	09/08/88	4	94	4	94	0
614.	9	CA	Applied Materials	Santa Clara	1	RI/FS	PS	10/01/83	4	89	4	90 *	-4
615.	9	CA	Atlas Asbestos Mine	Fresno County	1	RI/FS	F	09/21/84	4	89	3	90	-3
616.	9	CA	Castle Air Force Base	Merced	1	RI/FS	FF	07/21/89			1	92	new
					2	RI/FS	FF	07/21/89			1	91	new
617.	9	CA	Coalinga Asbestos Mine	Coalinga	1	RI/FS	PRP	11/16/87	4	89	1	90	-1
618.	9	CA	CTS Printex, Inc.	Mountain View	1	RI/FS	PS	04/19/89			2	91	new
619.	9	CA	Del Norte Pesticide Storage	Crescent City	1	RA	F	09/26/89			2	90	new
620.	9	CA	Fairchild Semiconductor Corp. (South San Jose Plant) (once listed as Fairchild Camera & Instrument Corp. (San Jose Plant))	South San Jose	1	RA	PS	03/20/89			1	96	new
621.	9	CA	FMC Corp. (Fresno Plant)	Fresno	1	RI/FS	PRP	02/05/87	1	91	*	*	*
622.	9	CA	Hewlett-Packard	Palo Alto	1	RI/FS	PS	05/18/89			1	96	new
623.	9	CA	Intel Corp. (Santa Clara III)	Santa Clara	1	RI/FS	PS	04/19/89			1	91	new
624.	9	CA	Intersil Inc./Siemens Components	Cupertino	1	RI/FS	PS	03/16/89			4	90	new

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625. 9	CA	Iron Mountain Mine	Redding	1	RA	F	06/06/88	3 89	3 90 *	-4
				1	RA	F	03/29/89		2 91	new
				1	RA	F	09/15/89		1 92 *	new
				2	RI/FS	F	03/28/87	2 93	2 93	0
626. 9	CA	J.H. Baxter & Co.	Weed	1	RI/FS	F	03/14/87	3 90	4 90	-1
627. 9	CA	Jasco Chemical Corp.	Mountain View	1	RI/FS	PRP	12/21/88		3 91	new
628. 9	CA	Lawrence Livermore National Laboratory (USDOE)	Livermore	1	RI/FS	FF	11/02/88		3 91	new
629. 9	CA	Liquid Gold Oil Corp.	Richmond	1	RI/FS	PS	09/20/83	1 91	1 91	0
630. 9	CA	Lorentz Barrel & Drum Co.	San Jose	1	RI/FS	F	02/17/88	3 90	3 90	0
631. 9	CA	Louisiana-Pacific Corp.	Oroville	1	RI/FS	F	11/15/86	2 90	4 90	-2
				1	RI	PRP	02/08/88	2 90	3 90	-1
632. 9	CA	Mather Air Force Base (AC & W Disposal Site)	Sacramento	1	RI/FS	FF	07/21/89		4 92	new
633. 9	CA	McClellan Air Force Base (Ground Water Contamination)	Sacramento	1	RI/FS	FF	07/21/89		2 96	new
				2	RI/FS	FF	07/21/89		1 91	new
				4	RI/FS	FF	07/21/89		2 96	new
634. 9	CA	McColl	Fullerton	1	RA	S	06/11/84	2 90	2 90	0
				2	RI/FS	F	02/03/86	4 89	4 90	-4
635. 9	CA	Micro Storage/Intel*		1	RI/FS	PS	05/17/89		3 91	new
636. 9	CA	Moffett Naval Air Station	Sunnyvale	1	RI/FS	FF	08/08/89		2 93	new
637. 9	CA	Monolithic Memories	Sunnyvale	1	RI/FS	PS	04/19/89		2 91	new
638. 9	CA	Montrose Chemical Corp.	Torrance	1	RI/FS	PRP	10/10/86	2 91	2 92	-4
639. 9	CA	National Semiconductor Corp.	Santa Clara	1	RI/FS	PS	04/19/89		2 91	new
640. 9	CA	Norton Air Force Base	San Bernardino	1	RI/FS	FF	06/29/89		4 95	new
				2	RI/FS	FF	06/29/89		4 91	new
				3	RI/FS	FF	06/29/89		4 91	new
				4	RI/FS	FF	06/29/89		4 94	new
641. 9	CA	Operating Industries, Inc. Landfill	Monterey Park	1	RI/FS	F	09/15/89		4 93 *	new

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					1	RI	FE	04/10/86			2	90 *	DNE
					4	RA	PRP	05/11/89			4	94 *	new
642.	9	CA	Purity Oil Sales, Inc.	Malaga	2	FS	F	06/23/89			4	90	new
643.	9	CA	Rhone-Poulenc, Inc./Zoecon Corp. (once listed as Zoecon Corp./Rhone-Poulenc, Inc.)	East Palo Alto	1	RI/FS	PS	08/27/87	4	90	*	*	*
644.	9	CA	Sacramento Army Depot	Sacramento	1	RI/FS	FF	12/16/88			4	91	new
					3	RI/FS	FF	12/16/88			4	91	new
					4	RI/FS	FF	12/16/88			4	91	new
645.	9	CA	San Fernando Valley (Area 1)	Los Angeles	1	RI/FS	S	08/16/85	4	92	3	93	-3
					2	RA	S	08/06/87	2	89	1	91 *	-7
646.	9	CA	San Fernando Valley (Area 2)	Los Angeles/Glendale	1	RI/FS	S	08/16/85	4	92	3	93	-3
647.	9	CA	San Fernando Valley (Area 3)	Glendale	1	RI/FS	S	07/20/87	4	92	3	93	-3
648.	9	CA	San Fernando Valley (Area 4)	Los Angeles	1	RI/FS	S	07/20/87	4	92	3	93	-3
649.	9	CA	San Gabriel Valley (Area 1)	El Monte	1	RI/FS	F	03/22/84	4	93	4	93	0
					1	RI/FS	S	09/30/85	4	93	4	93	0
					2	RI/FS	F	04/01/87	2	90	3	90	-1
650.	9	CA	San Gabriel Valley (Area 2)	Baldwin Park Area	1	RI/FS	F	03/22/84	4	93	4	93	0
					3	RI/FS	F	08/01/87	4	90	2	91	-2
					5	RI/FS	F	04/01/87	2	90	3	90	-1
651.	9	CA	San Gabriel Valley (Area 3)	Alhambra	1	RI/FS	F	03/22/84	4	93	4	93	0
652.	9	CA	San Gabriel Valley (Area 4)	La Puente	1	RI/FS	F	03/22/84	4	93	4	93	0
					3	RI/FS	F	04/01/87	2	90	3	90	-1
653.	9	CA	Sharpe Army Depot	Lathrop	1	RI/FS	FF	03/16/89			2	93	new
					2	RI/FS	FF	03/16/89			2	92	new
654.	9	CA	Signetics, Inc.	Sunnyvale	1	RI/FS	PS	04/19/89			*	*	new
655.	9	CA	Solvent Service, Inc.	San Jose	1	RI/FS	PS	04/20/89			3	90	new
656.	9	CA	Southern California Edison Co. (Visalia Poleyard)	Visalia	1	RI/FS	PS	12/18/87	1	91	1	91	0
657.	9	CA	Southern Pacific Transportation	Roseville	1	RI/FS	PRP	12/21/87	4	91	*	*	*

APPENDIX A

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES, AND REMEDIAL ACTIONS IN PROGRESS ON SEPTEMBER 30, 1989

RG	ST	SITE NAME	LOCATION	OPER-ABLE UNIT	ACTIVITY	LEAD	FUNDING START	PREVIOUS COMPLETION SCHEDULE		PRESENT COMPLETION SCHEDULE		STATUS
658. 9	CA	Spectra-Physics, Inc.	Mountain View	1	RI/FS	PS	01/18/89			3	91	new
659. 9	CA	Stringfellow	Glen Avon Heights	1	RI/FS	S	08/07/84	3	89	3	91	-8
				4	RA	PRP	05/27/88	2	90	2	90	0
				4	RA	S	04/06/87			3	90	DNE
				5	RI/FS	S	08/07/84	2	89	2	90	-4
660. 9	CA	Synertek, Inc. (Building 1)	Santa Clara	1	RI/FS	PS	06/21/89			3	91	new
661. 9	CA	T.H. Agriculture & Nutrition Co. (once listed as Thompson-Haywood Chemical Co.)	Fresno	1	RI/FS	PS	02/06/87	2	91	2	91	0
662. 9	CA	Teledyne Semiconductor	Mountain View	1	RI/FS	PS	01/19/89			3	91	new
663. 9	CA	TRW Microwave, Inc. (Building 825)	Turlock	1	RI/FS	PS	04/19/89			2	91	new
664. 9	CA	Van Waters & Rogers, Inc.	San Jose	1	RI/FS	PS	01/20/89			*	*	new
665. 9	CA	Waste Disposal, Inc.	Santa Fe Springs	1	RI/FS	F	02/02/88	3	90	4	90	-1
666. 9	CA	Watkins-Johnson Co. (Stewart Divison)	Scotts Valley	1	RI/FS	PRP	09/22/87	2	90	3	90	-1
667. 9	CA	Westinghouse Electric Corp. (Sunnyvale Plant)	Sunnyvale	1	RI/FS	PRP	08/24/88	2	91	2	91	0
668.10	ID	Arrcom (Drexler Enterprises)	Rathdrum	1	RI/FS	PRP	05/01/87	2	90	1	91	-3
669.10	ID	Bunker Hill Mining & Metallurgical	Smelterville	1	RI/FS	S	01/02/85	1	92	1	92	0
				2	RI/FS	PRP	05/13/87	2	93	2	93	0
670.10	ID	Pacific Hide and Fur Recycling Co.	Pocatello	1	RA	PRP	09/22/89			4	91	new
671.10	ID	Union Pacific Railroad Co.	Pocatello	1	RI/FS	PRP	06/21/88	3	90	3	90	0
672.10	OR	Allied Plating, Inc.	Portland	1	RI/FS	F	09/24/87	4	91	4	91	0
673.10	OR	Joseph Forests Products	Joseph	1	RI/FS	F	09/21/89			3	92	new
674.10	OR	Martin-Marietta Products	The Dalles	1	RA	PRP	09/05/89			1	90	new
675.10	OR	Teledyne Wah Chang	Albany	1	RI/FS	PRP	05/05/87	4	91	4	91	0
				2	RI/FS	PRP	05/05/87	4	89	1	90	-1
676.10	OR	United Chrome Products, Inc.	Corvallis	1	RA	F	09/24/87	3	89	1	91	-6

APPENDIX A

STATUS OF REMEDIAL INVESTIGATIONS, FEASIBILITY STUDIES,
AND REMEDIAL ACTIONS IN PROGRESS ON SEPTEMBER 30, 1989

RG	ST	SITE NAME	LOCATION	OPER-ABLE UNIT	ACTIVITY	LEAD	FUNDING START	PREVIOUS COMPLETION SCHEDULE		PRESENT COMPLETION SCHEDULE		STATUS
677.10	WA	American Crossarm & Conduit Co.	Chehalis	1	RI/FS	F	07/12/89			3	91	new
678.10	WA	American Lake Gardens	Tacoma	1	RI/FS	FF	09/21/89			4	90	new
679.10	WA	Colbert Landfill	Colbert	1	RA	MR	08/28/89			4	93	new
680.10	WA	Commencement Bay, Near Shore/Tide Flats	Pierce County	2	RI/FS	PRP	09/10/86	4	89	4	90 *	-4
				4	RI/FS	F	09/27/89			1	91	new
				5	RA	PS	09/30/89			3	90 *	new
681.10	WA	Commencement Bay, South Tacoma Channel	Tacoma	2	RI/FS	PRP	01/22/87	2	91	2	92	-4
682.10	WA	FMC Corp. (Yakima Pit)	Yakima	1	RI/FS	PRP	07/31/87	3	90	3	90	0
683.10	WA	Fort Lewis (Landfill No.5)	Tacoma	1	RI/FS	FF	02/06/89			4	90	new
684.10	WA	Fort Lewis Logistics Center	Tillicum	1	RI/FS	FF	04/23/87			1	90	DNE
685.10	WA	Hanford 100-Area (USDOE)	Benton County	1	RI/FS	FF	06/30/89			2	93	new
				2	RI/FS	FF	06/30/89			2	93	new
686.10	WA	Hanford 1100-Area (USDOE)	Benton County	1	RI/FS	FF	01/31/89			3	92	new
687.10	WA	Hanford 200-Area (USDOE)	Benton County	1	RI/FS	FF	02/28/89			2	94	new
688.10	WA	Hanford 300-Area (USDOE)	Benton County	1	RI/FS	FF	03/31/89			1	93	new
689.10	WA	Harbor Island (Lead)	Seattle	1	RI/FS	F	09/07/88	1	92	1	92	0
690.10	WA	Lakewood Site	Lakewood	1	RA	F	09/24/87	4	89	4	90	-4
691.10	WA	McChord Air Force Base (Wash Rack/Treatment Area)	Tacoma	2	RI/FS	FF	09/21/89			4	91	new
692.10	WA	Queen City Farms	Maple Valley	1	RI/FS	PRP	05/06/88	4	91	4	91	0
693.10	WA	Silver Mountain Mine	Loomis	1	RI/FS	F	09/21/87	4	89	2	90	-2
694.10	WA	Western Processing Co., Inc.	Kent	2	RA	PRP	07/06/87	4	89	4	90 *	-4
695.10	WA	Wycoff Co./Eagle Harbor	Bainbridge Island	1	RI/FS	F	09/03/87	2	90	4	90	-2
696.10	WA	Yakima Plating Co.	Yakima	1	RI/FS	F	06/07/89			4	91	new

APPENDIX

B

Remedial Designs in Progress on September 30, 1989

This appendix lists the remedial designs (RDs) in progress at the end of FY89 and their estimated completion schedule. Activities at multiple operable units, as well as first and subsequent activities, are listed.

- **Region** -- EPA region in which the site is located.

- **State** -- State in which the site is located.

- **Site Name** -- Name of the site, as listed on the *NPL, Supplementary Lists and Supporting Materials*, June 1988 and October 1989, OERR.

- **Location** -- Location of the site, as listed on the NPL.

- **Operable Unit** -- Operable unit at which the corresponding remedial activity is occurring.

- **Lead** -- The entity leading the activity, as follows:

  EP: Fund-financed with EPA employees performing the project, not contractors;

  F: Fund-financed and federal-lead by the Superfund remedial program;

  FE: EPA Enforcement program-lead;

  FF: Federal Facility-lead;

  MR: Mixed funding; monies from both the Fund and PRPs;

  PRP: PRP-financed and conducted;

  PS: PRP-financed work performed by the PRP under a state order (may include federal financing or federal oversight under an enforcement document);

  S: State-lead and Fund-financed; and

  SE: State enforcement-lead (may include federal financing).

  O (Other), SN (State-lead and -financed, no Fund money), and SR (State-ordered PRP response) activities are excluded from this status report because they do not include federal financing.

- **Funding Start** -- The date on which funds were allocated for the activity.

- **Present Quarter Estimated Completion** -- The quarter of the planned completion date for the activity, as of 9/30/89. CERCLIS compiled this information on October 20, 1989. To complete some gaps in the data, CERCLIS compiled additional planned completion dates on April 3, 1990, and April 6, 1990. An asterick (*) next to the completion date indicates that the date was taken from the later date. Some activities were not updated in the April 6, 1990 data, so a few activities with estimated completion dates in FY89 or earlier still remain.

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APPENDIX B

STATUS OF REMEDIAL DESIGNS IN PROGRESS ON SEPTEMBER 30, 1989

	RG	ST	SITE NAME	LOCATION	OPER-ABLE UNIT	LEAD	FUNDING START	PRESENT COMPLETION SCHEDULE
1.	1	CT	Yaworski Waste Lagoon	Canterbury	1	PRP	09/27/89	2 90
2.	1	MA	Baird & McGuire	Holbrook	1	F	05/06/87	3 90
3.	1	MA	Cannon Engineering Corp. (CEC)	Bridgewater	1	PRP	10/18/88	2 90 *
4.	1	MA	Charles George Reclamation Trust Landfill	Tyngsborough	3 4	F F	09/30/88 09/30/88	2 90 4 90
5.	1	MA	Hocomonco Pond	Westborough	1	PRP	08/07/87	2 91
6.	1	MA	Industri-Plex (once listed as Mark Phillip Trust)	Woburn	1	PRP	09/22/88	2 91
7.	1	MA	Iron Horse Park	Billerica	1 1	F PRP	09/25/89 09/27/89	3 90
8.	1	MA	Re-Solve, Inc.	Dartmouth	2	MR	03/30/89	2 91
9.	1	MA	Rose Disposal Pit	Lanesboro	1	PRP	08/16/89	4 90
10.	1	ME	McKin Co.	Gray	2	PRP	11/05/89	2 90
11.	1	ME	Pinette's Salvage Yard	Washburn	1	F	08/30/89	4 90
12.	1	ME	Saco Tannery Waste Pits	Saco	1	F	09/29/89	4 91
13.	1	ME	Winthrop Landfill	Winthrop	2	PRP	08/18/89	2 91
14.	1	NH	Keefe Environmental Services (once listed as KES)	Epping	2	S	08/01/88	2 90
15.	1	NH	Ottati & Goss/Kingston Steel Drum (once listed as Ottati & Goss)	Kingston	2	PRP	03/15/89	4 90
16.	1	NH	Tinkham Garage	Londonderry	1	PRP	09/23/88	4 90
17.	1	RI	Davis Liquid Waste	Smithfield	2	F	07/11/86	4 91
18.	1	VT	Old Springfield Landfill	Springfield	1	PRP	09/29/89	2 91
19.	2	NJ	Bog Creek Farm	Howell Township	2	F	09/05/89	3 90

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	RG	ST	SITE NAME	LOCATION	OPER-ABLE UNIT	LEAD	FUNDING START	PRESENT COMPLETION SCHEDULE
20.	2	NJ	Burnt Fly Bog	Marlboro Township	2	F	09/29/89	2 90
21.	2	NJ	Caldwell Trucking Co.	Fairfield	1	F	04/22/87	4 90
					1	F	04/22/87	2 90
22.	2	NJ	Chemical Control	Elizabeth	2	F	05/11/88	4 90
23.	2	NJ	Ciba-Geigy Corp. (once listed as Toms River Chemical)	Toms River	1	PRP	06/01/89	1 91
24.	2	NJ	Combe Fill South Landfill	Chester Township	1	S	06/26/87	2 90
					1	S	06/26/87	1 91
25.	2	NJ	D'Imperio Property	Hamilton Township	1	F	04/04/86	3 90
26.	2	NJ	Florence Land Recontouring Landfill	Florence Township	1	S	03/31/87	1 90
27.	2	NJ	GEMS Landfill	Gloucester Township	1	S	05/22/86	3 90
28.	2	NJ	Glen Ridge Radium Site	Glen Ridge	1	F	05/25/89	3 92
					1	F	12/09/87	1 90
29.	2	NJ	Goose Farm	Plumstead Township	1	PRP	01/09/88	3 90
30.	2	NJ	Kin-Buc Landfill	Edison Township	1	PRP	09/30/88	1 91
31.	2	NJ	Lang Property	Pemberton Township	1	F	03/20/87	3 90
32.	2	NJ	Lipari Landfill	Pitman	3	F	09/29/88	4 90
33.	2	NJ	Metalic/Aerosystems	Franklin Borough	1	F	01/06/88	2 90
34.	2	NJ	Montclair/West Orange Radium Site	Montclair/West Orange	1	F	05/25/89	3 92
					1	F	12/09/87	1 90
35.	2	NJ	Montgomery Township Housing Development	Montgomery Township	2	S	03/24/89	1 91
36.	2	NJ	Nascolite Corp.	Millville	1	F	08/03/88	4 90
37.	2	NJ	Price Landfill	Pleasantville	2	PS	06/26/87	3 90
38.	2	NJ	Rocky Hill Municipal Well	Rocky Hill Borough	1	S	03/24/89	1 91

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STATUS OF REMEDIAL DESIGNS IN PROGRESS ON SEPTEMBER 30, 1989

	RG	ST	SITE NAME	LOCATION	OPER-ABLE UNIT	LEAD	FUNDING START	PRESENT COMPLETION SCHEDULE
39.	2	NJ	Sharkey Landfill	Parsippany/Troy Hills	1	S	03/31/87	2 90
40.	2	NJ	Tabernacle Drum Dump	Tabernacle Township	1	F	09/30/88	1 90
41.	2	NJ	Vineland Chemical Co., Inc.	Vineland	1	F	09/30/89	1 92 *
42.	2	NJ	Waldick Aerospace Devices, Inc.	Wall Township	1	F	01/13/88	3 90
43.	2	NJ	Williams Property	Swaintown	1	S	09/30/88	1 91
44.	2	NY	American Thermostat Co.	South Cairo	1	F	04/14/88	1 91
45.	2	NY	Brewster Wellfield	Putnam County	2	F	09/29/88	1 90
46.	2	NY	Byron Barrel & Drum	Byron	1	F	09/30/89	2 92
47.	2	NY	Clothier Disposal	Town of Granby	1	PRP	03/28/89	2 90
48.	2	NY	Haviland Complex	Town of Hyde Park	1	F	04/29/88	2 90
49.	2	NY	Hooker Chemical (S Area)	Niagra Falls	1	PRP	12/01/86	3 90
50.	2	NY	Hudson River PCBs	Hudson River	1	S	09/28/84	1 91 *
					1	PRP	05/18/89	3 90
51.	2	NY	Katonah Municipal Well	Town of Bedford	1	PRP	06/15/88	1 90
52.	2	NY	Love Canal	Niagra Falls	2	S	06/28/85	1 90
					5	S	12/31/87	1 90
					5	PRP	06/01/89	1 91
					6	S	09/30/88	2 90
53.	2	NY	Ludlow Sand & Gravel	Clayville	1	F	03/31/89	1 91
54.	2	NY	Marathon Battery Corp.	Cold Springs	1	F	06/26/87	3 90
					1	F	06/26/87	4 89
					2	F	09/30/89	4 90
					3	F	09/30/88	1 91
					3	F	09/30/88	4 90
					3	PRP	03/26/89	4 89

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	RG	ST	SITE NAME	LOCATION	OPER-ABLE UNIT	LEAD	FUNDING START	PRESENT COMPLETION SCHEDULE
55.	2	NY	Old Bethpage Landfill	Oyster Bay	1	PS	11/15/88	1 90
56.	2	NY	Sinclair Refinery	Wellsville	1	PRP	10/01/88	1 90
					1	PRP	07/28/88	1 90
57.	2	NY	SMS Instuments, Inc.	Deer Park	1	F	09/30/89	3 91
58.	2	NY	York Oil Co.	Moira	1	F	09/29/88	1 90
59.	2	PR	GE Wiring Devices	Juan Diaz	1	PRP	09/30/88	4 91
60.	2	PR	Upjohn Facility	Barceloneta	1	PRP	05/09/89	3 90
61.	2	PR	Vega Alta Public Supply Wells	Vega Alta	1	PRP	04/27/89	3 90
62.	3	DE	Delaware Sand & Gravel Landfill (once listed as Deleware Sand & Gravel - Llangollen Army Creek Landfills)	New Castle County	1	PRP	08/26/88	2 90
63.	3	DE	Harvey & Knott Drum, Inc.	Kirkwood	2	PRP	09/14/87	4 90
64.	3	DE	Tybouts Corner Landfill	Smyrna	1	PRP	04/19/89	4 91
65.	3	DE	Wildcat Landfill	Dover	1	PRP	10/11/88	3 90
					2	PRP	10/11/88	3 90
66.	3	MD	Sand, Gravel & Stone	Elkton	1	PRP	01/05/89	4 92
					1	PRP	02/03/89	1 90
67.	3	MD	Southern Maryland Wood Treating	Hollywood	1	F	09/22/88	4 90
68.	3	PA	Ambler Asbestos Piles	Ambler	1	PRP	07/20/89	2 90
69.	3	PA	Berks Sand Pit	Longswamp Township	1	F	12/19/88	3 90
70.	3	PA	Bolenski Landfill	West Caln Township	1	F	03/24/87	1 90
					1	F	12/13/88	2 91 *
71.	3	PA	Croydon TCE	Croydon	1	F	03/01/89	3 89
72.	3	PA	Douglassville Disposal	Douglassville	3	F	09/27/89	3 91

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STATUS OF REMEDIAL DESIGNS IN PROGRESS ON SEPTEMBER 30, 1989

	RG	ST	SITE NAME	LOCATION	OPER-ABLE UNIT	LEAD	FUNDING START	PRESENT COMPLETION SCHEDULE
73.	3	PA	Drake Chemical	Lock Haven	3	F	12/21/88	3 90
74.	3	PA	Heblinka Auto Savage Yard	Weisenberg Township	1	F	05/05/89	2 90
75.	3	PA	Heleva LAndfill	North Whitehall Twp	1	F	09/28/88	2 90
76.	3	PA	Henderson Road Site	Upper Merion Township	1	PRP	02/27/89	4 91
77.	3	PA	McAdoo Associates	McAdoo Borough	1 1	PRP PRP	06/03/88 10/01/88	1 90 4 90
78.	3	PA	Mill Creek Dump	Erie	1	F	03/23/87	1 90
79.	3	PA	Moyers Landfill	Eagleville	1	F	03/23/87	3 88
80.	3	PA	Palmerton Zinc Pile	Palmerton	2 2	FE PRP	11/02/88 04/18/89	4 90 4 90
81.	3	PA	Publicker Industries, Inc.	Philadelphia	1	F	09/26/89	3 89
82.	3	PA	Raymark	Hatboro	2	PRP	01/26/89	1 90
83.	3	PA	Stratsburg Landfill	Newlin Township	2	F	07/17/89	4 89
84.	3	PA	Whitmoyer Laboratories	Jackson Township	2	F	08/01/89	1 90
85.	3	VA	Avtex Fibers, Inc.	Front Royal	1	PRP	08/26/89	1 92
86.	3	VA	L.A. Clarke & Son	Spotsylvania County	1	PRP	09/30/89	3 90
87.	3	VA	Saltville Waste Disposal Ponds	Saltville	1	PRP	07/27/88	3 91
88.	3	WV	West Virginia Ordnance	Point Pleasant	2	PRP	09/30/88	4 89
89.	4	AL	Alabama Army Ammunition Plant	Childersburg	1	FF	02/28/86	1 92 *
90.	4	AL	Anniston Army Depot (Southeast Industrial Area)	Anniston	2	FF	06/30/87	* *
91.	4	AL	Ciba-Geigy Corp. (McIntosh Plant)	McIntosh	1	PRP	09/28/89	3 91
92.	4	AL	Perdido Ground Water Contamination	Perdido	1	PRP	06/20/89	4 90 *

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STATUS OF REMEDIAL DESIGNS IN PROGRESS ON SEPTEMBER 30, 1989

	RG	ST	SITE NAME	LOCATION	OPER-ABLE UNIT	LEAD	FUNDING START	PRESENT COMPLETION SCHEDULE	
93.	4	AL	Stauffer Chemical Co. (Cold Creek Plant)	Bucks	1	PRP	09/27/89	1	91
94.	4	FL	American Creosote Works, Inc. (Pensacola Plant) (once listed as American Creosote Works)	Pensacola	1	F	09/25/89	3	90
95.	4	FL	Gold Coast Oil Corp.	Miami	1	PRP	07/03/89	1	90
96.	4	FL	Hipps Road Landfill	Duval County	1	PRP	07/15/88	2	90
97.	4	FL	Northwest 58th Street Landfill (once listed as part of Biscayne Aquifer)	Hialeah	1	PRP	04/19/88	3	90
98.	4	FL	Pioneer Sand Co.	Warrington	1	PRP	07/08/88	3	90
99.	4	FL	Pratt & Whitney Aircraft/United Technologies Corp.	West Palm Beach	1	SE	04/26/85	*	*
100.	4	FL	Sapp Battery Salvage	Cottondale	1	F	04/30/87	3	90
101.	4	FL	Tower Chemical Co.	Clermont	1	F	11/20/87	1	90
102.	4	FL	Whitehouse Oil Pits	Whitehouse	1	F	06/26/85	4	90
103.	4	FL	Zellwood Ground Water Contamination	Zellwood	1	F	09/30/89	4	90
104.	4	GA	Powersville Site	Peach County	1	PRP	12/02/88	1	91
105.	4	KY	Airco	Calvert City	1	PRP	01/05/89	2	90
106.	4	KY	B.F. Goodrich	Calvert City	1	PRP	01/05/89	2	90
107.	4	MS	Flowood Site	Flowood	1	PRP	08/22/89	3	90
108.	4	MS	Newson Brothers/Old Reichhold Chemicals, Inc.	Columbia	1	F	05/12/89	3	91
109.	4	NC	Cape Fear Wood Preserving	Fayetteville	1	F	09/08/89	3	90
110.	4	NC	Celanese Corp. (Shelby Fiber Operations)	Shelby	2	PRP	06/19/89	2	90
111.	4	NC	Chemtronics, Inc.	Swannanoa	1	PRP	03/23/89	3	90
112.	4	NC	National Starch & Chemical Corp.	Salisbury	1	PRP	07/27/89	2	90

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	RG	ST	SITE NAME	LOCATION	OPER-ABLE UNIT	LEAD	FUNDING START	PRESENT COMPLETION SCHEDULE
113.	4	SC	Geiger (C & M Oil)	Rantoules	1	F	04/19/88	3 88
114.	4	SC	Palmetto Wood Preserving	Dixiana	2	F	02/08/89	2 90
115.	4	SC	Wamchem, Inc.	Burton	1	PRP	01/31/89	2 90
116.	4	TN	American Creosote Works, Inc. (Jackson Plant) (once listed as Am,erican Creosote Works)	Jackson	1	F	06/29/89	1 90
117.	4	TN	Amnicola Dump	Chattanooga	1	EP	09/25/89	1 90
118.	5	IL	Belvidere Municipal Landfill	Belvidere	1	PRP	12/05/88	2 90
119.	5	IL	Byron Salvage Yard	Byron	1	F	09/26/89	1 91
120.	5	IL	LaSalle Electical Utilities	LaSalle	2	S	03/31/88	4 90
121.	5	IL	Outboard Marine Corp.	Waukegan	1	PRP	04/28/89	3 90
122.	5	IL	Velsicol Chemical (Illinois)	Marshall	1	PRP	01/23/89	3 90
123.	5	IN	Envirochem Corp.	Zionsville	1	FE	9/25/89	3 91 *
124.	5	IN	Fort Wayne Reduction Dump	Fort Wayne	1	PRP	12/28/88	2 90
125.	5	IN	Neal's Dump (Spencer)	Spencer	1	PRP	08/22/85	3 93
126.	5	IN	Ninth Avenue Dump	Gary	1 2	PRP F	01/13/89 09/20/89	3 90 3 91
127.	5	IN	Northside Sanitary Landfill, Inc.	Zionsville	1	FE	07/12/88	4 90
128.	5	IN	Seymour Recycling Corp.	Seymour	2	PRP	09/08/89	2 90
129.	5	MI	Cliff/Dow Dump	Marquette	1	F	09/27/89	2 91
130.	5	MI	Forest Waste Products	Otisville	2 2	F F	09/14/88 06/27/88	3 90 3 91 *
131.	5	MI	Liquid Disposal, Inc.	Utica	1	PRP	08/18/89	2 91
132.	5	MI	Mason County Landfill	Pere Marquette Twp	1	PRP	06/27/89	3 90

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APPENDIX B

STATUS OF REMEDIAL DESIGNS IN PROGRESS ON SEPTEMBER 30, 1989

	RG	ST	SITE NAME	LOCATION	OPER-ABLE UNIT	LEAD	FUNDING START	PRESENT COMPLETION SCHEDULE
133.	5	MI	Novaco Industries	Temperance	1	F	03/16/87	1 90
134.	5	MI	Rose Township Dump	Rose Township	1	PRP	07/18/89	4 91
135.	5	MI	U.S. Aviex	Howard Township	1	F	09/30/88	3 90
136.	5	MN	Arrowhead Refinery Co.	Hermantown	1	S	09/30/88	2 91
137.	5	MN	Kummer Sanitary Landfill	Bemidji	2	S	12/30/88	2 90
138.	5	MN	Long Prairie Ground Water Contamination	Long Prairie	1	S	09/19/88	3 90
139.	5	MN	Oak Grove Sanitary Landfill	Oak Grove Township	1	S	12/30/88	2 90 *
140.	5	MN	South Andover Site (once listed as Andover Sites)	Andover	1 1	S F	06/30/88 05/23/89	1 91 1 91
141.	5	OH	Allied Chemical & Ironton Coke	Ironton	1	PRP	03/09/89	1 91
142.	5	OH	Arcanum Iron & Metal	Drake County	1	F	03/20/87	1 91
143.	5	OH	Bowers Landfill	Circleville	1	F	09/29/89	1 91
144.	5	OH	Fields Brook	Ashtabula	1	PRP	03/22/89	3 91
145.	5	OH	Industrial Excess Landfill	Uniontown	1	F	09/29/89	1 92
146.	5	OH	Laskin/Poplar oil Co. (once listed as Poplar Oil Co.)	Jefferson Township	2	PRP	02/26/88	2 90
147.	5	OH	Pristine, Inc.	Reading	1	PRP	07/31/89	4 91
148.	5	OH	United Scrap Lead Co., Inc.	Troy	1	F	03/30/89	1 91
149.	5	WI	Eau Claire Municipal Well Field	Eau Claire	1 1	F F	09/26/89 09/29/89	4 91 * 1 90 *
150.	5	WI	Mid-State Disposal, Inc. Landfill	Cleveland Township	1	PRP	08/11/89	1 91
151.	5	WI	Schmalz Dump	Harrison	1	F	01/25/88	3 90

APPENDIX B

STATUS OF REMEDIAL DESIGNS IN PROGRESS ON SEPTEMBER 30, 1989

	RG	ST	SITE NAME	LOCATION	OPER-ABLE UNIT	LEAD	FUNDING START	PRESENT COMPLETION SCHEDULE
152.	5	WI	Wausau Ground Water Contamination	Wausau	1	PRP	05/02/89	1 90
153.	6	AR	Midland Products	Ola/Birta	1	S	06/30/88	2 90
154.	6	LA	Bayou Bonfouca	Slidell	2	F	06/23/87	1 91
155.	6	NM	South Valley	Albuquerque	2	PRP	09/01/89	4 90
					3	PRP	08/15/89	2 90
					5	PRP	09/01/89	2 91
156.	6	OK	Sand Springs Petrochemical Complex	Sand Springs	1	PRP	10/03/88	1 90
157.	6	TX	Bailey Waste Disposal	Bridge City	1	MR	03/31/89	2 91
158.	6	TX	Brio Refining, Inc.	Friendswood	1	PRP	06/29/89	4 91
159.	6	TX	Dixie Oil Processors, Inc.	Friendswood	1	PRP	06/30/89	4 91
160.	6	TX	French, Ltd.	Crosby	1	PRP	12/09/88	3 90
161.	6	TX	North Calvacade Street	Houston	1	S	09/22/88	2 91
162.	6	TX	Odessa Chromium #1	Odessa	2	S	08/30/88	1 90
163.	6	TX	Pesses Chemical Co.	Fort Worth	1	S	06/30/89	2 90
164.	6	TX	Sol Lynn/Industrial Transformers	Houston	1	PRP	03/31/89	4 90
					2	S	03/31/89	4 90
165.	7	IA	Lawrence Todtz Farm	Camanche	1	PRP	01/06/89	1 90
166.	7	KS	Arkansas City Dump	Arkansas City	2	F	04/28/89	2 90
167.	7	KS	Cherokee County (once listed as Tar Creek, Cherokee County)	Cherokee County	5	F	04/01/88	2 91
168.	7	MO	Ellisville Site	Ellisville	1	S	12/28/84	3 91
					2	S	03/31/87	2 90
169.	7	MO	Findett Corp.	St. Charles	1	PRP	05/22/89	1 90
170.	7	MO	Fulbright Landfill	Springfield	1	PRP	05/22/89	2 90

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	RG	ST	SITE NAME	LOCATION	OPER-ABLE UNIT	LEAD	FUNDING START	PRESENT COMPLETION SCHEDULE
171.	7	MO	Minker/Stout/Romaine Creek (once listed as Arena 2: Fills 1 and 2)	Imperial	1	F	09/28/89	1 91
172.	7	MO	Syntex Facility	Verona	1	PRP	05/05/88	1 90 *
173.	7	MO	Times Beach Site	Times Beach	2	F	09/28/89	1 92
					2	F	08/02/89	3 90
174.	7	NE	Hastings Ground Water Contamination	Hastings	9	PRP	12/14/88	4 90
175.	7	NE	Monroe Auto Equipment Co.	Cozad	1	PRP	07/15/86	* *
176.	8	CO	California Gulch	Leadville	1	PRP	04/25/89	1 91
180.	8	CO	Central City - Clear Creek	Idaho Springs	1	S	06/15/88	2 92
					1	S	01/20/88	2 92 *
					2	F	06/27/88	3 90 *
					2	F	06/27/88	2 90
181.	8	CO	Denver Radium Site	Denver	1	F	12/11/87	1 90
					2	F	12/11/87	3 90
					2	F	03/17/89	3 90
					3	F	12/11/87	3 90
182.	8	CO	Rocky Mountain Arsenal	Adams County	5	FF	08/03/89	1 91
					6	FF	07/20/89	1 90
					12	FF	03/17/89	2 90
184.	8	CO	Sand Creek Industrial	Commerce City	1	F	09/29/89	3 90
185.	8	CO	Smuggler Mountain	Pitkin County	1	FE	06/30/88	1 90
186.	8	MT	Libby Ground Water Contamination	Libby	2	PRP	03/27/89	3 90
187.	8	UT	Monticello Radioactively Contaminated Properties	Monticello	1	PRP	04/15/84	2 90
188.	9	AZ	Indian Bend Wash Area	Scottsdale/Tmpe/Phnx	2	PRP	10/03/88	2 90
189.	9	AZ	Motorola, Inc. (52nd Street Plant)	Phoenix	1	PS	10/31/88	4 90
190.	9	AZ	Tucson International Airport Area	Tucson	1	PRP	05/22/89	4 91

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STATUS OF REMEDIAL DESIGNS IN PROGRESS ON SEPTEMBER 30, 1989

	RG	ST	SITE NAME	LOCATION	OPER-ABLE UNIT	LEAD	FUNDING START	PRESENT COMPLETION SCHEDULE
					1	PRP	06/27/89	4 90
191.	9	CA	Coalinga Asbestos Mine	Coalinga	1	PRP	05/02/88	2 91
192.	9	CA	Fairchild Semiconductor Corp. (South San Jose Plant) (once listed as Fairchild Camera & Instrument Corp. (South San Jose Plant))	South San Jose	1	PS	03/20/89	2 90
193.	9	CA	IBM Corp. (San Jose Plant)	San Jose	1	PS	12/15/88	* *
194.	9	CA	Iron Mountain Mine	Redding	1	F	09/25/87	1 90
					1	F	09/05/87	4 90 *
195.	9	CA	Lorentz Barrel & Drum Co.	San Jose	2	F	12/19/88	1 90
196.	9	CA	Operating Industries, Inc., Landfill	Monterey Park	2	PRP	05/11/89	4 90
197.	9	CA	San Gabriel Valley (Area 1)	El Monte	2	F	03/27/89	1 92
					4	F	09/14/88	2 91 *
					4	F	09/14/88	2 91 *
198.	9	CA	San Gabriel Valley (Area 2)	Baldwin Park Area	2	F	09/14/88	2 91 *
					2	F	09/14/88	2 91 *
					5	F	03/27/89	1 92
199.	9	CA	San Gabriel Valley (Area 4)	La Puente	2	F	09/14/88	2 91 *
					2	F	09/14/88	2 91 *
					3	F	03/27/89	1 92
200.	9	CA	Selma Treating Co.	Selma	1	F	09/21/89	1 91
201.	9	CA	South Bay Asbestos Area (once listed as Alviso Dumping Area)	Alviso	1	F	09/14/89	1 92
202.	9	CA	Stringfellow	Glen Avon Heights	1	S	03/02/89	* *
					5	S	03/02/89	3 91
203.	10	ID	Pacific Hyde & Fur Recycling Co.	Pocatello	1	F	09/13/88	1 90
204.	10	OR	Gould, Inc.	Portland	1	PRP	09/29/88	4 90
205.	10	WA	Colbert Landfill	Colbert	1	MR	03/23/89	2 93

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APPENDIX B

STATUS OF REMEDIAL DESIGNS IN PROGRESS ON SEPTEMBER 30, 1989

	RG	ST	SITE NAME	LOCATION	OPER-ABLE UNIT	LEAD	FUNDING START	PRESENT COMPLETION SCHEDULE
206.	10	WA	Commencement Bay, Near Shore/Tide Flats	Pierce County	3	PRP	02/03/89	1 91
					5	PS	09/30/89	4 90
					5	PS	12/15/88	4 90
207.	10	WA	Commencement Bay, South Tacoma Channel	Tacoma	1	F	03/19/85	3 90 *
208.	10	WA	Frontier Hard Chrome, Inc.	Vancouver	1	F	03/23/88	2 91

APPENDIX

C

Record of Decision Abstracts

This appendix provides detailed descriptions of FY89 feasibility studies (FSs), as required by CERCLA section 301(h)(1)(A). These descriptions are based on Records of Decision (RODs) signed from October 1, 1988 through September 30, 1989. The RODs of the first and second remedial actions of the Fairchild Semiconductor (Mountain View Plant), CA, have been combined into one ROD abstract. EPA signed 139 RODs in FY89 and four ROD amendments, which are summarized in this appendix by 143 abstracts.

Each abstract provides background information on the Superfund site, including the date on which EPA signed the ROD, former user of the site, type of operation, contaminants of concern, and previous clean-up actions. Each abstract also includes a description of the remedial alternative selected in the ROD and provides information on the use of alternative or resource recovery treatment technologies and on the performance standards or goals for the site. Each abstract also includes the site's NPL rank for sites on the NPL. Proposed NPL sites and all federal facility sites are placed into groups (Gr) corresponding to groups of 50 on the final NPL. The table of contents for this appendix also lists the NPL rank or group number for a site. Federal facility sites are identified by placing an "(F)" after the site's group number. All sites abstracted in the appendix are listed alphabetically according to the site name and are grouped by EPA Region.

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	Pinette's Salvage Yard	ME	676	156
	Saco Tannery Waste Pits	ME	333	158
	South Municipal Water Supply Well	NH	579	159
	Sullivan's Ledge	MA	743	160
	Wells G&H	MA	349	161
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2	BEC Trucking	NY	837	163
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	Sydney Mine Sludge Ponds	FL	473	223
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	Auto Ion Chemicals, Inc.	MI	764	226
	Big D Campground	OH	834	227
	Bowers Landfill	OH	182	228
	Byron Salvage Yard	IL	684	229
	Cemetery Dump	MI	668	230
	Cliffs/Dow Dump	MI	653	231
	Cross Brothers Pail Recycling (Pembroke)	IL	396	232
	E.H. Schilling Landfill	OH	652	233
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	Laskin/Poplar Oil Co.	OH	569	239
	Miami County Incinerator	OH	69	240
	Midco I	IN	262	241
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	New Brighton/Arden Hills (Amendment)	MN	40	245
	New Brighton/Arden Hills	MN	40	246
	Ninth Avenue Dump	IN	438	247
	Northernaire Plating	MI	64	248
	Ott/Story/Cordova Chemical Co.	MI	136	249
	Outboard Marine Corp.	IL	87	250
	Waite Park Wells	MN	781	251
	Wauconda Sand & Gravel	IL	132	252
	Wausau Ground Water Contamination	WI	905	253
	Wausau Ground Water Contamination	WI	905	254
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	Whitehall Municipal Wells	MI	606	256
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6	Homestake Mining Co.	NM	663	258
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	Sheridan Disposal Services	TX	866	262
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7	Arkansas City Dump	KS	100	265
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	Monticello Radioactively Contaminated Properties	UT	629	280
	Sand Creek Industrial	CO	36	281
	Woodbury Chemical Co.	CO	300	282
9	Atlas Asbestos Mine	CA	288	283
	Beckman Instruments (Porterville Plant)	CA	665	284
	Coalinga Asbestos Mine	CA	289	285
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	South Bay Asbestos Area	CA	306	299
10	Commencement Bay, Neashore/Tideflats	WA	394	300
	Northside Landfill	WA	918	302
	Northwest Transformer	WA	694	303

REGION 1

(Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont)

NPL Rank: 565

AUBURN ROAD LANDFILL, NH

Second Remedial Action - Final
September 29, 1989

The Auburn Road Landfill site consists of four former land disposal areas on 200 acres of land in Londonderry, Rockingham County, New Hampshire. The four disposal areas, referred to as the Old Town Dump (3 acres), the Tire Dump (4 acres), the Solid Waste Area (6 acres), and the Septage Lagoon (1 acre), are sources of soil and ground-water contamination at the site. Land bordering the site is occupied primarily by private residences, and includes wetlands, streams, and a pond. In 1979, after verifying that industrial wastes were being disposed of at the site, the state prohibited further disposal of drums. Since 1980, 69 monitoring wells have been installed and numerous test pits have been excavated at the site. In 1986, EPA removed approximately 1,000 drums of waste materials from the site, the majority being removed from the Old Town Dump area. The first operable unit for the site was completed in December 1987, when all residences identified as being potentially impacted by site ground-water contamination were connected to a local public water supply. Concurrently the site owner erected a seven-foot high fence around the Old Town Dump, the Tire Dump, and the Solid Waste area. A second drum removal was conducted in October 1988 when EPA removed 16 drums from the Old Town Dump and 300 drums from the Tire Dump. This ROD represents the second and third operable units for the site and includes ground-water remediation and reducing residual soil contamination which is a contamination source to ground water. The primary contaminants of concern affecting the soil and ground water are VOCs including benzene, toluene, TCE, and PCE, and metals including arsenic and lead.

The selected remedial action for this site includes downgradient ground-water pumping and on-site treatment using chemical coagulation and precipitation to remove metal contaminants and air stripping to remove VOCs, which will be collected in a vapor phase carbon adsorption system; on-site discharge to recharge trenches; ground-water monitoring; and placing a multilayered natural and synthetic cap over each source area. The estimated present worth cost for this remedial action is $24,100,000, which includes annual present worth O&M costs of $1,460,000.

Performance Standards or Goals

Target clean-up levels were selected for ground-water treatment that are consistent with drinking water standards set by Safe Drinking Water Act MCLs or proposed MCLs. Chemical-specific ground water goals include benzene 5 ug/l (MCL), toluene 2,000 ug/l (MCL), PCE 5 ug/l (PMCL), TCE 5 ug/l (MCL), arsenic 50 ug/l (MCL), and lead 50 ug/l (MCL). Direct contact, ingestion, and inhalation of soil contaminants and further migration of contaminants to ground water will be prevented by capping.

Institutional Controls

Not applicable.

NPL Rank: 14

BAIRD & MCGUIRE, MA

Third Remedial Action
September 14, 1989

The Baird & McGuire site is a former chemical manufacturing facility in northwest Holbrook, Massachusetts, approximately 14 miles south of Boston. The 20-acre site is situated in a wetland area within the 100-year floodplain of the Cochato River which lies to the east. From 1912 to 1983 the company operated a chemical manufacturing and batching facility on the property. Manufactured products included herbicides, pesticides, disinfectants, soaps, floor waxes, and solvents. Waste disposal methods at the site included direct discharge into the soil, nearby brook and wetlands, and a former gravel pit (now covered) in the eastern portion of the site. Underground disposal systems were also used. The South Street wellfield, part of the municipal water supply for Holbrook, is within 1,500 feet of the Baird & McGuire property. The last operating well was shut down in 1982 due to organic contamination which possibly originated from the site. EPA conducted a removal action at the site in 1983 after a waste lagoon overflowed, spreading contaminants into the Cochato River. The company ceased operating shortly thereafter. A second removal action was conducted in 1985, following the discovery of dioxin in site soils. EPA also conducted an Initial Remedial Measure at the site from 1985 through 1987 that involved constructing a new water main to direct water away from the site, removing building structures, and installing a temporary cap. In 1986, a ROD was signed to address on-site ground-water treatment and incineration of contaminated soil. This ROD addresses the Cochato River sediment contamination. The primary contaminants of concern affecting the sediment are organics including PAHs and pesticides, and metals including arsenic.

The selected remedial action for this site includes placement of river silt curtains downstream of the site; excavation and on-site incineration of approximately 1,500 cubic yards of contaminated sediment; backfilling excavated areas with clean fill and on-site placement of treated sediment; restoration of wetland areas; and long-term surface water and sediment monitoring. The estimated present worth cost for this remedial action is $1,656,000, which includes annual O&M costs of $22,000.

Performance Standards or Goals

Sediment will be treated to a 10^{-5} to 10^{-6} excess cancer risk level. Chemical-specific goals include DDT 19 mg/kg, chlordane 5 mg/kg, PAHs 22 mg/kg, and arsenic 250 mg/kg. In addition, environmental exposure to the above contaminants will be reduced to the mean Sediment Quality Criteria that are numerical standards protective of aquatic life and its uses.

Institutional Controls

Not applicable.

NPL Rank: 451

KELLOGG-DEERING WELL FIELD, CT

Second Remedial Action
September 29, 1989

The Kellogg-Deering Well Field site is a 10-acre contaminated municipal well field in Norwalk, Fairfield County, Connecticut, that includes adjacent source areas that contribute to the well field contamination. The site lies within the Norwalk River's 100-year floodplain and consists of four municipal drinking water wells that supply approximately 25 percent of the water for the 45,000 residents in Norwalk. The city detected elevated TCE levels in the wells during routine monitoring in 1975 and subsequently shut down unacceptably contaminated wells until a redwood slat treatment system was installed in 1981. EPA conducted a remedial investigation between 1984 and 1986 leading to a 1986 ROD that required the city to operate an air stripping unit. EPA conducted a subsequent remedial investigation in 1987 that further defined the contaminated ground-water area and identified the Elinco/Pitney Bowes/Matheis Court Complex, located east of the site and upgradient of the well field, as a source of ground-water contamination. This ROD, the second of three planned operable units, addresses the major source area. The primary contaminants of concern affecting the soil and ground water are VOCs including benzene, PCE, TCE, toluene, and xylenes.

The selected remedial action for this site includes on-site *in situ* vacuum extraction followed by carbon adsorption to remediate soil underlying the major source area at the court complex; ground-water pumping and on-site treatment using air stripping followed by off-site discharge; and periodic sampling of ground water, soil vapor, and indoor air. The estimated present worth cost for this remedial action is $9,100,000, which includes a present worth O&M cost of $3,034,000 for 30 years.

Performance Standards or Goals

Chemical-specific goals for ground-water cleanup are based on MCLs and include benzene 5 ug/l, toluene 2,000 ug/l, TCE 5 ug/l, and PCE 5 ug/l. EPA has established soil clean-up goals based on a soil leaching model. Chemical-specific soil clean-up goals range depending on the soil type and include benzene 1.2 - 36.7 ug/kg, toluene 5,523 - 169,552 ug/kg, TCE 12 - 358 ug/kg and PCE 33 - 1,036 ug/kg.

Institutional Controls

Institutional controls will restrict soil excavation and well installation in contaminated areas.

NPL Rank: 890

NORWOOD PCBs, MA

First Remedial Action - Final
September 29, 1989

The 26-acre Norwood PCBs site consists of several industrial and commercial properties, parking areas, and vacant lots in Norwood, Norfolk County, Massachusetts. Significant site features include the Grant Gear property to the north, an office park complex which extends along the western portion of the site, and residential areas which border the site to the west and north. Meadow Brook, which discharges to the Neponset River, and an associated wooded wetlands area make up the north site boundary. Four piles of sediment sludge, previously dredged from the stream, are located on the south bank of the brook. Site contamination originated from disposal practices of previous businesses, primarily electrical equipment manufacturing, that operated from the building now owned by Grant Gear Realty Trust. In April 1983, the State responded to a citizen report of previous industrial waste dumping at the site and took surficial soil and sediment samples which confirmed PCB contamination. In June 1983, EPA removed 500 tons of PCB-contaminated soil from the office park complex and Grant Gear properties and disposed of it off site. The State implemented an Interim Remedial Measure in 1986 to limit access to areas with high surface contamination on the Grant Gear property by constructing a 1.5-acre cap. The primary contaminants of concern affecting soil, sediment, ground water, and building surfaces are VOCs including TCE and PCE, other organics including PCBs, PAHs, and phenol, and metals.

The selected source control remedial measures include excavation, solvent extraction, and on-site disposal of approximately 31,000 cubic yards of unsaturated soil and dredge pile sediment and approximately 3,000 cubic yards of Meadow Brook sediment followed by installing a soil cover over the treated soil; off-site incineration and disposal of extracted oils containing PCBs; flushing and cleansing portions of the Grant Gear drainage system; cleaning and sealing roof surfaces, and decontaminating machinery, equipment, and floor surfaces in the Grant Gear building which exceed TSCA clean-up levels; ground-water collection in a barrier drain trench with on-site treatment by carbon adsorption for PCBs, air stripping for removal of VOCs, and precipitation/filtration for removal of metals; wetlands restoration; long-term environmental monitoring of ground water, soil, sediment, and building surfaces; and institutional controls restricting ground-water and land use. The estimated present worth cost for this selected remedy is $16,100,000, which includes annual O&M costs for up to 10 years.

Performance Standards or Goals

To assist in the establishment of clean-up standards, EPA has divided the site into three sections: Section A is the area of soil and dredge sediment north of the Grant Gear fence and adjacent to Meadow Brook; Section B includes areas within the Grant Gear property and surrounding commercial properties; and the final section is the Meadow Brook sediment area. Chemical-specific soil target clean-up levels for Section A are PCBs 1 mg/kg and PAHs 2 mg/kg based on a 7×10^{-6} cancer-risk level; for Section B, PCBs 10 mg/kg (25 mg/kg for soil covered with pavement outside Grant Gear) and PAHs 6 mg/kg based on a 10^{-6} cancer-risk level, and TCE 24 ug/kg and PCE 60 ug/kg based on preventing contamination to ground water above MCLs. The clean-up level for sediment in Meadow Brook is PCBs 1 mg/kg based on 1.5×10^{-7} excess cancer-risk level, and PCBs 0.5 ug/kg for discharge to Meadow Brook. Ground-water target clean-up levels were established based on Federal and State MCLs for TCE 5 ug/l, PCE 5 ug/l, and four other organics.

Institutional Controls

Controls will be designed to ensure that ground water on the zone of contamination will not be used as a drinking water source, and to prevent disturbance of contaminated untreated subsurface soil within the Grant Gear property,

sediment in Grant Gear drainage systems and soil under paved areas outside Grant Gear.

NPL Rank: 788

O'CONNOR CO., ME

First Remedial Action - Final
September 27, 1989

The O'Connor Co. site covers a 9-acre area near the city limits of Augusta, Maine. The area neighboring the site consists of woodlands, a small poultry farm, private properties and residences, and wetlands. A portion of the site is also located within a 100-year floodplain. The F. O'Connor Company began operating a salvage and electrical transformer recycling business at the site in the early 1950s. Because of previous oil spills the state investigated the site in 1976 and found the surface water, sediment, and soil contaminated with PCBs. As a result of this study, the F. O'Connor Company constructed two surface-water impoundments (lagoons) to control further migration of oils from the site. In 1977, the State ordered the F. O'Connor Company to discontinue use of the lagoons. Subsequently, the lagoon waters were pumped into several on-site storage tanks and the sediment was excavated, deposited in a low area onsite, and covered with a clay cover. The sediment created a barrier for surface water and formed an upland marsh onsite. In May 1987, EPA and the state jointly issued an amended Administrative Order to F. O'Connor Company requiring field investigations and extensions of the existing fence to areas where additional contamination was found. The primary contaminants of concern affecting the soil, sediment, ground water, and surface water are VOCs including benzene, other organics including PCBs and PAHs, and metals including lead.

The selected remedial action for this site includes pumping and off-site treatment of lagoon and upland marsh surface water; excavation and on-site treatment of approximately 23,500 cubic yards of contaminated soil and sediment using a solvent extraction process followed by on-site disposal of residuals; on-site treatment of gases from the solvent extraction process; extraction and off-site treatment of solvent residues using incineration; on-site treatment by solidification of soil and sediment that do not achieve target clean-up goals after treatment, followed by off-site disposal; backfilling and upgrading the excavated area with clean soil and treated soil; ground-water pumping and treatment using activated carbon adsorption followed by on-site reinjection; and sediment and ground-water monitoring. The estimated total cost for this remedial action is $14,221,000 which includes annual O&M costs of $56,000 in year one, $54,000 for years two to four, $92,000 for year five, and $65,000 for years six to thirty.

Performance Standards or Goals

Target cleanup goals were based on a 10^{-5} excess cancer risk. Individual goals for soil and sediment include PCBs 1 mg/kg, PAHs 1 mg/kg, and lead 248 mg/kg; for ground water, PCBs 0.5 ug/l and benzene 5 ug/l; and for surface water, PCBs 0.065 ug/l and lead 1.94 ug/l.

Institutional Controls

Deed and land use restrictions to prohibit ground-water use will be implemented.

NPL Rank: 676

PINETTE'S SALVAGE YARD, ME

First Remedial Action - Final
May 30, 1989

The Pinette's Salvage Yard site is located approximately one mile southwest of the town of Washburn, Aroostook County, Maine, in the northeast corner of the state. The site consists of a vehicle repair and salvage yard and an adjacent undeveloped area containing wetlands. Land surrounding the site is used for residential, general industrial, and agricultural purposes. An undeveloped forest and a wetlands area are also adjacent to the site. The water supply for the approximately eight to ten residences located within a one-half mile radius of the site is obtained from private wells located in the deep, bedrock aquifer below the site. Municipal wells, used to supply the drinking water to the residents of Washburn, are located one mile northeast of the site. In June 1979, three electrical transformers were removed from Loring Air Force Base by a private electrical contractor and allegedly brought to the site where they ruptured while being moved from the delivery vehicle. Approximately 900 to 1,000 gallons of dielectric fluid containing PCBs spilled directly onto the ground. A removal action was performed in late 1983 which included excavation and off-site disposal of 800 cubic yards of municipal PCB-contaminated soil from the site. Subsequent investigations at the site revealed the presence of a wide range of PCB concentrations in the surface and subsurface soils. The highest levels of PCBs are in the general area of the transformer fluid spill. Surface migration of PCBs extends as far as the undeveloped land adjacent to the salvage yard. In addition, soil contaminated with chlorinated benzenes was found in the spill area. The total volume of contaminated soil above 5 mg/kg PCBs and containing other organics is approximately 2,200 cubic yards. Detectable concentrations of PCBs and benzene compounds were identified in both the shallow and deep aquifers localized within and slightly downgradient of the spill area. This remedy is designed primarily to address soil contamination and, to the extent practicable, ground-water contamination at the site. The primary contaminants of concern affecting the soil and ground water are VOCs including benzene, organics including PCB; and metals including lead.

The selected remedial action for this site includes excavation and off-site incineration of 300 cubic yards of soil containing greater than 50 mg/kg PCBs; excavation and on-site solvent extraction of 1,700 to 1,900 cubic yards of soil containing between 5 and 50 mg/kg PCBs and other organic contaminants, with off-site incineration of treatment process effluent and on-site treatment of air emissions; excavation of approximately 500 cubic yards of surface soil containing between 1 and 5 mg/kg PCBs to a minimum depth of 10 inches and placement, along with treated soil, in the area where more highly contaminated soil was excavated, followed by additional soil covering and revegetation; on-site ground-water pumping, and collection via interceptor trenches, with treatment using filtration and carbon adsorption, followed by discharge of treated water into the shallow aquifer; access restrictions; institutional controls; and sediment, ground-water, and surface-water monitoring. The estimated present worth cost for this site is $4,367,000 which includes annual O&M costs of $135,000 for years one to two, $42,000 for years three to five, and $20,000 for years six to thirty.

Performance Standards or Goals

Target clean-up goals were established for six soil contaminants including PCBs 5 mg/kg (based on a state clean-up level slightly more stringent than a 10^{-5} excess cancer risk level) and benzene 260 ug/kg. Target goals were provided for seven ground-water contaminants including PCBs 0.5 ug/l (Maine's Maximum Exposure Guidelines), benzene 5 ug/l (MCL), 1,2,4-trichlorobenzene 680 ug/l (based on 2 x 10^{-2} reference dose level), and lead 5 ug/l (MCL). Due to the technical impractibility from an engineering perspective of obtaining the PCB target clean-up goal in the ground water, EPA is invoking a waiver from compliance with this goal.

Institutional Controls

Institutional controls will be established to prevent use of on-site ground water for drinking water purposes both during and, if necessary, following overall site remediation.

NPL Rank: 333

SACO TANNERY WASTE PITS, ME

First Remedial Action - Final
September 27, 1989

The Saco Tannery Pits site is in Saco, Maine, approximately 15 miles southwest of Portland, Maine. The 233-acre site is in a rural area which includes forests and wetlands, and lies within the 100-year floodplain of Stuart Brook. Between 1959 and the early 1980s, a leather tannery operator used the site to dispose of process wastes in two 2-acre lagoons and 53 smaller disposal pits. EPA and state investigations in the early 1980s led to a removal response action which included pumping liquids from three waste pits and neutralizing the remaining sludge from the pits. The ROD addresses both source control and ground-water remediation and identifies a contingency plan in the event the state legislature fails to enact the necessary institutional controls within two years. The primary contaminants of concern affecting the sediment, sludge, ground water, and surface water are metals including arsenic, chromium, and lead.

The selected remedial action is contingent upon the state enacting legislation within two years designating the site as a permanent conservation area. The remedy includes pumping and off-site treatment and discharge of water from waste pits and lagoons followed by covering and revegetating waste pits, lagoons and associated wet areas; compensation for six acres of lost wetlands; ground-water and surface-water monitoring to determine whether contaminants exceed specified action levels which would require further site evaluation; and implementation of institutional controls. If legislation is not passed to restrict future use of the site, a contingency plan will be implemented which includes excavating and solidifying soil and sludge from the waste pits and lagoons with on-site disposal in a RCRA-permitted landfill, and ground-water and surface-water monitoring. The estimated present worth cost for the selected remedial action ranges from $9,211,600 to $10,551,400, which includes present worth O&M costs ranging from $2,500,000 to $3,800,000.

Performance Standards or Goals

Target clean-up levels were developed for sediment and sludge contaminants which exceed a carcinogenic risk of 10^{-7} or a noncarcinogenic risk greater than a total Hazard Index of 1.0. Specific clean-up goals include total chromium 2,000 mg/kg (based on the Ecological Risk Assessment), lead 125 mg/kg (health-based state target level), and arsenic 60 mg/kg. ACLs were established for arsenic in ground water. If other contaminants are detected above MCL levels, an evaluation of additional remedial action will be made.

Institutional Controls

If the state designates the site a permanent conservation area, land and ground-water use and deed restrictions will be implemented as part of this designation.

NPL Rank: 579

SOUTH MUNICIPAL WATER SUPPLY WELL, NH

First Remedial Action
September 27, 1989

The 250-acre South Municipal Water Supply Well site is approximately two miles south of the Town of Peterborough, in Hillsborough County, New Hampshire. The site includes the Contoocook River, the Noone Pond System, and a wetlands area. Also on the site are the New Hampshire Ball Bearings Incorporated (NHBB) manufacturing facility, several commercial establishments, and several apartments. Land use in the vicinity of the site is rural and undeveloped. Ground-water flow beneath the site is generally eastward from the NHBB property towards the South Municipal Well. The town of Peterborough discontinued use of the South Well in May 1983 after the state discovered VOC contamination in water samples taken from the well. Subsequent investigations revealed that a plume of contaminated ground water extended from under the NHBB property to the vicinity of the South Well. VOC contamination was also detected in soil on the NHBB property, and wetlands sediment was found to be contaminated with PCBs, metals, and PAHs. Investigations attributed the contamination to in-house chemical releases that were subsequently washed out through floor drains or slop sinks to outfalls, or washed out through facility doors. Exterior releases contributed to contamination at the site through the draining of a truck-mounted waste solvent tank. The primary contaminants of concern affecting the soil and ground water are VOCs including PCE, TCE, and toluene; the primary contaminants of concern affecting the sediment are organics including PCBs and PAHs, and metals.

The selected remedial action for this site includes ground-water pumping from the highly contaminated NHBB area plume and treatment using a phase separation settlement tank/pretreatment system, air stripping, carbon columns for air emission control, and on-site discharge; ground-water pumping from the dilute plume outside the NHBB area and treatment using air stripping, carbon columns, on-site discharge; *in situ* vacuum extraction of 7,500 cubic yards of contaminated on-site soil; excavation and/or dredging with dewatering of 1,170 cubic yards of wetlands sediment and off-site disposal; wetlands restoration with clean fill, surface contouring, and revegetation; implementation of institutional controls restricting ground-water use and well installation; and long-term ground-water monitoring. The estimated present worth cost for this remedial action is $7,387,769, which includes an estimated present worth O&M cost of $3,992,105.

Performance Standards or Goals

Target clean-up levels for ground water were based on SDWA MCLs including PCE 5 ug/l, TCE 5 ug/l, and toluene 2,000 ug/l. Target clean-up levels for soil were established to reduce contaminant migration to ground water and include PCE 4.5 ug/kg, TCE 1.5 ug/kg, and toluene 1,500 ug/kg. Soil target levels will attain a 3×10^{-10} excess cancer risk level. Target clean-up levels for sediment include PAHs 1.1 ug/kg and PCBs 1 ug/kg, which will attain an excess cancer risk of 2.9×10^{-7} for PCBs and 1.3×10^{-6} for PAHs for a total risk of 1.3×10^{-6}.

Institutional Controls

Institutional controls will be established to prevent well use and well installation in areas of contaminated ground water.

NPL Rank: 743

SULLIVAN'S LEDGE, MA

First Remedial Action
June 29, 1989

The Sullivan's Ledge site is a 12-acre disposal area in an urban area of New Bedford, Massachusetts. The site is bordered by a country club and marsh area to the north and small businesses to the east and west. The site was operated originally as a granite quarry and includes four 150 feet deep quarry pits. Between the 1930s and 1970s, the quarry and adjacent areas were used for disposal of hazardous materials and other industrial wastes. Site investigations conducted in 1986 and 1988 revealed high concentrations of PCBs in soil and sediment, and VOCs and inorganics in on- and off-site ground and surface water. Surface runoff and ground water from the disposal area discharge into the adjacent stream, which drains into the country club golf course and the Middle Marsh Wetlands area. In addition, a small portion of the site lies within the stream's 100-year floodplain. EPA concluded that the contamination includes on-site soils and PCB-contaminated sediment washed offsite to an adjacent stream and wetland areas, and wastes disposed of in the former quarry pits. This ROD addresses source control and migration management; a subsequent ROD will address the Middle Marsh area. The primary contaminants of concern affecting the soil, sediment, ground water, and surface water are VOCs including benzene and TCE, organics including PCBs and PAHs, and metals including lead.

The selected remedial action for this site includes excavation/dredging of 24,200 cubic yards of soil and 1,900 cubic yards of sediment with on-site treatment using solidification, followed by on-site disposal; construction of an 11-acre impermeable cap; air monitoring; diversion and lining of the stream adjacent to the site; active ground-water pumping and passive underdrain collection with treatment using oxidation/filtration and UV/ozonation with off-site disposal of contaminated residuals (ground-water disposal will be determined after further studies); wetlands restoration/enhancement; sediment, ground-water, and surface-water monitoring; institutional controls including ground-water use and access restrictions. The estimated present worth cost is $10,100,000; O&M costs were included in the present worth cost but were not provided.

Performance Standards or Goals

On-site soil clean-up standards for PCBs and PAHs were health-based using a 10^{-5} cancer risk level and include remediation of soil contaminated with total PCBs above 50 mg/kg and/or total PAHs above 30 mg/kg. Off-site soil will be tested further before chemical-specific goals are provided; however, off-site soil with PCBs greater than 10 mg/kg (based on a 10^{-5} cancer risk level) will be excavated and disposed of onsite, and soil with PCBs greater than 50 mg/kg will be solidified onsite. The sediment clean-up standard for PCBs is the interim mean sediment quality criteria (SQC) value of 20 ug/gC. Where total organic carbon (TOC) is less than or equal to 10 gC/kg, target treatment for sediment will be 0.2 mg/kg PCBs. Because of the geology of the deep fractured bedrock and possible presence of dense non-aqueous phase liquids, EPA considers ground-water treatment to MCLs technically impracticable. Active ground-water collection system clean-up standards for VOCs will reduce VOCs to a range of 1-10 mg/l and/or until an asymptotic curve indicates that no significant concentration reductions are being achieved. Passive ground-water collection system clean-up standards will be based on state AWQS.

Institutional Controls

Institutional controls will be implemented to prevent the use of ground water for drinking water and to place deed restrictions regulating land use at the site.

NPL Rank: 349

WELLS G&H, MA

First Remedial Action
September 14, 1989

The Wells G&H site encompasses 330 acres within the zone of contribution of two municipal drinking water wells known as Well G and Well H, commonly referred to as Wells G&H, in Woburn, Massachusetts. The area near the wells consists of industrial, commercial, residential, and recreational development. The Aberjona River flows through the site, and a substantial on-site wetlands area is associated with the river's floodplain. Wells G&H were developed in the 1960s and provided over one quarter of the Woburn community water supply. In 1979 the state closed the wells and provided the community with an alternate water supply after detecting several chlorinated volatile organic compounds (VOCs) in the wells. EPA investigations beginning in 1981 resulted in the site being divided into three discrete operable units: first, five properties inside the perimeter of the site boundary that were identified as source areas of contamination; second, a central area immediately surrounding Wells G&H with extensive ground-water contamination; and third, a segment of the Aberjona River and associated wetlands containing contaminated sediment. Between 1983 and 1989, EPA issued several Administrative Orders to site property owners requiring clean-up activities including limiting site access and removing drums and debris. This ROD addresses remediating contaminated soil and ground water found at the first operable unit, the five properties identified as principal sources of contamination, and further evaluating the remaining operable units. A subsequent ROD will address the second and third operable units which include the central area of the site and the river sediment. The primary contaminants of concern affecting the soil, sludge, debris, and ground water are VOCs including PCE and TCE, other organics including carcinogenic PAHs (cPAHs), PCBs, and pesticides, and metals including lead.

The selected remedial action for this site includes *in situ* volatilization, using carbon adsorption for treatment of the extracted vapor, of the 7,400 cubic yards of soil contaminated with VOCs only; excavation and on-site incineration of 3,100 cubic yards of the remaining contaminated soil and backfilling the excavated areas; ground-water pumping and treatment in the five source areas, using pretreatment for metals followed by air stripping and vapor phase carbon filtering with either discharge on-site to the Aberjona River or reinjection into the aquifer or both; removing and disposing of 410 cubic yards of sludge and debris; and ground-water monitoring. The estimated present worth cost for this remedial action is $68,400,000.

Performance Standards or Goals

Three approaches were used to determine soil clean-up levels. The first approach was based on protecting ground water from VOC contamination from the soil and includes individual goals for soil of PCE 36.7 ug/kg and TCE 12.7 ug/kg. The second approach was based on a 10^{-6} cancer-risk level and includes individual goals for cPAHs 0.694 mg/kg, PCBs 1.04 mg/kg, and 4-4'-DDT 23.5 mg/kg. The third approach established a clean-up goal for lead at 640 mg/kg based on a target blood lead level of 10 ug/dl. Ground-water clean-up goals for the aquifer were established at MCLs and include PCE 5 ug/l (based on TCE) and TCE 5 ug/l. Effluent levels for discharge to the Aberjona River were based state AWQSs; if discharge is to the aquifer, MCLs will be met.

Institutional Controls

EPA recommends that deed and land use restrictions be implemented to restrict use of the aquifer in the vicinity of the site.

NPL Rank: 38

W.R. GRACE & CO., INC. (ACTON PLANT), MA

First Remedial Action
September 29, 1989

The W.R. Grace & Co., Inc. (Acton Plant) site is in Acton and Concord, Massachusetts. The American Cyanamid and Dewey & Almy Chemical companies formerly owned the 200-acre site where they manufactured explosives, synthetic rubber container sealant products, latex products, plasticizers, and resins. In 1954 W.R. Grace & Company purchased the property and began producing container sealing compounds, latex products, and paper and plastic battery separators. Effluent wastes from these operations flowed into several unlined lagoons and were later buried in on-site waste areas, including an industrial landfill. After a 1978 investigation revealed that ground water in the vicinity of the site was contaminated with VOCs, W.R. Grace & Company agreed to fully restore the aquifer. An aquifer restoration system was installed in 1985 which recovers and treats ground water under the site's waste disposal areas. Subsequent samplings, however, have indicated that the system has only minimally reduced the ground-water contamination at the site. This first operable unit primarily addresses the source contamination and includes minimal modifications to the aquifer restoration system. Further ground-water remediation will be addressed in a subsequent ROD. The primary contaminants of concern affecting the soil, sediment, and sludge are VOCs including benzene and toluene, other organics, and metals including arsenic.

The selected remedial action for this site includes excavation and off-site incineration of highly contaminated soil and sludge; on-site solidification of less contaminated soil, sludge, and sediment followed by on-site disposal in the landfill and capping of the landfill; covering and monitoring other waste areas; modification to the aquifer restoration system to address air stripper emissions controls; and environmental monitoring. The estimated total cost for this remedial action is $7,058,000, which includes an estimated O&M cost of $2,468,000.

Performance Standards or Goals

Soil clean-up goals were established for five indicator compounds to ensure that any further contaminant migration to the ground water will not result in ground-water levels exceeding drinking water standards (including MCLs). Chemical-specific goals were provided but specific goals for each contaminant varied depending on the location of the waste area on site. The overall cumulative risk associated with the soil clean-up levels is 8.34 x 10-7.

Institutional Controls

Not applicable.

REGION 2

(New Jersey, New York, Puerto Rico, Virgin Islands)

NPL Rank: 837

BEC TRUCKING, NY

First Remedial Action - Final
September 28, 1989

The BEC Trucking site, also known as the Binghamton Equipment Company, is in the town of Vestal, Broome County, New York. The 3.5-acre site is an open lot which overlies a Class II aquifer. Land use neighboring the site is primarily commercial/industrial, but includes wetlands or marsh area to the west. Prior to the mid-1960s, the BEC Trucking site was an unimproved marshland. The original owner, Haial Trucking, filled some of the marshlands with various fill materials, including fly ash from a local power company. BEC Trucking, Haial Trucking's successor, operated a combination truck body fabrication and truck maintenance facility. Paint thinners and enamel reducers used during operations, and waste hydraulic oil and waste motor oil reportedly generated during operations were stored in a drum storage area on the western portion of the site. A 1982 state inspection identified approximately 50 drums, 20 of which contained waste engine or cutting oils, enamel reducers, paint thinners, and waste solvents. The drums in the storage area were removed in 1983 along with some stained soil around the drums. In 1988, extensive sampling of ground water, surface water, and soil revealed low-level contamination. The suspected source of on-site ground-water and surface-water contamination appears to be a leaking underground storage tank on a neighboring property. Remedial activities are currently being undertaken at the neighboring site to address any ground-water or surface-water contamination at the site resulting from the tank's leakage.

The selected remedial action for this site is no further action. A monitoring program will be established to ensure that this remedy continues to be protective of human health and the environment. The estimated cost for this remedial action will be determined during the development of the proposed monitoring program.

Performance Standards or Goals

Not applicable.

Institutional Controls

Not applicable.

NPL Rank: 332

BOG CREEK FARM, NJ

Second Remedial Action - Final
June 28, 1989

The Bog Creek Farm site is a 4-acre disposal area consisting of a man-made pond, bog, and trench in Howell Township, Monmouth County, New Jersey. The site is bordered to the north by Squankum Brook, to the west by two residences and a riding stable, and to the south and north by open fields. Between 1973 and 1974, organic solvents and paint residues were dumped around a trench in the eastern portion of the property, creating a highly contaminated soil area. Some chemicals migrated into a shallow underlying aquifer, creating a contaminant plume that discharged to the pond and bog along the northern border of the site and to the north branch of Squankum Brook. In late 1974, the property owner removed some waste from the disposal trench and covered the trench under direction from the Howell Township Health Department. A 1985 ROD selected a first operable unit remedy that involved excavating the soil from the waste trench, pond, and bog areas, and incinerating the soil onsite. This second operable unit focuses on remediating the contaminated ground water in the shallow aquifer and the contaminated brook sediment. The primary contaminants of concern affecting the sediment and ground water are VOCs including benzene, toluene and xylenes, and other organics including phenols.

The selected remedy for this site includes ground-water pumping and treatment using air stripping, hydrogen peroxide/ultra violet photolysis oxidation, carbon adsorption, and reinjection; excavation of brook sediment, followed by on-site incineration and on-site disposal; and stream bed restoration using clean sand or soil of similar consistency to the existing material. The estimated present worth cost for this remedial action is $6,927,000, which includes annual O&M costs of $663,000 for ten years of ground-water treatment.

Performance Standards or Goals

Because there is no human exposure to contaminated ground water, the clean-up goals are based on protection of the surface water (north branch of Squankum Brook) rather than human consumption of ground water. The goals are derived from limits that would allow for surface-water discharge under a state NPDES permit. Chemical-specific goals include petroleum hydrocarbons 15 mg/l, total lead 56 ug/l, benzene 5 ug/l, toluene 74 ug/l, and phenol 47 ug/l. Individual contaminant goals were not specified for brook sediment.

Institutional Controls

Not applicable.

NPL Rank: 538

BYRON BARREL & DRUM, NY

First Remedial Action - Final
September 29, 1989

The Byron Barrel & Drum site is in Genesee County, New York, and occupies approximately two acres of an eight-acre tract of land. The rural area surrounding the site includes woods, wetlands, and agricultural land, with approximately 320 people living within a one-mile radius of the site. The site is a former salvage yard for heavy construction equipment, some of which remains on-site along with other debris. From 1978 to 1980, the site owner reportedly abandoned approximately 200 barrels of hazardous waste without a permit. Some drums were reportedly ripped open, causing the hazardous waste to mix with the soil, and ultimately buried onsite. The state and EPA discovered these barrels in 1982 and initiated an investigation that resulted in the removal and disposal of the drums and approximately 40 cubic yards of contaminated soil and debris. A subsequent remedial investigation in 1987 revealed that solvent spills have contaminated two major areas of the site, resulting in soil and ground-water contamination. This remedial action addresses the two contaminated ground-water plumes and residual soil contamination which have been releasing contaminants into the ground water. The primary contaminants of concern affecting the soil and ground water are VOCs including benzene, PCE, TCE, toluene, and xylenes, other organics including PAHs, and phenols, and metals including chromium and lead.

The selected remedial action for this site includes pumping and treatment of ground water using precipitation, sedimentation, and filtration to remove metals, and air stripping and carbon adsorption to remove organics, followed by reinjection into the aquifer and, if necessary, off-site discharge of excess treated water; disposal of ground-water residues at an off-site RCRA-permitted facility; treatment of 4,100 cubic yards of contaminated soil using *in situ* soil flushing; further evaluation of 1,100 cubic yards of inorganic contaminated soil to determine ultimate disposal; dismantling and decontaminating debris followed by off-site disposal; and air and ground-water monitoring. The estimated present worth cost for this remedial action is $5,572,000, which includes annual O&M costs of $259,700.

Performance Standards or Goals

Ground water will meet state and Federal ARARs including MCLs. Specific ground-water clean-up levels include benzene 5 ug/l (MCL), toluene 2,000 ug/l (MCL), xylenes 440 ug/l (MCL), PCE 5 ug/l (based on TCE MCL), and TCE 5 ug/l (MCL). Soil will meet site-specific action levels, which will ensure that organic and inorganic contaminants will not leach into the ground water at levels above MCLs. Specific soil clean-up levels include toluene 45,000 ug/kg, xylenes 8,200 ug/kg, PCE 140 ug/kg, and TCE 47 ug/kg.

Institutional Controls

Not applicable.

NPL Rank: 52

CALDWELL TRUCKING CO., NJ

Second Remedial Action
September 28, 1989

The 11-acre Caldwell Trucking Co. site is in Fairfield Township, Essex County, New Jersey. The site is situated on an extensive 100-year floodplain of the Passaic River and neighbors Deepavaal Brook and numerous wetlands, as well as residential and commercial properties. From the 1950s to 1984, the Caldwell Trucking Company dumped, and allowed others to dump, septic wastes into unlined lagoons and later into steel holding tanks at the site. An EPA investigation conducted between 1984 and 1986 revealed that on-site soil and a municipal well were contaminated with VOCs, PCBs, and metals. The investigation resulted in a 1986 ROD which provided for soil remediation, restoration of a municipal well, and residential hookups to municipal water. Ground water, however, remains contaminated because of a TCE-contaminated plume which extends 4,000 feet from the site towards the Passaic River. Additional sources of the plume have been identified, including the neighboring General Hose facility that will be addressed by other federal and state authorities. A small seep to Deepavaal Brook's tributary, which is recharged by ground water, is also contaminated with TCE. This response is the second remedial action and addresses the remediation of contaminated off-site ground water. The primary contaminants of concern affecting the ground water are VOCs including TCE.

The selected remedial action for this site includes pumping and treatment of off-site ground water using air stripping with off-site discharge to the Passaic River; installation of a drainage system to eliminate surface exposure to contaminated ground water; sealing ground-water wells; and ground-water monitoring. The estimated present worth cost for this remedial action is $11,540,000 that includes annual O&M costs of $315,000 for 30 years. If, however, access to private properties and public roads needed for implementation of this remedial action cannot be obtained, EPA and the state will implement a contingency remedy that includes limited treatment of ground water, remediation of surface water, and sealing ground-water wells.

Performance Standards or Goals

This operable unit invokes a waiver from federal and state drinking water standards based on technical impractability, because it would take more than 100 years of pumping and treatment to attain state drinking water standards (e.g., TCE 1 ug/l). Instead, the remedy will achieve interim clean-up levels that allow for potable use of ground water with minimal treatment. Air emissions and effluent discharges from the treatment facility will comply with state ARARs.

Institutional Controls

Not applicable.

Group: 11

CHEMICAL INSECTICIDE CORP., NJ

First Remedial Action
September 29, 1989

The Chemical Insecticide Corp. site is part of a 94-acre industrial development in Edison, Middlesex County, New Jersey. From 1958 to 1970 Chemical Insecticide Corporation (CIC) produced and stored pesticide formulations at the property resulting in soil, surface-water, and ground-water contamination. The site is currently vacant and consists of the remaining building foundations, asphalt roadways, a one-acre wetlands area, and a surface-water drainage ditch bordering the site to the east, which ultimately drains into the Raritan River. Between 1966 and 1969, CIC was ordered by the city to close on-site lagoons, dispose of leaking drums, and stop wastewater discharge. Subsequent RI/FS investigations revealed the extreme complexity of the site due to the number and variety of contaminants (herbicides, pesticides, and metals) and the physical characteristics of the site. To address concerns relating to high levels of contamination in the drainage ditch, EPA installed a fence to limit access to the ditch, in 1988. Subsequently, EPA removed contaminated surface-water run-off that had collected in a parking lot onsite, and repaired the ditch to prevent future overflow incidents. This operable unit represents an interim remedial action to address contaminated surface-water run-off from the site until the source of contamination, the soil, is remediated. Future operable units will address contaminated soil and ground water. The primary contaminants of concern in the soil which may affect the surface water are organics including pesticides, and metals including arsenic.

The selected remedial action for this site includes clearing and grading the site; covering the entire site with an impermeable surficial cap; constructing a surface-water run-off diversion system; controlling the release of collected, uncontaminated surface-water run-off from the site; and surface-water monitoring. The estimated present worth cost for this remedial action is $1,420,211, which includes annual O&M costs of $37,184.

Performance Standards or Goals

The selected remedy does not provide for treatment; rather, it requires monitoring of collected surface water and provides values of allowable discharge to the storm drain system. Chemical-specific discharge levels were provided based on state standards, including arsenic 50 ug/l (based on state WQS) and five pesticides.

Institutional Controls

Not applicable.

NPL Rank: 184

CIBA-GEIGY CORP., NJ

First Remedial Action
April 24, 1989

The Ciba-Geigy Corp. site is in Dover Township, Ocean County, New Jersey. The site covers 1,400 acres, 320 of which are developed; the remaining area is largely wooded. The site is bounded by industrial, commercial, residential, and recreational areas. The Toms River, which derives surface water primarily through ground-water baseflow, runs through the northeast sector of the property. The aquifer system in the site area is tapped by municipal, industrial, and private wells. The manufacturing facility, presently owned by Ciba-Geigy Chemical Corporation, has been in operation since 1952 and is composed of numerous buildings, an industrial wastewater treatment plant, and a lined reservoir for emergency storage of treated and untreated wastewater. From 1952 to 1988, a variety of synthetic organic pigments, organic dyestuffs and intermediates, and epoxy resins were manufactured at the site. The company disposed of chemical wastes on site in several locations, including a 5.2-acre drum disposal area (containing approximately 100,000 drums); a 3.9-acre lime sludge disposal area (used for disposal of inorganic wastes); a 12-acre filtercake disposal area (which received sludge from the wastewater treatment); five backfilled lagoons comprising 8.5 acres; and a calcium sulfate disposal area. The drum disposal area and lime sludge disposal area were closed and capped in 1978. About this time, the filtercake disposal area was also closed and covered with soil. Ground-water contamination is migrating from these inactive disposal sites easterly towards the Toms River. Currently, the company generates both liquid and solid wastes. The liquid wastes are treated on site in a wastewater treatment plant before discharge to the Atlantic Ocean. The solid wastes are disposed of off site, and sludges from the wastewater treatment plant are disposed of in a permitted, double-lined, on-site landfill. EPA began investigating the site in 1980. Throughout its operation, the facility has routinely violated treatment and disposal permits, including accepting hazardous off-site waste beginning in 1981. The landfill reportedly was leaking as early as 1981, precipitating remedial measures by the state including issuance of a consent order forcing Ciba-Geigy to close part of the landfill and monitor ground water and leachate. In 1984, after discovering that Ciba-Geigy was illegally disposing drums containing liquids and hazardous waste in the landfill, the state ordered Ciba-Geigy to remove 14,000 drums. In 1985, leaking equalization basins associated with the wastewater treatment plant led Ciba-Geigy to close the basins and to begin remediation of the contaminated plume from these basins. Currently, contaminants are present in leaking drums, waste sludges, soil, and ground water. This ROD addresses the first operable unit focusing on the remediation of ground-water contamination in the upper aquifer. Remediation of the on-site source areas and deeper aquifer (if needed) will be addressed in future operable units. The primary contaminants of concern affecting the ground water are VOCs including benzene, PCE, TCE, and toluene, and metals including arsenic and chromium.

The selected remedial action for this site includes sealing contaminated residential irrigation wells; on- and off-site ground-water pumping with on-site treatment using filtration, reverse osmosis, and GAC in an upgraded version of the Ciba-Geigy wastewater treatment plant, followed by temporarily retaining the ground water in basins for monitoring and subsequent discharge to the Toms River; and implementation of a river and ground-water monitoring program. The estimated present worth cost for this remedial action is $164,500,000, which includes annual O&M of $12,539,000.

Performance Standards or Goals

Ground water will comply with all CWA requirements and will be treated to meet the proposed New Jersey State Surface Water Quality Standards including benzene 1 ug/l, PCE 1 ug/l, TCE 1 ug/l, toluene 26 ug/l, total chromium 50 ug/l, and arsenic 50 ug/l. The New Jersey MCLs

will be attained for the aquifer. Specific goals for the aquifer include benzene 1 mg/l, PCE 1 mg/l, TCE 8 mg/l, and chromium 0.05 mg/l. For unregulated VOCs in the aquifer, single contaminant levels for carcinogens are not to exceed 5 ug/l, and single contaminant levels for possible carcinogens or noncarcinogens are not to exceed 50 ug/l.

Institutional Controls

Not applicable.

NPL Rank: 799

CLAREMONT POLYCHEMICAL, NY

Second Remedial Action - Final
September 22, 1989

The Claremont Polychemical site is a 9.5-acre abandoned chemical production facility in Oyster Bay, Nassau County, New York. Land in use in the area is devoted primarily to light industrial and commercial operations. Contamination at the site took place between 1968 and 1980 and resulted from ink and pigment manufacturing operations that generated wastes including organic solvents, resins, and wash wastes. The site consists of a one-story building with a contaminated sump, five 5,000-gallon wastewater treatment basins containing sludge, and six above-ground tanks, three of which still contain waste materials. The initial discovery of site contamination occurred in 1979 when the county found 2,000 to 3,000 waste drums, some uncovered and others leaking. By the following year many of these drums were either removed or reused in the plant; however, the county had by this time identified an area of organic solvent contamination east of the building. Subsequently, a 10-foot layer of soil in the area of contamination was excavated and placed on a plastic liner. The liner has since deteriorated and monitoring has identified ground-water contamination under the site. In October 1988, a removal action was conducted that included the removal of liquids in the treatment basins and the classification, separation, and storage of the approximately 700 bags and drums of waste. The first operable unit for this site will address soil and ground-water contamination and will be initiated after the second operable unit. This second operable unit addresses the wastes in containers, above-ground tanks, wastewater treatment basins, and a sump. The total volume of wastes at the site could be as high as 100,000 pounds of solid materials, 10,000 gallons of liquids, and 25,000 pounds of sludge. The primary contaminants of concern in drummed and packaged liquids and solids, and in treatment basin sludge, are VOCs including benzene, toluene, TCE, and PCE, other organics, and metals including arsenic, chromium, and lead.

The selected remedial action for this site includes compatibility testing on the contents of each treatment basin, above-ground tank, sump, drum, and bag with bulking and consolidation of compatible wastes and pumping the contents of the above-ground tanks, treatment basins, and sump into storage tanks; analytical testing of composite samples of drums or bulked wastes to determine appropriate treatment or disposal methods; and transporting the wastes for off-site treatment or disposal as appropriate. The estimated present worth for this remedial action, assuming treatment using incineration, is $1,339,000 with no O&M costs.

Performance Standards or Goals

The RCRA-listed wastes will be treated using the best demonstrated available technology or treated to attain specific treatment levels, as appropriate, to comply with RCRA land disposal restrictions. Chemical-specific levels were not specified.

Institutional Controls

Not applicable.

NPL Rank: 654

CLOTHIER DISPOSAL, NY

First Remedial Action - Final
December 28, 1988

The Clothier Disposal site is located in a rural area near the town of Granby, Oswego County, New York. It is a privately owned, 15-acre parcel of land, of which approximately 6 acres have been used for waste disposal. Land use in the vicinity of the site is predominantly agricultural. A wetland passes through the site to the west of the area used for waste disposal. Ox Creek also flows through the site in a northerly direction, feeding into the Oswego River, and a portion of the site is located within the 100-year floodplain. Ground water flow patterns clearly indicate that flow is toward Ox Creek. In 1973, drums of chemical waste were discovered on the Clothier property, despite State denial of a landfill permit application. After the New York Department of Environmental Conservation brought suit, the owner made several attempts to clean up the property. These attempts, however, resulted in drums being broken and drained. Subsequently, additional dumping of roofing materials, household wastes and junked vehicles occurred at the site. Based on data from the remedial investigation and State sampling, EPA established the need for a removal action for 2,200 drums located on site. A number of potentially responsible parties under an administrative order on consent removed 1,858 drums. EPA removed the remaining drums and visibly contaminated surficial soil and debris associated with the drums. This remedy addresses the low-level residual soil contamination remaining on site. If the results of ground-water, surface-water and sediment sampling determine a need to remediate the ground water and/or the wetland, a subsequent operable unit remedy will be undertaken. The primary contaminants of concern affecting the soil are VOCs including toluene, xylenes, and PCE, other organics including PAHs, PCBs and phenols, and metals.

The selected remedial action for the site includes placement of a one-foot soil cover over the contaminated areas and regrading and revegetation of the site; installation of rip-rap, as needed, on the embankment sloping towards Ox Creek to prevent soil erosion; construction and post-construction air monitoring; institutional controls preventing the utilization of the underlying ground water, or any land use involving significant disturbance of the soil cover; and long-term ground-water, soil, sediment and surface-water monitoring. The estimated present worth cost for this remedy is $500,000, which includes annual O&M costs of $27,000.

Performance Standards or Goals

Because the remedy addresses containment, chemical-specific standards or goals are not applicable.

Institutional Controls

Well restrictions will prevent the use of underlying ground water. Land use restrictions on residential use, or any use involving excavation at the site or significant disturbance of the soil cover. Any institutional controls, including but not limited to deed restrictions or easements, shall be consistent with New York law.

NPL Rank: 575

DE REWAL CHEMICAL CO., NJ

First Remedial Action - Final
September 29, 1989

The De Rewal Chemical Co. site is in Kingswood Township, Hunterdon County, New Jersey. The 3.7-acre site lies within the 100-year floodplain of the Delaware River and consists of a former dumping area, a garage, a private residence, and a building formerly occupied by the De Rewal Chemical Company. Between 1970 and 1973, the De Rewal Chemical Company reportedly manufactured and stored a textile preservative and an agricultural fungicide on site. The State discovered De Rewal Chemical Company's improper chemical handling practices in 1972, but was unsuccessful in forcing the company to comply with permit requirements. The De Rewal Chemical Company continued to improperly dump chemicals on site, including one incident in which a tank truck containing 3,000 to 5,000 gallons of highly acidic chromium solution was allowed to drain onto the soil and eventually to the Delaware River. In 1973, the State ordered the company to excavate and place contaminated soil on an impermeable liner. The company reportedly only placed a portion of the contaminated soil on an uncovered plastic sheet before filing for bankruptcy. The primary contaminants of concern affecting the soil and ground water are VOCs including PCE, TCE, and toluene, other organics including PAHs, and metals including chromium and lead.

The selected remedial action for this site includes excavation of 8,000 cubic yards of soil with on-site thermal treatment of 2,100 cubic yards of organic-contaminated soil followed by solidifying the soil and ash residue along with the remaining 5,900 cubic yards of inorganic contaminated soil and on-site disposal; monitoring and controlling air emissions generated during thermal treatment; pumping and off-site treatment of ground water at an off-site industrial wastewater treatment facility; ground-water monitoring; provision of a treatment system for the on-site residential well; temporarily relocating on-site residents; and preparing a cultural resources survey to ensure compliance with the National Historic Preservation Act. The estimated present worth cost for the selected remedial is $5,097,000, which includes O&M costs of $865,400.

Performance Standards or Goals

Contaminated soil which exceeds state action levels will be excavated and treated to meet state action levels. Specific soil cleanup goals include total VOCs 1 mg/kg, chromium 100 mg/kg, and lead 250 mg/kg. Ground water will be treated to meet state SDWA MCLs. Specific ground-water cleanup goals include TCE 1 ug/l, PCE 1 ug/l, chromium 50 ug/l, and lead 50 ug/l.

Institutional Controls

Institutional controls will be implemented restricting further property use to ensure the integrity of the solidified mass.

NPL Rank: 188

EWAN PROPERTY, NJ

Second Remedial Action - Final
September 29, 1989

The 43-acre Ewan Property site is in the New Jersey Pinelands in Shamong Township, Burlington County, New Jersey. The site neighbors forests and forested wetlands, farmland, and residences. An aquifer underlying the site contains a plume contaminated by on-site disposal practices. Between 1974 and 1975, the site owner reportedly buried uncontained and drummed hazardous wastes in an on-site disposal area. In 1982, the county was informed of the possible hazardous waste dumping and initiated ground-water monitoring and soil sampling programs the following year. Both the ground water and soil within the disposal area were found to be contaminated with VOCs and metals. This remedial action represents the second of two operable units for the site. The 1988 ROD addressed the treatment of 4,500 cubic yards of source waste, including buried drums and other heavily contaminated materials. This second operable unit addresses the remediation of the residual soil that will remain after implementation of the first operable unit and the treatment of the contaminated ground water. The primary contaminants of concern affecting the soil and ground water are VOCs including benzene, PCE, TCE, toluene, and xylenes, and metals including chromium and lead.

The selected remedial action for this site includes excavating and treating 22,000 cubic yards of soil using solvent extraction and soil washing, followed by redepositing treated soil on site as clean fill; treating and disposing of spent solvent off site; treating spent wash water on site using the ground-water treatment system; regrading and revegetating disposal areas; pumping and treatment of ground water followed by reinjecting treated ground water into the underlying aquifer; and environmental monitoring. The estimated present worth cost for this remedial action is $35,152,447 which includes annual O&M costs of $1,903,980.

Performance Standards or Goals

Soil will be treated to meet state Solid Waste Regulations and concentrations that would not deteriorate ground-water above ground water remedial objectives. No specific levels for soil were provided. Ground water will meet state water quality criteria (SWQC) to protect ground water in the New Jersey Pinelands and Federal and state MCLs to protect drinking water supplies. Specific ground-water treatment levels include benzene 1 ug/l (SWQC), TCE 1 ug/l (SWQC), toluene 2,000 ug/l (MCL), xylenes 44 ug/l (SWQC), lead 50 ug/l (MCL), and chromium 50 ug/l (SWQC).

Institutional Controls

Not applicable.

Group: 10(F)

FEDERAL AVIATION ADMINISTRATION TECHNICAL CENTER, NJ

First Remedial Action
September 26, 1989

The 5,000-acre multipurpose FAA Technical Center site is a federal facility eight miles northwest of Atlantic City, in Atlantic County, New Jersey. The site includes a jet fuel farm, an air terminal, a state national guard fighter group, the extensive facilities of the FAA Technical Center, and the Upper Atlantic City Reservoir. Atlantic City's municipal water supply is provided by nine ground-water supply wells located just north of the reservoir on FAA property as well as by water drawn directly from the reservoir. Land use in the site vicinity includes forested land and commercial and residential areas. There are 25 known areas of contamination at the FAA Technical Center. This is the first ROD for an area of contamination at this facility. Further areas of contamination will be addressed in future RODs. Soil and ground water at the site are contaminated with VOCs apparently attributable to the jet fuel farm. Subsurface jet fuel contamination is probably the result of leaking pipes, storage tanks, and spills associated with above ground and underground storage tanks, associated valves, piping, and dry wells, or a truck loading stand. As an interim remedial measure, free product recovery pumps were installed in 1988-89 in three on-site wells to recover the hydrocarbon plume floating on the water table. Product is currently being extracted and incinerated offsite. The total volume of spilled free product has been estimated at 360,000 gallons, the total volume of contaminated soil found in two hot spot areas was estimated to be 33,000 cubic yards, and the total volume of contaminated ground water was estimated to be 13,300,00 gallons. The jet fuel farm will be closed within the next year as new facilities come on line. The primary contaminants of concern affecting the soil and ground water are VOCs including benzene, toluene, and xylenes, and other organics including PAHs (naphthalene) and phenols.

The selected remedial action for this site includes *in situ* soil vacuum extraction (soil venting) and off-gas treatment using either incineration or activated carbon adsorption; extraction of free product floating on the plume followed by off-site incineration; ground-water extraction and addition of nutrients for subsequent reinjection and *in situ* biodegradation of residual ground water contamination; and ground-water monitoring. The estimated present worth cost for this remedial action is $583,000, which includes a total present value O&M cost of $200,000.

Performance Standards or Goals

Ground-water clean-up levels are based on state and federal MCLs, whichever is more stringent, and include benzene 1 ug/l (state MCL), xylene (total) 44 ug/l (state MCL), and toluene 2,000 (federal MCL). Total phenols will meet the state Ground Water Quality Standard of 300 ug/l. The soil clean-up levels are based on state Soil Cleanup Action Levels, which are TBCs, and include 1 mg/kg for total priority pollutant VOCs. For total petroleum hydrocarbons the action level is 100 mg/kg. No chemical-specific ARARs for soil contaminants were identified.

Institutional Controls

Not applicable.

NPL Rank: 562

FULTON TERMINALS, NY

First Remedial Action - Final
September 29, 1989

The 1.6-acre Fulton Terminals site is in Fulton, Oswego County, New York. The site is bordered to the west by the Oswego River, and a section of the site lies within the river's 100-year floodplain. Commercial and industrial operations are the primary land uses in the vicinity of the site. Spills and leaks of chemical wastes stored in eight tanks at the site resulted in soil and ground-water contamination. The wastes were produced as a result of a combination of former asphalt and roofing manufacturing operations conducted from 1936 to 1960, and a more recent hazardous waste storage operation. From 1972 to 1977, Fulton Terminals, Inc., operated a staging and storage area for hazardous wastes destined for off-site incineration. In 1981, following a citation for not meeting federal and state standards for the operation of a hazardous waste storage facility, Fulton Terminals initiated a cleanup which included emptying and removing four storage tanks. From June 1986 to May 1987, EPA and the PRPs undertook removal activities that included securing the site, removing all remaining storage tanks, excavating and removing approximately 300 cubic yards of contaminated soil and tar-like waste, and partially removing and plugging a storm sewer pipe running to the Oswego River. This remedy addresses the low levels of soil contamination remaining at the site and a plume of contaminated ground water which threatens the Oswego River. The primary contaminants of concern affecting the soil and ground water are VOCs including benzene, TCE, and xylenes, other organics including PAHs, and metals including arsenic.

The selected remedial action for this site includes excavation and low temperature thermal treatment of approximately 4,000 cubic yards of contaminated soil and backfilling the treated soil, provided it passes the TCLP Toxicity Test; placement of a one foot cap of clean top soil over the site; ground water pumping and treatment on site using air stripping and carbon adsorption, followed by reinjection or other type of recharge into the aquifer; disposal of soil and ground-water treatment waste residues at a RCRA-approved offsite hazardous waste facility; air monitoring; and ground-water monitoring for three years. The estimated present worth cost for this remedial action is $4,031,000, which includes an annual O&M cost of $732,000 for three years.

Performance Standards or Goals

Soil treatment levels are designed to prevent leaching to ground water that will result in levels above MCLs. Chemical-specific soil goals include TCE 2 mg/kg, benzene 1.4 mg/kg, and xylenes 8 mg/kg. Ground-water clean-up levels will meet the more stringent of federal and state drinking water standards, including TCE 5 ug/l (MCL) and arsenic 1,000 ug/l (MCL). Several contaminants such as benzene, xylenes, and certain metals may exceed drinking water standards at the end of remediation because they are detected at higher concentrations upgradient, and have been determined to be naturally occurring in the area. Naturally occurring wastes are not addressed under Superfund.

Institutional Controls

Institutional controls will be applied to prevent use of the underlying ground water due to the high concentration of naturally occurring metals in the ground water surrounding the site. These controls will include well construction permits and water quality certifications in accordance with state law.

NPL Rank: 197

GLEN RIDGE RADIUM SITE, NJ

First Remedial Action
June 30, 1989

The Glen Ridge Radium site is in the Borough of Glen Ridge and the town of East Orange in Essex County, New Jersey. The site covers approximately 90 acres of residential neighborhoods including 306 properties. The Montclair/West Orange Radium site is adjacent to this site and is being addressed concurrently under one remedial action. The soil at the site is contaminated to varying degrees with radioactive waste materials suspected to have originated from radium processing or utilization facilities located nearby during the early 1900s. The waste material was disposed of in then-rural areas of the communities. Houses were subsequently constructed on or near the radium waste disposal areas. Some of the radium contaminated soil is believed to have been used as fill in the low-lying areas, and some of the fill was mixed with cement for sidewalks and foundations. Temporary radon ventilation systems and gamma radiation shielding have been installed and maintained by EPA and the state to reduce indoor exposures. In June 1985, the state initiated a pilot study and excavated portions of the radium contaminated soil and disposed of the soil off site. The primary contaminant of concern affecting the soil and structures is radium^{226} which decays to radon gas.

The selected remedial action for this site includes excavation of approximately 41,000 cubic yards of highly contaminated soil and an unspecified amount of debris followed by off-site disposal; installation and maintenance of indoor engineering controls at less contaminated properties; environmental monitoring to ensure remedy effectiveness; and continuation of a treatment technology study for future actions. A final decision for the less contaminated properties has been deferred until after the 60-day public comment period extension. The estimated present worth cost for this remedial action is $53,000,000 with no O&M costs.

Performance Standards or Goals

The radium^{226}-contaminated soil will be excavated to a concentration of 5 pCi/g above background concentration at the surface (top 6 in) and 15 pCi/g above background in subsurface soil.

Institutional Controls

A decision to implement municipal or county health ordinances (e.g., permits for home repair or outdoor activities, deed restrictions) was deferred as a result of public comment.

NPL Rank: 858

MARATHON BATTERY CORP., NY

Third Remedial Action - Final
September 29, 1989

The Marathon Battery Corp. site is a former battery manufacturing plant in Cold Springs, Putnam County, New York. The site is composed of three study areas: Area I, which consists of East Foundry Cove Marsh and Constitution Marsh; Area II, which encompasses the former plant, presently a book storage warehouse, the surrounding grounds, and a vault with cadmium-contaminated sediment dredged from East Foundry Cove; and Area III, which includes East Foundry Cove (48 acres), West Foundry Cove and the Hudson River in the vicinity of Cold Spring pier and a sewer outfall. Contamination in Area III emanates from plant wastewater that was discharged via the city sewer system into the Hudson River at Cold Spring Pier or, in some instances, through a storm sewer into East Foundry Cove. A Record of Decision (ROD) was signed for Area I in September 1986 with clean-up activities to includes dredging the East Foundry Cove Marsh. The second ROD for this site was signed in September 1988 and included decontamination of the battery plant and soil excavation in Area II. This 1989 ROD represents the third and final operable unit for the site and addresses sediment contamination in Area III. The primary contaminants of concern affecting sediment at the site are metals including cadmium and nickel.

The selected remedial action for the site includes dredging of approximately 55,000 cubic yards of cadmium-contaminated sediment in East Foundry Cove to a depth of one foot, followed by on-site chemical fixation and off-site disposal; sampling and analysis of the area adjacent to and under Cold Spring pier and dredging approximately 900 cubic yards of cadmium-contaminated sediment from this area followed by treatment with East Foundry Cove sediment; sediment monitoring and performance of a hydrological study of Area III to determine if West Foundry Cove is a depositional area and in need of remediation; and long-term sediment monitoring. The estimated present worth cost for this selected remedy is $48,499,500, which includes annual O&M costs of $21,303,330 for the first year and $132,700 for years 2-30.

Performance Standards or Goals

The risk assessment for the site used references doses because neither of the contaminants of concern are considered carcinogenic. The acceptable sediment concentration of cadmium is 220 mg/kg. Expectations are that by dredging the upper layer of contaminated sediment, 95% of the cadmium contamination will be removed. It is anticipated that following remediation, cadmium concentrations in the dredged areas will not exceed 10 mg/kg.

Institutional Controls

Not applicable.

NPL Rank: 198

MONTCLAIR/WEST ORANGE RADIUM SITE, NJ

First Remedial Action
June 30, 1989

The Monclair/West Orange Radium site is located in the towns of Montclair and West Orange in Essex County, New Jersey. The site covers approximately 120 acres of residential neighborhoods. The Glen Ridge Radium site is adjacent to this site and is being addressed concurrently under one remedial action. The soil at the site is contaminated with radioactive waste materials suspected to have originated from radium processing or utilization facilities located nearby during the early 1900s. The waste material was disposed of in then-rural areas of the communities. Houses were subsequently constructed on or near the radium waste disposal areas. Some of the radium-contaminated soil is believed to have been used as fill in low-lying areas, and some of the fill was mixed with cement for sidewalks and foundations. Temporary radon ventilation systems and gamma radiation shielding have been installed and maintained by EPA and the state to reduce indoor exposures. In June 1985 the state initiated a pilot study, excavated portions of the radium-contaminated soil and disposed of the soil off site. The primary contaminant of concern affecting the soil and structures is radium^{226} which decays to radon gas.

The selected remedial action for this site includes excavation of approximately 41,000 cubic yards of highly contaminated soil and an unspecified amount of debris followed by off-site disposal; installation and maintenance of indoor engineering controls at less contaminated properties; environmental monitoring to ensure remedy effectiveness; and continuation of a treatment technology study for future actions. EPA deferred a final decision for the less contaminated properties until after a 60-day public comment period extension. The estimated present worth cost for this remedial action is $53,000,000 with no O&M costs.

Performance Standards or Goals

The radium^{226}-contaminated soil will be excavated to a concentration of 5 pCi/g above background concentration at the surface (top 6 in) and 15 pCi/g above background in subsurface soil.

Institutional Controls

A decision to implement municipal or county health ordinances (e.g., permits for home repairs or outdoor activities, deed restrictions) was deferred as a result of public comment.

NPL Rank: 702

NORTH SEA MUNICIPAL LANDFILL, NY

First Remedial Action
September 29, 1989

The 131-acre North Sea Municipal Landfill site is on eastern Long Island in Southampton, Suffolk County, New York. The site is south of Little Peconic Bay, in an area of extensive ponds, coves, and wetlands. The 131-acre active landfill overlies two aquifers and neighbors private homes that obtain their drinking water from private domestic wells. Two landfill cells, a proposed cell and a series of 14 lagoons are also on the site. Municipal solid waste, refuse, debris, and septic system waste from residential, industrial, and commercial sources have been disposed of at the site since 1963. From the early 1960s to 1985 Cell #1 received approximately 1.3 million cubic yards of municipal waste and septic sludges. Subsequent ground water monitoring revealed a contaminated plume migrating from cell #1 toward a nearby cove. Cell #1 was closed and partially capped in 1985, and a storm water diversion system was also installed to collect storm water and recharge it. Cell #2, which was equipped with a leachate collection system and accepted approximately 80,000 tons of municipal waste annually, has been closed since October 1989. The town has constructed Cell #3, which is now in operation. From the late 1960s to 1986, 14 lagoons were used to dispose of approximately 11 million gallons of septic waste. The lagoons were subsequently excavated and backfilled. This is the first of two planned operable units and addresses source control through remediation of Cell #1 and the former sludge lagoons. A subsequent Record of Decision will address ground and surface water contamination. The primary contaminants of concern affecting the soil and sludge are VOCs, other organics including PAHs, metals including arsenic and lead, and other inorganics.

The selected remedial action for this site includes covering Cell #1 with a low permeability cap; implementing site security and deed restrictions; sampling sludge/soil in the former sludge lagoons; and long-term air, surface water and ground water quality monitoring. The estimated present worth cost for this remedial action ranges from $7,700,000 to $8,300,000, depending on the type of landfill cap selected. These figures include an estimated annual O&M cost ranging between $190,000 and $200,000.

Performance Standards or Goals

Capping of the landfill reduces emissions of methane gas and VOCs, and reduces percolation of precipitation through the landfill and thus migration of hazardous substances into ground water. Individual contaminant goals were not specified for this source control remedial action.

Institutional Controls

Site security and deed restrictions will be implemented.

NPL Rank: 692

PEPE FIELD, NJ

First Remedial Action - Final
September 29, 1989

The Pepe Field site is a former disposal area in the town of Boonton, Morris County, New Jersey. The 3-acre site is an inactive, municipally owned recreational facility in a predominantly residential area. From 1935 to 1950 the E.F. Drew Company used the site to dispose of wastes generated from processing vegetable oils and soap products. Materials reportedly deposited onsite by the E.F. Drew Company were diatomaceous earth and activated carbon filter residue, incinerator and boiler ash, boiler ash, lime sludge, and soap residue. Residents living adjacent to the site complained about objectionable odors originating from the site. To reduce odor emissions, the town implemented elements of the odor abatement program proposed by the Drew Company. During the 1960s, the town covered the site with soil and installed a leachate collection and treatment system. Although these measures reduced the the odor problems, some incidents were still reported. Investigations revealed gas concentrations exceeding the lower explosive limit in the soil vapor at the perimeter of the site and in an apparent soil gas plume extending below the property adjacent to the site. The primary contaminants of concern affecting the soil found in the landfill include hydrogen sulfide and methane gases.

The selected remedial action for this site includes maintaining the site cover; installing and maintaining a landfill gas collection and treatment system using carbon adsorption; disposing of carbon offsite; upgrading and maintaining the existing leachate collection and treatment system; ground-water monitoring; and implementing deed restrictions to prevent waste disruption. The estimated present worth cost for this remedial action is $1,293,700, which includes an estimated O&M cost of $108,000 for the first two years and $93,000 for the next 28 years.

Performance Standards or Goals

Ground water and soil already meet state drinking water standards and state action levels. Leachate quality will comply with state requirements for discharge either to a publicly owned treatment works or to a nearby river. Emissions from the gas treatment system will comply with state air pollution regulations. Chemical-specific cleanup goals were not specified.

Institutional Controls

Deed restrictions will be implemented to prevent waste disruption.

Group: 7(F)

PICATINNY ARSENAL, NJ

First Remedial Action
September 28, 1989

The Picatinny Arsenal is a munitions and weapons research and development installation covering 6,491 acres and containing 1,500 buildings in Morris County, near the city of Dover, New Jersey. Ground-water contamination above state and federal action levels has been detected in the vicinity of Building 24, where past wastewater treatment practices resulted in the infiltration of metal plating waste constituents (i.e., VOCs and heavy metals) into the ground water. Two unlined lagoons alongside Building 24, thought to be a source of contamination, was eliminated during a 1981 action during which the unlined lagoons were demolished, contaminated soil removed, and two concrete lagoons installed. Two additional potential sources of contamination are a dry well at Building 24 and a former drum storage area at Building 31, directly across the street from Building 24. This interim ground-water clean-up remedy is designed to prevent deterioration to Green Pond Brook, a major drainage artery onsite, while the arsenal as a whole is evaluated. The primary contaminants of concern affecting the ground water are VOCs including TCE, and metals.

The selected interim remedy for this site includes ground-water pumping and treatment using a pretreatment system for the removal of metals and solids and air stripping to remove VOCs; GAC filtration of VOCs from the air stripper exhaust and air stripper effluent; discharge of treated ground water to Green Pond Brook; and effluent and air monitoring. Cost data was not provided because USACE was preparing to offer a competitive bid contract for the system.

Performance Standards or Goals

ARARs will be used to establish effluent quality and allowable VOCs emissions; however, ARARs for ground-water clean up will apply to the final remedial action, not this interim action. Chemical-specific cleanup levels, therefore, were not established.

Institutional Controls

Not applicable.

NPL Rank: 291

PORT WASHINGTON LANDFILL, NY

First Remedial Action - Final
September 30, 1989

The Port Washington Landfill site is on the eastern portion of Manhasset Neck, Nassau County, Long Island, New York. The 139-acre municipally owned site consists of two landfilled areas separated by a vacant area. This Record of Decision addresses the 53-acre inactive landfill on the western portion of the site, which is the suspected source of methane gas thought to cause furnace explosions in residences neighboring the landfill during 1979 through 1981. From 1974 to 1983 the landfill operator accepted incinerator residue, residential and commercial refuse, and construction rubble for disposal. Because extensive air monitoring, performed in 1981, revealed high methane levels in several areas residences, a venting system was installed to prevent subsurface gases from migrating west of the landfill and to destroy hazardous chemicals commonly detected in sanitary landfill gas. In 1981, the county also determined the presence of VOC contaminants in a drinking water well on site, which has since been removed from service. The primary contaminants of concern affecting the soil and ground water are VOCs including PCE, TCE, and benzene, and other organics including methane gas.

The selected remedial action for this site includes capping the landfill; rehabilitating the existing gas collection system and installing additional vacuum extraction vents; ground-water pumping and treatment using a metals removal process and air stripping followed by discharge to an aquifer recharge basin; and environmental monitoring using ground-water and landfill gas wells. The estimated present worth cost for this remedial action is $42,580,000, which includes a present worth O&M cost of $16,247,000 for 30 years.

Performance Standards or Goals

Ground-water clean-up goals are based on SDWA MCLs and state standards for drinking water. Chemical-specific goals were not provided.

Institutional Controls

Not applicable.

NPL Rank: 627

PREFERRED PLATING CORP., NY

First Remedial Action
September 22, 1989

The 0.5-acre Preferred Plating Corp. site is in a light industrial area of Farmingdale, Suffolk County, New York. The site is bordered to the east and west by commercial and light industrial properties, to the north by a large wooded area, and to the south by a residential community and a U.S. Army facility. More than 10,000 people live within a 3-mile radius of the site. Between September 1951 and June 1976, Preferred Plating Corporation operated a metal treating facility that resulted in the generation, storage, and disposal of hazardous waste. Untreated wastewater was discharged to four concrete leaching points directly behind the facility. Site investigations conducted by the county as early as 1953 revealed heavy metal contamination of ground water and cracked and leaking on-site leaching pits. Ground water is used for drinking water supplies by the entire population of both Naussau and Suffolk counties. The nearest public water supply well fields are located approximately one mile southeast of the site. This operable unit addresses the overall ground-water contamination attributable to the site; a second operable unit will be undertaken to more fully characterize and identify any contaminated soil and to investigate potential upgradient sources of contamination. The primary contaminants of concern affecting the ground water are VOCs including TCE and PCE, and metals including chromium and lead.

The selected remedial action for this site includes pumping and on-site treatment of contaminated ground water using metal precipitation, carbon adsorption, and ion exchange followed by reinjection of the treated ground water; off-site disposal of 220 gallons per day of wet cake generated by the water treatment plant and spent carbon filters to a RCRA subtitle C facility; and periodic ground-water monitoring. The estimated present worth cost is $9,327,400 for 12 years with an annual O&M cost of $920,900.

Performance Standards or Goals

On-site ground-water clean-up standards for the contaminants of concern were based on SDWA MCLs and State Ground Water Quality Regulations. Because this Record of Decision is only part of a total remedial action that will include another operable unit, the selected remedy by itself will not meet all chemical-specific ARARs or be capable of restoring area ground water to ground-water quality standards until upgradient source areas are removed. In the event a second operable unit fails to identify or control the source area, a waiver for technical impracticability will be sought.

Institutional Controls

Not applicable.

NPL Rank: 535

SMS INSTRUMENTS, INC., NY

First Remedial Action
September 29, 1989

The 1.5-acre SMS Instruments, Inc. site is in a light industrial and residential area of Deer Park, Suffolk County, New York. Since 1967 the site has been operated as an industrial facility which overhauls military aircraft components. Past waste disposal practices included discharging untreated wastewater from degreasing and other refurbishing operations to an underground leaching pool. In 1980 the site owner removed 800 gallons of VOC and metal-contaminated wastewater from the pool, and subsequently filled it with sand and sealed all drain pipes. In 1981 the county required the site owner to leak test a 6,000 gallon underground storage tank (UST) used to store jet fuel. Because tests indicated leakage, the tank was emptied and, in 1988, was excavated and removed. This Record of Decision represents the first of two operable units at the site and addresses ground-water and soil contamination. Source areas include the former UST area, the leaching pool, and spill areas where wastes were formerly stored in drums. A subsequent operable unit will investigate suspected sources of upgradient contamination. The primary contaminants of concern affecting the soil and ground water are VOCs including PCE, TCE, and xylenes, and metals including chromium and lead.

The selected remedial action for this site includes treating approximately 1,250 cubic yards of soil using *in situ* steam stripping or air stripping depending on the results of a planned treatability study; and ground-water pumping and treatment using air stripping followed by reinjection through on-site wells. The contingency plan for soil remediation includes excavation and off-site incineration of contaminated soil. The estimated present worth cost for the selected remedial action is $1,195,800, which includes an annual present worth O&M cost of $437,576.

Performance Standards or Goals

Treated ground water will meet state and federal drinking water standards prior to reinjection. Specific ground water cleanup goals include TCE 5 ug/l (MCL), PCE 0.7 ug/l (state), xylenes 5 ug/l (state), chromium 50 ug/l (MCL), and lead 25 ug/l (State). Soil will be treated until all VOC contaminants of concern attain a soil contaminant level of less than 10 ug/kg.

Institutional Controls

Not applicable.

NPL Rank: 42

VINELAND CHEMICAL CO., INC., NJ

First Remedial Action
September 28, 1989

The Vineland Chemical Co., Inc. site is in Vineland, Cumberland County, New Jersey. The site is in a residential/industrial area and borders the Blackwater Branch stream, a tributary to the Maurice River, which ultimately flows into Union Lake. The Vineland facility consists of several herbicide manufacturing and storage facilities, a wastewater treatment facility, and several lagoons. The facility produces approximately 1,107 tons of herbicide waste by-product salts, EPA hazardous waste number K031, each year which were stored on site in uncontrolled piles on the soil, in the unlined lagoons, and in abandoned chicken coops. Furthermore, arsenic-contaminated wastewater was discharged into unlined lagoons until 1980 when Vineland Chemical Company began treating wastewater. Since 1978, hazardous waste salts produced at the site have no longer been stored on site for more than 90 days and are disposed of off site by licensed shippers; however, the past improper storage of those salts have resulted in extensive arsenic contamination of soil, sediment, and ground water because of the high solubility of the salts. The ground water underneath the plant discharges into the Blackwater Branch stream and has resulted in contamination of sediment in Blackwater Branch, the Maurice River, and Union Lake. The site has been divided into four discrete operable units to facilitate remediation: sediment in the 870-acre Union Lake; sediment in the Maurice River and Blackwater Branch stream areas; soil associated with the Vineland Chemical Company facility; and ground water underlying the site. The primary contaminant of concern affecting the soil, sediment, and ground water is arsenic.

The selected remedial actions for this site will be implemented in four discrete operable units (OUs). OU 1, the plant site source control, will include *in situ* flushing of 126,000 cubic yards of arsenic-contaminated soil, 54,000 cubic yards of which will be excavated and consolidated with 72,000 cubic yards of undisturbed soil; decontaminating on-site storage buildings (chicken coops); and closing two impoundments followed by off-site treatment and disposal of the wastewater and sludge recovered from the impoundments. OU 2, the plant site ground water, will include ground-water pumping and treatment followed either by reinjection, off-site discharge to the Maurice River, or reuse for soil flushing; and off-site treatment and disposal of residue sludge from ground-water treatment. OU 3, the stream and river areas sediment, will include excavating, dredging, and treating 62,600 cubic yards of exposed and buried sediment from the Blackwater Branch and its floodplain using water wash extraction followed by on-site redeposition of treated sediment; treating and off-site disposal of sludge residue from the water wash extraction process; implementing a three-year period of natural river flushing for the Maurice River sediment after remediating the arsenic-contaminated ground water; and selection of a water wash contingent remedy for the river sediments if levels persist above action levels. OU 4, an interim remedy for the Union Lake sediment, will include dredging, excavating, and treating sediment from Union Lake using water wash extraction followed by redeposition into the lake; treating and disposing of sludge residue off-site; and sediment and surface water monitoring. The estimated present worth cost for these remedial actions is $66,384,636, which includes estimated annual O&M costs of $3,463,463 for the short term and $38,010 for the long term for the plant source control, stream and river sediment, and lake sediment operable units; and a present worth O&M cost of $5,155,053 for the ground water operable unit.

Performance Standards or Goals

Soil, sediment, and ground-water clean-up goals for arsenic are based on 10^{-6} health-based levels and MCLs. Specific goals include 20 mg/kg (soil and surface sediment), 120 mg/kg (submerged sediment), and 50 ug/l (ground water).

Institutional Controls

Not applicable (may be determined and implemented at a later date).

NPL Rank: 419

VINELAND STATE SCHOOL, NJ

First Remedial Action - Final
September 30, 1989

The 195-acre Vineland State School site is in the northern part of the city of Vineland, Cumberland County, New Jersey. The site, commonly referred to as the Vineland Developmental Center, is a residential treatment facility for mentally handicapped women and is comprised of numerous buildings to care for the 1,300 residents. In addition to the facility, the site includes farmland, a hospital care facility, facility maintenance shops, and an unregulated incinerator. The site overlies three aquifers which serve as major sources of drinking water for the county. There were numerous allegations of improper waste disposal at five separate on-site subsites. Subsite one, a former landfill which has since been used to covered and vegetated, reportedly had been used to dump mercury and arsenic-contaminated pesticides. Data from the remedial investigation, however, could not confirm these allegations. At subsite two, PCB-contaminated fluid spilled and spread over a 1-acre area. The State remediated subsite two in 1988, which included demolishing and disposing of approximately 3,900 tons of PCB-contaminated soil and concrete pads off site. Subsite three was a garbage dump for 10 years before being backfilled and used as a baseball field. Subsites four and five were pits where transformer oils and chemicals were dumped in the mid 1950s. Investigation results of the subsites excluding subsite two, which was cleaned up in 1988, revealed only low levels of contamination.

The selected remedial action for this site is no further action. The risks posed by the contamination in these areas are within the acceptable range as determined by the state and EPA. As a precautionary measure, however, ground water and disposal areas will be monitored. No costs were specified for this remedial action.

Performance Standards or Goals

Not applicable.

Institutional Controls

Not applicable.

REGION 3

(Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia)

NPL Rank: 655

AMBLER ASBESTOS PILES, PA

Second Remedial Action - Final
September 29, 1989

The Ambler Asbestos Piles site is in the southwestern portion of the Borough of Ambler, Montgomery County, Pennsylvania. This second operable unit for the site addresses the CertainTeed asbestos pile portion of the Ambler Asbestos site. The CertainTeed asbestos pile contains asbestos scrap materials and encompasses approximately 3.5 acres of a 5-acre tract. Land around the site is used for industrial, commercial, residential, and transportation purposes. The site is bordered to the southeast by the Stuart Farm Creek floodplain and associated wetlands system, and to the west by the Wissahickon Creek floodplain. The CertainTeed pile was created by the disposal of asbestos-cement scrap originating from asbestos pipe manufacturing operations at the CertainTeed plant. In addition, asbestos-contaminated sludge from a process water treatment settling pond was also disposed of at the site. Asbestos waste disposal continued from 1962 until 1977 when the state ordered the CertainTeed pile closed. At present the pile contains approximately 110,000 cubic yards of asbestos-related waste material which is covered by approximately 22,000 cubic yards of soil. Several inorganic contaminants have also been detected in the soil and debris of the pile as well as in surface water and sediment from Stuart Farm Creek. Because the actual sources of the inorganic contaminants in the creek have not been identified, a verification study will be performed to define the source of these contaminants. The primary contaminant of concern affecting the soil, sediment, debris, and surface water is asbestos.

The selected remedial action for the site includes regrading the pile plateau to promote proper storm water drainage; placing a soil cover with geotextile reinforcement on portions of the pile plateau and slope where the soil cover is less than two feet deep; performing a verification study to determine the source of inorganics in Stuart Farm Creek; installing erosion control devices to protect the toe of the pile from scouring by Stuart Farm Creek; implementing erosion and sedimentation controls to facilitate vegetation; restricting site access; monitoring air and surface water; and post-closure maintenance. The estimated present worth cost for this remedial action is $753,000, which includes annual O&M costs of $21,700 for the first five years and $10,200 for years six to thirty.

Performance Standards or Goals

This remedy addresses containment of asbestos-contaminated debris; therefore, no clean-up level is provided for the debris.

Institutional Controls

Institutional controls will be established to restrict future land use to surficial activities by authorized personnel.

NPL Rank: 512

BALLY GROUND WATER CONTAMINATION, PA

First Remedial Action
June 30, 1989

The Bally Ground Water Contamination site is a municipal water supply well field in the Borough of Bally in Berks County, near the Philadelphia metropolitan area. The Bally Well Field and the springs to the northwest of the site are the public water sources for approximately 1,200 Bally residents. The area near the site includes wetlands to the north and a manufacturing plant (the plant) 1,000 feet to the south of one of Bally Well Field's municipal wells (Well No. 3). Since the 1930s degreasing solvents containing methylene chloride, TCA, methanol, toluene, and TCE have been used in manufacturing at the plant. One of the plant's facilities includes a drum storage area which contains empty drums, waste oil, and spent degreasers. A 1982 state water quality check identified the plant as a source of VOC contamination in Bally's municipal wells. Former lagoons underlie the plant and are also considered potential sources of aquifer contamination. From December 1982 to March 1987 the Borough of Bally did not use the contaminated Municipal Well No. 3 for water supply although the water was periodically pumped and discharged into a nearby pond to contain the contaminant plume. Pumping, however, had the effect of drawing VOCs deeper into the aquifer. The well was completely shut down in March 1987. Results of additional ground water contamination studies indicated that 19 of 35 wells sampled contained detectable levels of VOCs. Currently a plume of VOC-contaminated ground water extends from the plant to the east and northeast. Plume contaminant movement has become more controlled since pumping and air stripping pilot testing began at Well No. 3. Ground water is the focus of this remediation because no remaining source of VOC contamination has been identified on the site. The primary contaminants of concern affecting the ground water are VOCs including TCE.

The selected remedial action for this site includes abandoning appropriate wells in the attainment area; pumping and treatment of ground water from Municipal Well No. 3 by air stripping with either vapor phase carbon, regenerable vapor phase carbon, or vapor phase catalytic oxidation, followed by discharging treated water to an adjacent stream or into the municipal potable water system, as needed, to provide a suitable alternative water supply; implementation of institutional controls restricting the use of operable private wells and the construction of new wells within the attainment area; and performing ground-water and surface-water monitoring to measure contaminant concentration and migration. The estimated present worth cost for this remedial action ranges from $2,950,000 to $3,640,000, which includes O&M costs from $105,000 to $189,000 depending on the chosen treatment option.

Performance Standards or Goals

Ground water will be treated to meet MCLs or PMCLs when final MCLs are unavailable. Chemical-specific goals include TCE 0.005 mg/l (MCL).

Institutional Controls

Institutional controls will be implemented to restrict the use of operable private wells and the construction of new wells.

NPL Rank: 924

CRAIG FARM DRUM, PA

First Remedial Action - Final
September 29, 1989

The Craig Farm Drum site covers approximately 117 acres near the village of Fredericksburg in Armstrong County, Pennsylvania. The area around the site is dominated by farmland and forest, and a creek crosses the southern portion of the site. The site consists of two abandoned strip mine pits which were later used for disposal of distillation residue containing resorcinol and other high polymers. From 1958 to 1963 the Koppers Chemical Co. disposed of 2,500 tons of resorcinol production residue in 55-gallon drums in the pits. Resorcinol is an organic compound used as an adhesive enhancer in commercial products such as tires and pharmaceuticals. Investigations in 1984 revealed that the majority of drums were broken or crushed and were without lids. The primary contaminants of concern affecting the soil and ground water are VOCs including benzene, other organics, phenols, metals including lead and chromium, and other inorganics.

The selected remedial action for this site includes the excavation of 32,000 cubic yards of soil from the two disposal pits and surrounding area with on-site treatment using solidification; placement of treated soil in a newly excavated and lined on-site landfill followed by capping; passive collection of ground water using a seep interceptor system with off-site treatment; and performing a ground water verification study. The estimated present worth cost for this remedial action is $5,188,000, which includes estimated annual O&M costs of $124,000 for 30 years.

Performance Standards or Goals

Soil will be excavated until the organic compound resorcinol is no longer detectable (<50 mg/kg). Ground-water performance levels include benzene 0.005 mg/l (MCL), phenol 3.5 mg/l (AWQC), chromium 0.05 mg/l (MCL), and lead 0.05 mg/l (MCL).

Institutional Controls

Deed notices will be implemented to notify property owners of contaminants at the site.

NPL Rank: 801

CROYDEN TCE, PA

First Remedial Action
December 28, 1988

The Croyden TCE site is located in Bristol Township, Bucks County, Pennsylvania. VOC contamination in the ground water has been detected over a 3.5-square mile area referred to as the study area. The study area is predominantly residential with an estimated 3,000 residents. A small southeastern portion of the study area containing elevated levels of VOCs, particularly TCE, and numerous potential source areas have been identified and are referred to collectively as the "focused area of investigation." This smaller area is composed of the Croyden residential community and several manufacturing and commercial establishments. The study area is bordered on the south by the Delaware River. Neshaminy Creek, which borders the study area to the west, and Hog Run Creek which flows through the focused area of investigation, both discharge to the river. Although the source of contamination has not been identified, the contaminant plume appears to be flowing south-southeast into the East Branch of Hog Run Creek and probably into the Delaware River. EPA identified the Croyden site following a series of studies beginning in 1984 conducted on the Rohm & Haas site, an industrial landfill, located on the southern boundary of the site. The primary contaminants of concern affecting the ground water are VOCs including TCE and PCE.

The selected remedial action for this site includes connecting approximately 13 residences to the public water supply system via the construction of new water services lines, mains, hydrants, and valves; and ground-water monitoring to ensure that homes located outside of the TCE-contaminated zone will not be at risk from the migrating plume. The estimated present worth cost for this remedial action is $106,000 with annual O&M cost of $3,400 for 30 years.

Performance Standards or Goals

This operable unit does not address treatment of contaminated soil or water. The remedy will prevent human exposure to concentrations of TCE in excess of federal, state and local health-based ARARs.

Institutional Controls

Not applicable.

NPL Rank: 927

CRYOCHEM, INC., PA

First Remedial Action
September 29, 1989

The 19-acre CryoChem, Inc. facility is a metal fabricating facility in the village of Worman, Earl Township, Berks County, Pennsylvania. The facility consists of a workshop area, a warehouse, and an office building which are all located in the southern four acres of the site. Between 1970 and 1982, Cryochem reportedly used chemical solvents to clean dye from metal welds at a rate of two to three 55-gallon drums per year. The facility also reported that a solvent spill had occurred at some unspecified time in the past. Spilled solvent is suspected to have collected in the workshop drains and flowed, through underground channels, towards a stream that flows across the site. Spilled solvent has also migrated through the soil column and has contaminated the ground water underlying the site. Ground-water samples, collected between 1981 and 1985 by the state and EPA, revealed that an on-site production well, nearby residential wells, and on-site soil have been contaminated. As a result of drinking water contamination, EPA installed activated carbon filters in 13 homes in 1987. This Record of Decision, the first of two operable units, addresses the distribution of clean water to residents whose water supply is affected or potentially affected by ground-water contamination. The primary contaminants of concern affecting the ground water are VOCs including TCA, DCA, TCE, DCE, and PCE.

The selected remedial action for this first operable unit includes installation of dual-activated carbon adsorption units or continued maintenance of existing carbon units at affected homes until a permanent clean water supply is developed; implementation of periodic sampling at potentially affected homes; construction of a new uncontaminated water supply to serve affected and potentially affected residences and businesses; and periodic sampling of residents outside the affected area. The estimated present worth cost for this remedial action is $1,260,000 which includes annual O&M costs of $80,000.

Performance Standards or Goals

Ground water will meet SDWA MCLs or an excess cancer-risk level less than 10^{-6} if an MCL has not been developed for a particular chemical. Target cleanup levels for ground water include TCA 200 ug/l (MCL), DCA 0.38 ug/l (based on a 10^{-6} cancer risk), TCE 5 ug/l (MCL), DCE 7 ug/l (MCL), and PCE 0.66 ug/l (based on a 10^{-6} cancer risk).

Institutional Controls

Not applicable.

NPL Rank: 106

DOUGLASSVILLE DISPOSAL, PA

Second Remedial Action - Final
(and Amendment)
June 30, 1989

The Douglassville Disposal site is a 50-acre abandoned waste oil processing facility in Union Township, Berks County, Pennsylvania. The area surrounding the site includes agricultural land, residences, and light industrial development. The site lies almost entirely within the 100-year floodplain of the Schuylkill River, which borders the site to the north and east. The Schuylkill River is used for municipal and industrial water supply, recreational purposes, and waste assimilation. Further downstream of the site, seven public water supply users draw water from the Schuylkill River. From 1941 to 1979 the site operated as a lubrication oil and waste solvent recycling facility. Wastes generated from the recycling processes were stored on site in several lagoons. The site consists of a former waste oil processing area and various waste disposal areas. Because of the site's size and the complexity of the various on-site activities, the site has been divided into 10 source areas of contamination. Disposal areas include two backfilled sludge disposal lagoons (source areas four and five), an oily filter cake disposal area (source area two), an oil drum storage area (source area eight), an area where waste oil sludge was landfarmed into the soil (source areas three and six), the former processing facility/tank farm area (source area one), a small backfilled lagoon (source area nine), an old incinerator (source area seven), and an area of scrap metal and tanks (source area 10). In 1970 heavy rain caused a lagoon to overflow and breach safety dikes; two to seven million gallons of waste flowed into the Schuylkill River. Two years later, a hurricane caused the Schuylkill River to overflow its banks and inundate the entire site, releasing an estimated six to eight million gallons of waste. EPA subsequently drained and backfilled the lagoons. Beginning in 1979 operations changed to refining waste oils for use as fuel in industrial boilers. Oily wastewater sludge from the refining process was landfarmed in the area until 1981, when the state mandated operational corrections to the landfarming practices. All operations ceased in 1985. The 1988 Record of Decision (ROD) addressed the risks associated with the former processing facility/tank farm area, which were impediments to any future soil and ground-water remediation. This second and final response action addresses soil and ground-water contamination remaining after the former processing facility/tank farm and associated wastes have been removed offsite. This ROD also amends, in part, the 1985 ROD, which outlined the remedial action for the source areas designated as two, four, and five but deferred a decision regarding ground-water contamination. The primary contaminants of concern affecting the soil, sediment, and ground water are VOCs including benzene, toluene, and vinyl chloride. other organics including PAHs, PCBs, and phenol. and metals including lead.

The selected remedial action for this site includes excavation and on-site thermal treatment of 48,400 cubic yards of soil and sludge from source area two, and 600 cubic yards of oily sediment from the drainage ditch that runs from source area nine, followed by backfilling ash residue into source area two; covering the backfilled area with clean soil followed by revegetation; capping of source areas one, four, and five with one foot of fly ash and two feet of soil followed by revegetation; if ash residues exceed EP toxicity levels solidification would be required prior to onsite disposal; capping source areas three, six, and nine (approximately 10 acres) with one foot of clean soil followed by revegetation; implementing institutional controls to prevent soil disturbance and well drilling; ground-water and surface-water monitoring; and establishing ACLs for ground water. The estimated present worth cost for this remedial action ranges from $39,430,000 to $53,769,000 depending on whether ash residue requires solidification prior to disposal.

Performance Standards or Goals

The selected remedy will treat soil that exceeds a 10^{-6} cancer-risk level. Ground-water protection standards will be alternate concentration levels (ACLs) and will be established as the maximum existing concentration measured in the monitoring wells. The ACLs include benzene 2,000 ug/l, toluene 2,300 ug/l, vinyl chloride 1,200 ug/l, phenol 7.1 ug/l, and lead 227 ug/l. Lead emissions to the air will not exceed NAAQS and state air quality standards which are set for lead at 1.5 ug/m^3 (on a quarterly average).

Institutional Controls

Institutional controls will be implemented to restrict area access and ground water use.

NPL Rank: 487

HAVERTOWN PCP, PA

First Remedial Action
September 29, 1989

The Havertown PCP site is in Havertown, Delaware County, Pennsylvania, approximately 10 miles west of Philadelphia. This 12 to 15 acre site consists of a wood treatment facility, an adjacent manufacturing facility, and Naylors Run Creek which drains the area. Land use in the vicinity of the site consists of commercial and residential properties. Contamination at the site is due to improper disposal of wastes generated from wood preserving operations. From 1947 to 1963, PCP-contaminated oil was dumped into a well which drained into ground water beneath the facility. In 1972, the state identified contaminated ground water discharging from a storm sewer into Naylors Run. From 1976 to 1982 EPA performed containment activities including installing filter fences in Naylors Run and sealing a sanitary sewer pipe. In 1988 EPA installed a catch basin in Naylors Run to trap discharge from the storm sewer pipe. Other onsite wastes include five holding tanks filled with PCP and VOC-contaminated wastewater and numerous 55-gallon drums of unanalyzed waste materials. This Record of Decision (ROD), the first of two operable units, will address the remediation of surface water and the disposal of drummed and tanked wastes. A subsequent ROD will address the impact of contaminated soil on ground-water contamination at the site. The primary contaminants of concern affecting the surface water are VOCs including benzene, toluene, and TCE, other organics including phenols, dioxins, PCP, and PAHs, metals including arsenic and chromium, and oils.

The selected remedial action for this site includes off-site land disposal of 200 drums of soil and oily debris, and off-site treatment and disposal of 6,000 gallons of wastewater stored in on-site tanks; soil monitoring; installing and operating an oil/water separator at the storm sewer effluent point to Naylors Run; multimedia monitoring; and implementation of site access restrictions. The estimated present worth cost for this remedial action is $1,158,200, which includes an estimated annual O&M cost of $110,000 for years one to five and $45,000 for years six to thirty.

Performance Standards or Goals

Cleanup goals for the site are based on a 10^{-6} risk level. Specific surface water cleanup goals include reducing the discharge of PCP-contaminated oil to Naylors Run to less than 5 mg/l which translates to a surface water concentration of 17 ug/l. In addition, surface water concentrations for benzene, toluene, TCE and other VOCs will be reduced by 17%.

Institutional Controls

Not applicable.

NPL Rank: 778

HEBELKA AUTO SALVAGE YARD, PA

First Remedial Action
March 31, 1989

The 20-acre Hebelka site is located in a rural area of the Weisenburg Township in Lehigh County, Pennsylvania. The site is bordered primarily by agricultural fields; however, three residences are located on or immediately adjacent to the site. From 1958 to 1979, the property was used as an automobile junk yard with intermittent periods of activity involving salvage operations. Debris including two large piles of battery casings, empty drums, junk cars, and scrap metal were accumulated on site. A site inspection in December 1985 revealed lead in soil downgradient from the battery piles, and chromium in downgradient sediment. Lead concentrations were highest in surface soil samples (<3ft) ranging from 200 to 65,000 mg/kg. This Record Of Decision addresses source control; a second operable unit will address migration pathways such as downgradient sediment and ground water. The primary contaminant of concern at the site is lead.

The selected remedial action for this site includes excavation and on-site fixation of 5,000 cubic yards of soil, followed by off-site disposal of treated soil at a sanitary landfill; excavation and recycling of 1,000 cubic yards of battery casings; and soil backfilling and revegetation. The estimated present worth cost for this remedial action ranges from $6,073,436 to $6,884,652; the greater cost reflects the additional expense of disposing of the battery casings if recycling is impractical. No O&M costs are expected.

Performance Standards or Goals

The soil will be excavated down to a lead concentration of 560 mg/kg based on health-risk calculations.

Institutional Controls

Not applicable.

NPL Rank: 404

HENDERSON ROAD, PA

Second Remedial Action - Final
September 29, 1989

The Henderson Road site is a 7.6-acre site in Upper Merion Township, Pennsylvania. O'Hara Sanitation Company, Inc. has used the site for waste storage, waste recycling, vehicle maintenance, and parking and office facilities since 1974. The area surrounding the site is zoned for industrial and residential use. The site is bounded by the Pennsylvania Turnpike, the Conrail property including train tracks, Henderson Road, and Frog Run. The Upper Merion Reservoir, located 2,000 feet upgradient of the site, serves as part of the water source for approximately 228,000 people. Prior to 1974 the site was operated by the Ellis Concrete Company as a concrete preparation plant. During this operation cinders may have been placed on the western portion of the site and on adjacent railroad property. In 1974 William J. O'Hara, Inc. began landfilling trash and construction debris on central and eastern portions of the site until 1984. Between 1974 and 1977 William J. O'Hara, Inc. alledgedly injected industrial waste into a 160-foot onsite well. Furthermore, liquid waste, sludge, and drums may have been disposed of in the landfill. The first operable unit for this site, as described in a June 1988 Record of Decision, included pumping and treatment, using air strippers, of contaminated ground water. This will be accompanied by additional characterization of the injection well, exavation of oil pit sediment if found, removal of significant waste within the well if feasible, institutional controls, further characterization of saturated and unsaturated zones, possibly direct treatment in the unsaturated zone, monitoring, and periodic evaluation of cleanup goals. The second operable unit addresses all surface sources of contamination at the site. The primary contaminants of concern affecting the soil and ground water are VOCs including benzene, toluene, PCE, and TCE, and other organics including PAHs. The predominant carcinogenic risk for the landfill operable unit (LOU) is based on the prediction of movement of leachate to ground water. Of the 19 chemicals of concern identified for the LOU, bis (2-chloroethyl) ether and six volatiles are considered by EPA to pose the greatest threat to ground water. Other routes of exposure include those from ingestion of soil and inhalation of fugative emissions.

The selected remedial action for this operable unit includes installation of erosion controls; regrading and capping, including possibly moving the on-site watermain; installing a short- and long-term leachate collection system with treatment and discharge to be determined during design; excavation and on-site consolidation of trash, soil, and cinder currently located at the adjacent Turnpike property with appropriate remediation of wastes left in place at the Turnpike property; further sample collection and data evaluation in the western portion of the site leading to a determination regarding treatment and/or capping in that area, and contingent ground water recovery; monitoring of ground water and leachate; and institutional controls. The estimated present worth cost for this remedial action is $7,265,000, which includes an annual O&M cost of $213,260.

Performance Standards or Goals

Treatment prescribed for this landfill operable unit is designed to achieve an on-site risk of 4.2 x 10^{-6}. Soil cleanup is based on depth from surface not on concentrations of contaminants. Clean-up standards for the aquifer, which has been considered as Class IIA, are identified consistently for both operable units and are based on the most conservative value derived from the following: MCLs, MCLGs, aquatic water quality criteria, drinking water equivalent levels, suggested no-adverse effect levels, models developed during the risk assessment, processes described in the Superfund Public Health Evaluation Manual, and specific values developed by EPA where no other ARARs exist. MCLs were used where available. Alternate concentration limits are proposed for 1,1-dichloroethane, 1,2-dichloroethane, benzene, 1,2-dichloropropane, and trichloroethene.

Chemical-specific ARARs are proposed in the LOU ROD for 56 constituents.

Institutional Controls

Institutional controls will be used to restrict activities that would interfere with remediation at the site.

NPL Rank: 888

KIMBERTON SITE, PA

Second Remedial Action - Final
June 30, 1989

The Kimberton site is in Chester County, Pennsylvania, near the Philadelphia metropolitan area. The site encompasses an industrial production plant currently owned by Monsey Products Company, Inc., and adjacent properties within the neighboring village of Kimberton. Water quality testing since 1981 has revealed numerous area domestic and commerical potable well water supplies contaminated with VOCs. A portion of this contamination originated from the on site industrial production plant, which disposed of wastes in several lagoons during the 1950s. An EPA investigation in the spring of 1982 revealed the presence of organics, including TCE and DCE, in local ground water, surface water, and soil. In mid 1982, fifty seven, 55-gallon drums from an abandoned on-site septic system were excavated, removed, and disposed of off site. In 1984 a remedial action program was initiated to excavate, remove, and dispose of approximately 2,050 cubic yards of soil from three former lagoon areas that were highly contaminated with VOCs. These lagoons are in proximity to numerous private water supply wells and less than 1 mile from French Creek, which is used for public recreation and fishing. VOCs are believed to ultimately discharge to surface waters to the north and east in the village of Kimberton via the ground water. In 1985, 67 residential and commercial wells were sampled and found to contain various concentrations of TCE, DCE, and vinyl chloride. As a result of these findings, the former and current owners of the plant agreed to provide 23 residential and commercial locations with an alternate source of drinking and contact water as an interim solution under the first operable unit. This second operable unit addresses the contaminated plume and the source of contamination. The primary contaminants of concern affecting the ground water and surface water are VOCs including TCE and DCE.

The selected remedial action for this site includes the continued provision of alternate water supplies through GAC treatment system and/or potable water supply storage tanks; pumping and treatment of ground water using an air stripping system with on-site discharge to an adjacent stream; long-term ground water monitoring; collection and treatment of surface water at the local ground water discharge point using an air stripping system; and institutional controls to restrict ground water use. The estimated present worth cost of this remedial action is $2,630,000, which includes annual O&M costs of $175,000.

Performance Standards or Goals

The current goal of ground-water remediation is to achieve natural background conditions. Ground water will gradually meet MCLs through air stripping, natural flushing, and VOC degradation. VOC-contaminated ground water will be treated to attain MCLs including TCE 5 ug/l, DCE 7 ug/l, and vinyl chloride 2 ug/l. Surface water will be treated to meet ambient water quality criteria including TCE 21,900-45,000 ug/l and DCE 11,600 ug/l. Because the site is located in a nonattainment area for ozone, air emissions from the air stripping system will comply with state air toxic guidelines.

Institutional Controls

Institutional controls will be implemented to restrict the installation and use of new ground-water extraction wells within the area affected by ground-water contamination.

NPL Rank: 258

M.W. MANUFACTURING, PA

First Remedial Action
March 31, 1989

The M.W. Manufacturing site is a former copper recovery facility located in Montour County, Pennsylvania, two miles north of Danville. The Pennsylvania Department of Transportation (PennDOT) maintains a storage area immediately north of the site, and farmlands and wooded lots are adjacent to the site on the west and south. Mauses Creek flows in a southerly direction past the site. Several private residences, motels, gas stations, restaurants, and a Head Start school are located just north of the PennDOT storage area and rely on private ground-water wells for drinking water. M.W. Manufacturing was engaged in secondary copper recovery from scrap wire, using both mechanical and chemical processes. Granular carbon wastes generated by the chemical process was dumped on site, and spent solvents and acids were allegedly disposed of on site. In 1972, M.W. Manufacturing filed for bankruptcy and the Philadelphia National Bank acquired the property. Warehouse 81 Inc. acquired the site in 1976, and subsequently formed a limited partnership with Domino Salvage, Inc. to recover wire at the site using mechanical recovery only. The initial remedial investigation revealed several areas posing potential threats to public health: the carbon waste pile, four wire-fluff waste piles, a surface impoundment, buried lagoon and contaminated soil, drums and storage tanks. This remedial action addresses the concerns for direct contact with and migration to ground water of contaminants from the carbon waste pile. The remaining areas are the subject of a long-term remedial investigation and feasibility study. The primary contaminants of concern affecting the soil are VOCs including PCE and TCE, organics including PCBs, and metals including lead.

The selected remedial action for this site includes excavating the carbon waste pile (approximately 875 cubic yards of contaminated waste and contaminated underlying soils) and transporting the waste off site to an incinerator facility and disposing of the ash in an off-site RCRA hazardous waste landfill. The estimated capital cost for this remedial action is $2,061,000. Since on-site remediation activities are anticipated to require less than one year, there are no O&M costs.

Performance Standards or Goals

Excavation of soils will be based on visible contamination. The carcinogens will be treated to less than 2 ug/kg for each individual contaminant which corresponds to the risk range of 10^{-4} to 10^{-6}.

Institutional Controls

Not applicable.

NPL Rank: 488

NEW CASTLE SPILL, DE

First Remedial Action - Final
September 28, 1989

The New Castle Spill site is a former manufacturing facility 0.5 mile north of New Castle, Delaware, and is in the 100-year floodplain of the Delaware River. Commercial enterprises and residences neighbor the site and receive potable water from the deeper of the two aquifers underlying the site. The six-acre area associated with the site consists of municipal property, wetlands, and the Witco manufacturing facility which produced plastic foams using (2-chloropropyl)-phosphate. In 1977, because of dead grass near the facility's drum storage area, Witco investigated the area and determined that four to five drums of tris had spilled and contaminated the soil and the shallow aquifer. The state subsequently pumped and discharged contaminated ground water into adjacent wetlands. A 1988 remedial investigation revealed that there is no longer a source of contamination at the site and that tris has contaminated the shallow aquifer but not the deeper aquifer. This limited response action addresses the ground-water contamination in the shallow aquifer. The primary contaminant of concern affecting the ground water is (2-chloropropyl)-phosphate.

The selected remedial action for this site includes natural attenuation as the treatment of the principal threat to ground water; ground-water, surface-water, and sediment monitoring; and implementation of institutional controls. The estimated present worth cost for this remedial action is $466,147, which includes O&M costs of $25,000.

Performance Standards or Goals

Because there are no ARARS for the chemical of concern, (2-chloropropyl)-phosphate, EPA has established a TBC criterion of 4.4 mg/l which is based on an average daily intake of 0.125 mg/kg/day. Achieving the TBC level through natural attenuation is expected to take four years.

Institutional Controls

Institutional controls will be implemented to restrict further installation of wells in the shallow aquifer.

NPL Rank: 581

ORDNANCE WORKS DISPOSAL AREAS, WV

First Remedial Action (Amendment)
September 29, 1989

The Ordnance Works Disposal Areas site is on the west bank of the Monangahela River in Morgantown, Monongolia County, West Virginia. Several chemical facilities have operated at the site since the early 1940s, producing substances such as hexamine, ammonia, methyl alcohol, formaldehyde, ethylene diamine and coke. This operable unit addresses on-site contamination found in the following areas: an inactive landfill where solid and chemical wastes were disposed of; a scraped area which consists of bare soil adjacent to the landfill where solid wastes were buried; two former lagoon areas which were closed following a clean-up action in 1976; and several streams located in the southern portion of the site. This Record of Decision (ROD) supersedes a 1988 ROD which was rescinded after public comments prompted further investigation. The primary contaminants of concern affecting the soil and sediment are carcinogenic PAHs, and metals including arsenic and lead.

The selected remedial action for this site includes excavation and on-site treatment of approximately 425 cubic yards of inorganic contaminated soil from hot spots in the scraped area and lagoon area using solidification, followed by placement of the treated soil in the landfill before capping; installing a multimedia RCRA Subtitle C cap on the landfill and regrading and revegetation; excavating approximately 13,460 cubic yards of organic-contaminated soil and sediment from the lagoon area, scraped area, and streams, with on-site treatment by bioremediation in a treatment bed; ground-water, surface-water, and sediment monitoring; and implementing deed restrictions to prohibit residential and industrial construction at the site. A contingency remedy has been selected which would include soil washing of contaminated soil as the principal treatment. The estimated present worth cost for this remedial action is $8,332,000, which includes annual O&M costs of $88,200 for four to ten years.

Performance Standards or Goals

Clean-up goals for carcinogens (e.g., cPAHs and arsenic) are based on a 10^{-6} excess cancer risk level. Chemical-specific soil and sediment goals include cPAHs 44.7 mg/kg, arsenic 88.8 mg/kg, and lead 500 mg/kg.

Institutional Controls

Deed restrictions will be imposed to prohibit residential and industrial construction in the landfill area and residential construction in the remaining areas of the site.

NPL Rank: 44

PUBLICKER INDUSTRIES, INC., PA

First Remedial Action
June 30, 1989

The Publicker Industries, Inc. site is a 37-acre, abandoned manufacturing plant in Philadelphia, Pennsylvania. A chemical company lies to the north, a marine terminal to the south, and the Delaware River to the east. Although the immediate area surrounding the site is primarily industrial, approximately 400,000 people live within one mile of the site. From 1912 to 1985, Publicker Industries owned and operated a liquor and industrial alcohol manufacturing plant at the site. The plant included 440 large tanks, storage drums, product stock, chemical laboratories, reaction vessels, production buildings, warehouses, a power plant, and several hundred miles of above- and below-ground process lines. Petroleum was also stored on site during the late 1970s and the early 1980s. Publicker Industries discontinued operations and sold the property in 1986. EPA evaluated site conditions in 1987 following two explosions and a large fire. Tankers, pits/sumps, and numerous process lines were found to contain fuel oils or other contaminated oils. EPA initiated an emergency removal action in December 1987 to stabilize the site and control the threat of additional fires and explosions. Emergency removal activities included on-site bulking and storing of solid and liquid waste streams; disposing of highly reactive laboratory wastes and cylinders off site; crushing approximately 3,100 emptied drums; wrapping overhead pipelines insulated with asbestos; and implementing a 24-hour fire and security watch. According to EPA estimates, over one million gallons of bulked waste materials remain on-site stored in dilapidated tanks and drums. Twelve waste streams have been identified, including base neutral liquids and solids, organic liquids and solids, oxidizing liquids and solids, water reactives, chlorides, crushed empty metal drums, and contaminated oils. This remedial action is designed to stabilize the site and enable continued site clean-up of soil, ground water, and asbestos. The primary contaminants of concern affecting the soil and ground water are VOCs, and other organics including PCBs and pesticides.

The selected remedial action for this site includes off-site treatment and disposal of the various waste streams in RCRA-permitted facilities; demolition of above-ground process lines, with proper packaging of contaminated insulation and on-site storage pending disposition in a subsequent remedial action; and off-site disposal of hazardous chemicals recovered from within the lines. The estimated capital cost for this remedial action is $13,900,000; there are no O&M costs.

Performance Standards or Goals

This initial remedy action will stabilize the site and remove the threat of fire or explosion by removing, treating, and disposing of waste streams off site.

Institutional Controls

Not applicable.

NPL Rank: 852

REESER'S LANDFILL, PA

First Remedial Action - Final
March 30, 1989

The Reeser's Landfill site is an inactive unlined municipal refuse dump located approximately five miles west of Allentown, Pennsylvania. The site is situated in a valley used predominantly for farming; however, there are residences to the west and northeast. Principal drainage in the area is via Iron Run, and the landfill drains via a series of seeps along the landfill perimeter and a network of surface channels. The 15-acre landfill is located on the southern portion of a 51.5-acre private parcel of land, and historically operated as an open pit iron mine. After mining operations ceased local residents used the site as a dump, and in the late 1960s the property was leased to Reeser's Hauling Service. The landfill, which was never issued a solid waste permit, reportedly received a variety of wastes including domestic, commercial, industrial, and demolition wastes, and possibly battery wastes and drums. In 1981, after a fire burned in the northern corner of the landfill for several months, the state ordered Mr. Reeser to properly close the landfill to comply with state municipal waste disposal regulations. This has yet to be carried out. EPA investigations have determined that there is no direct contact threat from the site soil or from ground water. Additionally, Reeser's Landfill has not adversely impacted the receptor stream, Iron Run, as evidenced by the presence of similar contaminant levels upstream and downstream from the site. The water quality of off-site and on-site ponds was also similar. Therefore, it was determined that no remedial action was necessary. There are no primary contaminants of concern affecting this site.

The remedial action for this site is a no-action remedy with ground-water review within five years.

Performance Standards or Goals

Not applicable.

Institutional Controls

Not applicable.

NPL Rank: 838

STRASBURG LANDFILL, PA

First Remedial Action
June 29, 1989

The Strasburg Landfill site is a 22-acre facility in western Newlin Township, Chester County, Pennsylvania. The surrounding area includes farmland and 200 homes within one mile of the site. Two creeks, Brandywine and Briar Run, flow within 0.5 mile of the site's western, southern, and eastern borders and receive surface drainage. A major aquifer underlying the landfill provides drinking water via private wells to all local residences. These private wells are as close as 720 feet to the landfill. In the spring of 1979 site owners began accepting industrial wastes and heavy metals which, by year's end, included more than 1,000 cubic yards of polyvinyl chloride wastes, 2,052 cubic yards of industrial wastes and sludge, and 35,000 gallons of heavy metal sludge. In December 1979, the state claimed that industrial wastes from the landfill caused excessive siltation of Briar Run Creek, and eight months later the state prohibited the site owners from receiving any additional industrial wastes. In 1980 sampling revealed VOC contamination in the ground water and by April 1983 leachate seeped at a rate of several gallons per minute from the southeastern portion of the landfill. After charging the site owners with operating violations and subsequently suspending their operating permit, the state ordered the landfill to be closed. As part of the closure plan, leachate was collected and stored in 5,000 gallon tanks, and the landfill was regraded and covered. The leachate is currently transported daily to an off-site treatment facility. Additionally, surface water runoff was directed toward a sediment pond which discharged directly into Briar Run Creek. Proposed corrective measures, however, were never completely implemented. Several seepage areas have since been observed near the landfill. One large seepage area is near the southeastern corner of the landfill. Liquid from the seep ultimately flows into a sediment pond near the eastern edge of the landfill which drains via a drainage channel towards Briar Run Creek. During heavy rainfalls, the sediment pond overflows into Briar Run Creek. The state has performed analyses of seep water from Briar Run Creek and of leachate from a manhole near the sediment pond and has monitored ground water for VOCs. Three residential drinking water wells contain multiple organic compounds. The primary contaminants of concern affecting the sediment pond and ground water are VOCs including TCE and benzene, toluene, and xylenes.

The selected remedial action for this site includes leachate collection, using an interceptor drain, and off-site treatment; and provision of an alternate water supply to affected residences by installing point-of-use activated carbon treatment systems at residences with contaminated ground water above levels of concern. The estimated capital cost for the remedial action is $42,850, with estimated annual O&M costs of $4,500. Costs are based on an estimate of three residences requiring an alternate water supply.

Performance Standards or Goals

Treated ground water concentrations for carcinogenic contaminants will be such that the aggregate carcinogenic risk would be less than 10^{-6}. Target concentrations for noncarcinogenic contaminants will ensure a Health Index less than 1. Because of an ARAR waiver for the leachate, no chemical-specific clean-up goals were specified for the leachate seep.

Institutional Controls

Not applicable.

NPL Rank: 266

WHITMOYER LABORATORIES, PA

First Remedial Action
June 30, 1989

The 22-acre Whitmoyer Laboratories site is located in Jackson Township, Lebanon County, Pennsylvania. Land use surrounding the site is predominantly agricultural; however, there is some residential, commercial, and industrial development within 1.5 miles of the site. This includes a manufacturing plant to the south; a pharmaceutical factory to the east; a large, active limestone quarry to the west; and an elementary school to the northwest of the site. Portions of the site are within neighboring Tulpehocken Creek's 100-year floodplain. The creek, which is bordered by small, open wetlands areas, is being proposed for inclusion in Pennsylvania's scenic river system, with a "priority 1A status." Priority 1A status would designate the stream as being in most urgent need of protection. In 1957, site owners began producing organic arsenicals at the site. In 1964, widespread ground-water contamination was discovered on site leading to the placement of concentrated wastes in a concrete vault and the initiation of ground-water pumping and treatment. Sludge from the ground-water treatment was later consolidated in lagoons. In 1987 an EPA investigation revealed that approximately 69,000 gallons of concentrated liquids had been abandoned on site in 18 tanks and 14 piping units. The wastes include 5,000 gallons of water-immiscible liquids, 25,000 gallons of water-miscible liquids with a high arsenic content, and 39,000 gallons of water-miscible liquids with a low arsenic content. All the tanks and piping units are within 400 feet of Tulpehocken Creek; 27 of the 32 tanks and piping are within 150 feet. Because the site slopes toward the creek, any release from a tank or piping failure is likely to contaminate the creek. Flooding of the creek could cause failure of these tanks, resulting in catastrophic release of contaminants to the creek. Additionally, contaminants released from the tanks and piping units could migrate to ground water and/or the drinking water supply lines serving the site. Because the concentrated liquids pose significant health and environmental threats, their removal is addressed in this first operable unit. Subsequent operable units will identify potential soil, ground-water, and surface-water/sediment contamination and additional remedial actions that may be necessary. The primary contaminants of concern in the concentrated liquids are VOCs including PCE, and metals including arsenic.

The selected interim remedial action for this site includes consolidating, transporting off site, and then treating, using thermal treatment or biodegradation, or recycling approximately 69,000 gallons of concentrated liquid wastes at a permitted RCRA facility, followed by disposing of treated water in off-site surface water and disposing of solid residues in an off-site landfill; decontaminating 32 tanks and approximately 2,000 feet of piping to meet RCRA Subtitle C closure standards and disposing of the tanks and piping on site; and treating and disposing of the cleaning agent residues off site at RCRA-permitted facilities. The estimated capital cost of this interim remedial action is $475,000, with no O&M costs.

Performance Standards or Goals

This interim remedial action will comply with ARARs.

Institutional Controls

Not applicable.

NPL Rank: 842

WILDCAT LANDFILL, DE

Second Remedial Action - Final
November 28, 1988

The Wildcat Landfill is located 2.5 miles southeast of Dover, in Kent County, Delaware. A 2.7-acre pond, formed by the landfill blocking natural drainage from upland areas, is located along the northwestern border of the site. The pond and the landfill are located along the west bank of the St. Jones River and are bordered to the north and east by the river and associated marshlands, and to the south and west by residential and commercial development. Portions of the site lie within the 100-year floodplain of the St. Jones River. The landfill was addressed in the first operable unit ROD signed in June 1988. This operable unit details the selection of a remedial alternative which addresses the largely environmental concerns the landfill poses to the pond and associated biota. The landfill was operated as a state-permitted sanitary landfill between 1962 and 1973, accepting both municipal and industrial wastes. Industrial wastes suspected to have been disposed of on site include latex waste and paint sludges. During its 11 years of operation, the facility routinely violated operating and other permits issued by the regulatory agencies. In August 1973, the facility was ordered closed by the state and the site owners were required to cover the site with soil and vegetation. EPA began investigating the site in 1982. Surface water and sediment in the pond were contaminated by inorganic constituents leaching from the landfill. The primary contaminants of concern affecting the sediment and surface water in the pond are metals including arsenic, chromium and lead.

The selected remedial action for this site includes draining, filling, and revegetating the pond area consistent with the landfill cover selected in the previous ROD; constructing a new pond elsewhere on the site; implementing institutional controls for land use restrictions; and ground-water monitoring upgradient of the new pond. Pond water will be discharged to St. Jones River, to the north of the site.

Performance Standards or Goals

Prior to draining, the pond water will be analyzed to ensure that Federal Water Quality Criteria are met at the ground-water discharge location.

Institutional Controls

Land use restrictions will be implemented to prevent development on the area of the filled pond. Restrictions will also be made to ensure that the integrity of the new pond is maintained.

REGION 4

(Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee)

NPL Rank: 142

ABERDEEN PESTICIDE DUMPS, NC

First Remedial Action
June 30, 1989

The Aberdeen Pesticide Dumps site is a former disposal area in Moore County, North Carolina, approximately 1.6 miles west-northwest of Aberdeen. The site is in a rural area, on the property of Partners in the Pits, LTD and Yadco of Pinehurst Inc., and bounded on the south by a railroad, on the north by the sixth fairway of the Pit golf course, and on the east and west by undeveloped property. Although the rural area is sparsely populated, residential growth is expected in the near future. In August 1984, the state was alerted that pesticides had been disposed of at and around the site for a number of years. A state inspection revealed that soil and debris were contaminated with pesticides. In June 1985, EPA initiated an emergency response action to excavate and remove on-site contaminated surface soil and two buried trenches. The soil and debris were disposed of off site. In 1986 pesticides were detected in drinking water from four municipal wells and three private wells in Aberdeen causing EPA to reinvestigate the site. A subsequent investigation identified additional trenches containing approximately 12 million pounds of pesticide wastes. A test burn, conducted in December 1986, incinerated 12,000 pounds of pesticide-contaminated soil and debris using a mobile incinerator. Residual ash was stored on site in twenty-seven 55-gallon drums. Additional removal funding was provided to excavate, shred, screen, and stockpile approximately 22,000 cubic yards of pesticide-contaminated materials. The predominant contaminants of concern affecting the soil and debris are chlorinated organo-pesticides.

The selected remedial action for this site includes excavating and homogenizing stockpiled pesticide-contaminated wastes; treating homogenized wastes in an on-site, mobile thermal treatment facility and reinjecting process wastewater or scrubber blowdown into the thermal treatment facility; analyzing ash to demonstrate ash is nonhazardous; monitoring air emissions; and redisposing residual ash on-site. The estimated present worth cost for this remedial action is $14,533,000. There are no annual O&M costs associated with this remedial action.

Performance Standards or Goals

The selected remedy will attain federal and state ARARs; however, no chemical-specific goals were provided. Clean-up criteria established for the stockpile are to background levels and to the RCRA EP toxicity levels. The air pollution control system will achieve performance standards, which are defined as hydrogen chloride less than 4 pds/hr and particulate matter of less than 0.08 grains/dry ft^3 in the exhaust gas connected to 7 percent oxygen content.

Institutional Controls

Not applicable.

NPL Rank: 51

AMERICAN CREOSOTE WORKS, INC. (PENSACOLA PLANT), FL

First Remedial Action (Amendment)
September 28, 1989

The 18-acre American Creosote Works, Inc. (Pensacola Plant) site, is in a dense moderately commercial and residential area of Pensacola, Florida, approximately 600 yards from Pensacola Bay and Bayou Chico. American Creosote Works, Inc. operated a wood preserving facility on site from 1902 to 1981. During this time, process wastewater containing pentachlorophenol (PCP) was discharged into two 0.9-and 1.8-acre unlined, on-site surface impoundments. Prior to 1970, wastewater in these ponds was allowed to overflow through a spillway into the neighboring Bayou Chico and Pensacola Bay. After 1970, wastewater was periodically drawn from the ponds and discharged to designated on-site spillage areas. Additional discharges occurred during periods of heavy rainfall when the ponds overflowed. In March 1980, the city found considerable quantities of oily, asphaltic, creosotic material in the ground water near the site. Because of the threat posed to human health and the environment due to frequent overflows from the waste ponds, EPA and the state performed an emergency cleanup in 1983, which included dewatering the two ponds, treating the water via coagulation and filtration, and discharging treated water to the city sewer system. The sludge in the ponds was then solidified and capped. EPA signed a ROD in 1985 requiring all on-site and off-site contaminated solids, sludge, and sediment to be placed in an on-site RCRA-permitted landfill. Because the state concurred with the selected remedy, no remedial action was taken. Consequently, a post remedial investigation was conducted in 1988 to characterize the extent of contamination followed by a post feasibility study in 1989 to identify, develop, and evaluate alternatives. This ROD is the first of two planned operable units and addresses remediation of contaminated surface soil. A subsequent operable unit will address treatment of contaminated subsurface soil, sludge, and ground water. The primary contaminants of concern affecting the surface soil are organics including dioxins, carcinogenic PAHs, and PCP.

The selected remedial action for this site includes excavating and treating 23,000 cubic yards of PAH-contaminated soil using solid-phase bioremediation in an on-site land treatment area followed by on-site disposal of treated soil in the excavated areas or spreading the soil over the entire site; implementing temporary erosion control measures to preserve surface water quality; collecting leachate and drain water for spraying over the treatment area to moisten soil; monitoring dissolved oxygen, pH, nutrients, and soil moisture content; removing debris, repairing fences, sampling the cap and disposing of drums containing drilling mud; and implementing land and ground water use restrictions. The estimated present worth cost is $2,275,000 which includes an O&M cost of $319,000.

Performance Standards or Goals

Soil cleanup levels are based on cancer potency factors (CPF) and 10^{-5} excess cancer risk levels. Soil clean-up goals include cPAHs 50 mg/kg, dioxins 2.5 ug/kg (based on 2,3,7,8 - TCDD toxicity equivalency), and PCP 30 mg/kg.

Institutional Controls

Ground-water and land use restrictions will be implemented.

NPL Rank: 623

AMERICAN CREOSOTE WORKS, INC. (JACKSON PLANT), TN

First Remedial Action
January 5, 1989

The American Creosote Works, Inc. (Jackson Plant) site is located immediately southwest of Jackson, in central Madison County, Tennessee. The 60-acre site is in a partially developed area, and is bounded on the southwest by the South Fork of the Forked Deer River, on the west and north by Central Creek (a tributary to the South Fork of the Forked Deer River), on the east by a lumber mill, and on the south by the Seaboard Railroad. American Creosote Works conducted wood preserving operations using both creosote and PCP from the early 1930s until December 1981. Wastewater sludge from the treatment processes is listed as RCRA KOO1 waste. Untreated process wastewater and potentially contaminated stormwater runoff were discharged directly into Central Creek until 1973, at which time a levee was constructed to retain surface water runoff. The soil borrow pits used for the levee construction became sludge storage lagoons. A wastewater treatment system was installed on site during 1974 and 1975, and operated until 1981. Reportedly, a "few" loads of filter sludge from the treatment system were spread on the back road on the east end of the property, and a recirculation pond overflowed more than once. In March 1983 five unlined lagoons containing creosote and PCP sludge and water overflowed, prompting the first of two EPA removal actions. In May 1983 the first removal consisted of pumping and treating approximately 30 million gallons of water, placing the remaining untreated oil/water mixture in empty tanks on site, stabilizing the contaminated soil and sludge remaining in the lagoon material, and covering two lagoons with a clay cap. A second removal action was conducted in March 1986 after several storage tanks were determined to be leaking. The plant process facilities, including the treatment building, storage tanks, piping, ponds, and filters, are considered a point source of contaminants due to leakage from these structures and adjacent pits. Furthermore, several tanks and pipes are structurally unsound and open to precipitation, posing a threat of overflow or sudden, major release of contaminants. This remedial action will focus on reducing surface contamination resulting from degradation of the tanks and site structures, and minimizing the potential for increased contamination due to flooding while further information is developed and analyzed. A subsequent remedial action will address contaminated soil, ground water, and surface streams. The primary contaminants of concern affecting the sludge, site structures, debris, and tanked liquids are VOCs and other organics including PAHs and phenols.

The selected remedial action for this site includes consolidation and incineration of sludge in the vicinity of the buildings and tanks; on-site or off-site incineration of the oils and sludge from the tanks; treatment of tanked process liquids on site using a sand filter, filter press, and carbon adsorption unit, followed by discharge to a surface stream; decontamination and off-site disposal of site structures (e.g., buildings, tanks, pipes) in a RCRA Subtitle D facility; construction of a flood-protection dike; deed restrictions and site fencing; and site stabilization including monitoring on-site water levels behind the dikes and pumping, treating (as needed), and discharging impounded water pending a final remedy. The estimated present worth cost for this remedial action ranges from $5,000,000 to $6,000,000. Annual O&M costs were not provided.

Performance Standards or Goals

Remedy reduces potential for direct exposure to sludge and process liquids while further investigations are conducted. Quantitative goals were not provided for final site remediation.

Institutional Controls

Deed restrictions will be implemented to restrict further use of the site.

NPL Rank: 418

AMNICOLA DUMP, TN

First Remedial Action - Final
March 30, 1989

The Amnicola Dump site is an 18-acre inactive construction debris disposal site located in Chattanooga, Tennessee. The site is located along the east bank of the Tennessee River, approximately 0.5 mile upstream of the intake for the primary drinking water source for the city of Chattanooga. The site is bordered on the north by dense vegetation and vegetation-covered debris, and on the south by an industrial research facility. The site drains westerly towards the river. During the 1930s the Amnicola Dump site was reportedly used for clay mining operations, resulting in several water-filled pits. During the period from 1957 to 1964 construction debris and other unidentified wastes were occasionally disposed of in many of the open pits. The site was then operated as a dump by the city of Chattanooga until 1973, predominantly receiving construction debris including a substantial amount of waste wood which was subsequently incinerated on site. The ashes eventually filled 12 acres of the 18-acre site. The only industrial waste reportedly disposed of at the site was latex waste. Unauthorized waste dumping and concerns about leachate discharge in proximity to the drinking water intake area led to closure of the site in 1973. Closure included covering, grading slopes, filling depressions, draining standing water, applying rip-rap along the western perimeter, constructing drainage ditches, and seeding the entire surface area of the fill. The current owner and operator has been burning, storing, and handling creosoted railroad ties, contributing to elevated PAHs in surface soil. The primary contaminants of concern affecting the soil, debris, and ground water are organics including PAHs, and metals including chromium.

The selected remedial action for this site includes excavating and screening 600 cubic yards of contaminated soil/debris with on-site solidification/fixation of 400 cubic yards of contaminated soil and 200 cubic yards of debris (debris exceeding clean-up goals or LDR requirements will be disposed of off site), followed by on-site disposal of solidified mass; monitoring of ground water for four years; conducting a public health assessment five years after completion of the remedial action; and implementation of institutional controls including ground-water and land use restrictions. The estimated present worth cost for this remedial action is $640,000 with O&M cost of $384,000.

Performance Standards or Goals

Soil will be treated to the health-based clean-up goal of 100 mg/kg total cPAHs. Ground water will be bought to ACLs through ground-water use restrictions. Individual ACLs were provided for nine contaminants, including chloroform 86 ug/l and chromium 890 ug/l.

Institutional Controls

Land use restrictions will be imposed on the site to prevent the accumulation of contamination exceeding the surface soil clean-up goals as a result of handling, storage, or burning creosoted railroad ties. Ground-water use restrictions will be imposed within a reasonable distance from the site in keeping with the establishment of ACLs.

NPL Rank: 672

CAPE FEAR WOOD PRESERVING, NC

First Remedial Action - Final
June 30, 1989

The 9-acre Cape Fear Wood Preserving site is in Cumberland County, North Carolina on a 41-acre tract of land. The predominantly flat site is comprised of the wood treatment facility, wetlands, and undisturbed forests. A variety of land uses exist in the area including industrial, agricultural, and residential. The Cape Fear Wood Preserving facility operated from 1953 to 1983 first using a wood-treating process that included creosote and later switching to a technique known as the copper-chromium-arsenic (CCA) process. Liquid and sludge wastes generated by both of these processes were pumped into a drainage ditch and an unlined lagoon. In 1977, as a result of a state site investigation that revealed coal tar creosote contamination, the property owner was ordered to remove 900 cubic yards of creosote contaminated soil. In 1984 EPA conducted a site investigation which resulted in an emergency removal action. This action included excavating contaminated soil and sludge followed by off-site disposal and pumping lagoon water into on-site storage tanks. In 1986, 500 gallons of creosote spilled from a storage tank causing EPA to conduct a second emergency response. Emergency response activities included removal and solidification of 10 cubic yards of sludge and pumping of 15,000 gallons of CCA waste water into on-site storage tanks. The primary contaminants of concern affecting the soil, sediment, ground water, and surface water are VOCs including benzene, other organics including PAHs, and metals including arsenic and chromium.

The selected remedial action for this site includes off-site disposal of CCA salt crystals found in the drainage system and solidified creosote at a RCRA landfill and off-site disposal of asbestos-containing pipe insulation in the county solid waste facility; removal and decontamination of on-site pipes and tanks to be sold for scrap metal or disposed of in the county solid waste facility; excavation and on-site treatment of soil and sediment using soil flushing as the preferred alternative or a low thermal desorption process to remove organics followed by soil washing or fixation/stabilization/solidification to address inorganics (a soil washing treatability study will determine if the preferred alternative would be appropriate) followed by placement of treated soil and sediment in the excavated area and revegetation; pumping with on-site treatment of ground water and surface water with off-site discharge at a POTW or a surface stream; sale of 50,000 gallons of CCA solution to a buyer, if no buyer is found, CCA solution and CCA-contaminated wastewater will be treated using the ground-water treatment system; and ground-water monitoring. The estimated present worth cost for this remedial action ranges from $14,370,000 to $14,910,000 including present worth O&M costs which range from $1,020,000 to $1,310,000 for 30 years.

Performance Standards or Goals

The ground-water clean-up criteria established for this site are benzene 5 ug/l (MCLs), cPAHs 10 ug/l (CLRQL) and noncarcinogenic PAHs 14,350 ug/l. For surface water the criteria are arsenic 12 ug/l (AWQC), chromium 11 ug/l (AWQC), and copper 14 ug/l (background). The soil criteria are arsenic 94 mg/kg, benzene 0.005 mg/kg (CLQRL), chromium 88 mg/kg (background), carcinogenic PAHs 2.5 mg/kg, and total PAHs 100 mg/kg (background); and the sediment criteria are total PAHs 3 mg/kg, arsenic 94 mg/kg, and chromium 88 mg/kg.

Institutional Controls

Not applicable.

NPL Rank: 767

CAROLAWN, INC., SC

First Remedial Action
September 27, 1989

The Carolawn, Inc. site is an approximately 60-acre, abandoned waste storage and disposal facility in Fort Lawn, Chester County, South Carolina. Rural and agricultural areas surround most of the site. Four residences lie within 300 yards of the site, and approximately 30 single family residences lie within a 2-mile radius of the site. The site is bordered to the east by Fishing Creek, which empties into the Catawba River 8 miles south of the site. Approximately 2,500 people receive their water supply from the Catawba River. Storage trailers and tanks and as many as 480 drums of solvents and liquid and solid wastes have been stored inside a 3-acre fenced portion of the property since 1970. An additional 660 drums and 11 storage tanks were located outside the fenced area to the north. Drums, waste, and contaminated soil were removed from the site by EPA in 1981, and all nearby residences were provided an alternative water source. An additional 17 storage tanks were removed in 1986 by the PRPs. Contaminants have been detected in ground water flowing underneath the site which discharges into Fishing Creek. This ROD addresses remediation of contaminated ground water. A subsequent ROD will address remediation of the contaminated soil, if necessary. The primary contaminants of concern affecting the ground water are VOCs including TCE, and metals including lead.

The selected remedial action for this site includes ground-water pumping and treatment using one or more of the following methods: air stripping, biodegradation, activated carbon filtration, and metals removal, and will be determined during the remedial design stage based on the level of contaminants found and the treated ground-water discharge point selected; implementing deed restrictions; plugging condemned wells; disposing the two inactive incinerators and two remaining drums; and monitoring ground water and soil. The estimated present worth cost for this remedial action ranges from $1,141,071 to $1,356,305, with a present worth O&M cost for over 30 years ranging from $753,433 to $916,723, depending on the extent of treatment and ultimate discharge point for the treated water.

Performance Standards or Goals

Ground water will meet SDWA MCLs. Target clean-up levels included TCE 5 ug/l and lead 5 ug/l.

Institutional Controls

Deed restrictions will be implemented.

NPL Rank: 203

CELANESE CORP. (SHELBY FIBER OPERATIONS), NC

Second Remedial Action - Final
March 28, 1989

The 450-acre Celanese Corp. site is a polyester raw-material production facility located in Cleveland County, North Carolina. The plant's facilities include a plant production area, wastewater treatment area, former waste disposal areas, and a land farm area. The adjacent land is rural, and some residences are located within 1 mile of the site. The plant began operations in 1960 as Fiber Industries, Inc. and manufactured polyester polymer chip and filament yarn using the chemicals dimethyl terephthalate and ethylene glycol. The plant's waste treatment facility was constructed in phases concurrent with the manufacturing plant; thus, in the years prior to the completion of the treatment facility, chemical wastes were dumped directly into a drainage ditch. Treated effluent has been discharged to Buffalo Creek since the mid-1960s when Fiber Industries, Inc. completed construction of the treatment facility. Celanese Corporation bought the site and facilities in 1983. In addition to the discharge from the wastewater treatment plant, Celanese Corp. also discharges alum-treated bandcaster water directly to Buffalo Creek. Several areas around the plant have been used for waste disposal, including old burning pits for normal plant wastes (polyester and trash), a glycol recovery unit (GRU) sludge burial area, two soak-away ponds used to contain treated sanitary sewage from 1960 to 1969, and a former drum storage and staging area. Four additional buried waste areas are located to the north and outside of the main plant perimeter fence: a polymer and fiber landfill, a construction debris landfill, a 21-acre sludge disposal area, and a drum storage area which temporarily stored 2,000 to 3,000 drums of waste chemicals and solvents from 1970 to 1978. The drums were removed by 1978. A 1988 ROD addressed extraction and treatment of contaminated ground water. This second operable unit addresses source control including contaminated sludge and soil associated with the GRU trenches and burn pit areas. The primary contaminants of concern affecting the soil and sediment are VOCs including benzene and TCE, other organics including phenols and PAHs, and metals including lead and chromium.

The selected remedial action for this site includes excavation of 3,710 cubic yards of GRU sludges, plastic chips, burn pit residuals, and sediment with on-site incineration of contaminated soil and GRU sludge and chemical fixation (solidification) of incinerator ash, plastic chips, burn pit residuals and sediment, followed by disposal of the inert, solidified material in the excavated area; regrading and filling of excavated area; and ground-water monitoring. The estimated present worth cost for this remedial action is $3,500,000; O&M costs were not provided.

Performance Standards or Goals

The selected remedy will attain a 10^{-6} cancer-risk level as it removes the source of the ground-water contamination. No chemical-specific standards or goals were provided.

Institutional Controls

Not applicable.

NPL Rank: 864

CHEMTRONICS, INC., NC

First Remedial Action (Amendment) - Final
April 26, 1989

This ROD amends the April 5, 1988, Chemtronics, Inc. ROD which included an incorrect calculation regarding the chemical quality of the ground water. The Chemtronics site is an active waste disposal facility located in a rural area of Swannanoa, Buncombe County, North Carolina. The 1,027-acre site was developed as an industrial facility in 1952 and was purchased by Chemtronics, Inc. in 1978. Approximately 10 acres of the site were used for waste disposal operations. Records indicate the presence of 23 individual on-site disposal areas (DAs) which are grouped into six discrete areas: DA-6, DA-7/8, DA-9, DA-10/11, DA-23, and the acid pit. From 1952 to 1971 solid waste materials and possibly solvents were incinerated in pits and chemical wastes, including waste materials generated in the production of the chemical warfare agent 3-quinuclidinyl benzilate (BZ) and the tear gas agent o-chlorobenzylidene malononitrile (CS), were placed in 55-gallon drums with a neutralizing solution, and then buried on site in trench-type landfills. From 1971 to 1975 small volumes of liquid wastes were disposed of in on-site pits and trenches, and solid wastes, rocket motors, explosive wastes, and other waste types were burned. From 1975 to 1979 Chemtronics, Inc. constructed pits and trenches as needed, for the disposal of spent acid and various organic wastes. In 1980 the state ordered Chemtronics to discontinue all discharges to site pits and trenches. The pits were subsequently backfilled. Starting in 1979, Chemtronics installed a 500,000-gallon lined lagoon over an old leaching field for the biotreatment of wastewater. The incompatibility of the liner with the brominated wastes introduced into the lagoon caused the lagoon to release its contents. The lagoon was reconstructed in August 1980, using a different liner, and deactivated in 1984. In September 1984, the U.S. Army Toxic Hazardous Materials Agency sampled two drums in DA-10/11. These drums were suspected of containing wastes from the production of BZ. Although no BZ was found, EPA initiated an immediate removal of these drums in January 1985 due to heightened public awareness of the site. In the original ROD the selected remedial action for the contaminants and contaminated soil in DA-23 was soil fixation/stabilization/solidification, followed by capping. This remedy has been changed to capping only. The original remedy was selected due to the concentration level of the contaminant benzylic acid a benzophenone found in the ground water downgradient of DA-23. However, a transcription error was discovered in the analytical results for this ground-water sample. The laboratory reported the concentrations as 470 mg/l instead of 470 ug/l. Subsequent sampling verified that the correct concentration was in the 0-470 ug/l range. Therefore, EPA elected to change the source control remedial action for DA-23 to capping only. The primary contaminants of concern affecting the soil, sediment, ground water and surface water are VOCs including benzene, toluene, PCE, and TCE, other organics including pesticides and explosives, and metals including arsenic, lead, and chromium.

The selected remedial action for this site includes multi-layer capping of DA-6, DA-7/8, DA-9, DA-10/11, DA-23 and the acid pit area; ground-water pumping and treatment using air stripping, carbon adsorption, or metal removal with treatment and discharge to be determined during design; sampling of pond water and sediment and if necessary, surface-water treatment using the ground-water treatment system and on-site disposal of sediment; implementation of institutional controls and access restrictions; and sediment, ground-water, and surface-water monitoring. The estimated present worth cost for this remedial action is $2,248,900 with an annual O&M cost of $501,900.

Performance Standards or Goals

Ground-water clean-up levels are provided based on MCLs and several TBCs. Individual goals include TCE 0.005 mg/l (MCL), benzene 0.005 mg/l (MCL), PCE 0.007 mg/l (RSD), toluene 2.0 mg/l (PMCLG), RDX 0.035 mg/l (USAIWQC),

TNT 0.044 mg/l (PPLV), lead 0.05 mg/l, PCBs 10 mg/kg (TSCA), RDX 95 mg/kg (PPLV), TNT 305 mg/kg (PPLV), and CS 43.3 mg/kg (PPLV).

Institutional Controls

Institutional controls will be implemented; however, none were specified.

NPL Rank: 130

CIBA-GEIGY CORP. (McIntosh Plant), AL

First Remedial Action
September 28, 1989

The 1,500-acre Ciba-Geigy Corp. (McIntosh Plant) site is in southern Washington County, northeast of McIntosh, Alabama. The plant's initial operations, which began in 1952, were devoted solely to the manufacture of DDT. In 1970, the facility expanded its manufacturing operations to include herbicides, insecticides, and chelating and sequestering agents. Other products produced by Ciba-Geigy include resins and additives used in the plastics industry. Wastes and residues generated during production operations were managed on site. In 1985, EPA issued Ciba-Geigy a RCRA Part B permit for active waste management units on site. The permit included a corrective action plan requiring Ciba-Geigy to remove and treat contaminated ground water and surface water at the site. In 1987, as part of this plan, Ciba-Geigy installed a ground-water pumping and treatment system which has been effective in addressing the ground-water contamination. This first of three planned operable units addresses ground-water contamination in the shallow Alluvial aquifer. The second operable unit will address the deeper Miocene aquifer and the final operable unit will address contamination of soil at eleven former waste management areas. The primary contaminants of concern affecting the ground water are VOCs including benzene and toluene, other organics including pesticides, and metals including arsenic.

The selected remedial action for this site includes no further action for the shallow aquifer beyond continued ground-water pumping and on-site treatment using an existing biological wastewater treatment system, followed by discharge to the Tombigbee River under an NPDES permit, and ground-water and effluent monitoring. The estimated annual O&M cost for this remedial action is $325,000.

Performance Standards or Goals

Ground-water clean-up goals are based on Safe Drinking Water Act MCLs or proposed MCLs. Ground-water clean-up goals include benzene 5.0 ug/l (MCL), toluene 2,000 ug/l (PMCL), and arsenic 50 ug/l (MCL).

Institutional Controls

Not applicable.

NPL Rank: 131

KASSOUF-KIMERLING BATTERY DISPOSAL, FL

First Remedial Action
March 31, 1989

The Kassouf-Kimerling Battery Disposal site, formerly known as the Timber Lake Battery Disposal and the 58th Street Landfill, is located in Tampa, Florida. The site consists of a 42,000 ft^2 landfill area in which empty lead-acid battery casing and fill dirt were deposited in September 1978. The estimated volume of fill is 11,350 cubic yards. Land use in the area includes residential, commercial, and industrial development to the south; and undeveloped land occupied by small lakes and marshes to the north, east, and west. Surface water flows from the west marsh to the east marsh by way of a canal cut through the site and eventually discharges into the Palm River. This remedy addresses the landfill wastes and contaminated underlying soil. A second and final operable unit will address contaminated sediment and surface water in the adjacent wetlands. The primary contaminants of concern affecting the soil, debris, and ground water are metals including arsenic, cadmium, and lead.

The selected remedial action for this site includes excavation of the landfill wastes and contaminated underlying soil, followed by treatment using solidification/chemical fixation and on-site disposal in the landfill area. Specific protocols for treatment will be determined by bench-scale testing. The estimated present worth cost for this remedial action is $2,500,000 to $3,500,000.

Performance Standards or Goals

The soil and debris in the source area will be treated to meet RCRA criteria including EP toxicity concentrations. Ground-water standards including MCLs and AWQC will be met over a short period of time due to the excavation and fixation of the landfill materials.

Institutional Controls

Not applicable.

NPL Rank: 287

NEWSOM BROTHERS/OLD REICHHOLD CHEMICALS, INC., MS

First Remedial Action - Final
September 18, 1989

The 81-acre Newsom Brothers/Old Reichhold Chemicals, Inc. site is in Marion County, Columbia, Mississippi. The site is in a predominantly residential area and was used as a wood processing facility under several owners from 1936 until 1977, when a fire and explosion destroyed the facility. Site activities included producing tall oils, turpentine, calcium and zinc resinates, and polymerized and rubber resins. Furthermore, PCP was apparently mixed with diesel oil and sold, and xylenes were used in a number of processes. A state investigation in 1976 revealed that wastewater containing phenols, oil, and grease was discharging to a small creek. Further investigations resulted in EPA performing an immediate removal action in 1984, which included the removal of over 600 surface drums from the site and excavating and draining two ponds, one of which was subsequently filled with clean fill. On-site buried drum areas were the target of another EPA removal action conducted in 1987-88. Approximately 3,900 drums were excavated and shredded, drum contents were disposed of off site, and 1,920 tons of soil were removed. In addition there is an extensive system of concrete drains that served to collect and drain spilled wastes and rainwater that has an area of runoff of approximately 300,000 square feet. There is an estimated 650 cubic yards of bulk hazardous substances remaining on site consisting of black tar-like waste material and a resin material in three excavations and in the drainage system. The primary contaminants of concern affecting the soil, sediment, and bulked wastes are organics including PAHs, PCBs, and PCP, and metals.

The selected remedial action for this site includes excavation and off-site disposal of 30,300 cubic yards of contaminated soil and 7,300 cubic yards of contaminated pond and creek sediment; excavation and off-site incineration of 650 cubic yards of tar-like waste material and any soil/sediment containing RCRA hazardous wastes, followed by off-site disposal; draining, filling, and capping on-site ponds; recontouring the site; and ground-water monitoring for five years. The estimated present worth cost for this remedial action is $14,180,000, which includes an estimated present worth O&M cost of $520,225.

Performance Standards or Goals

Soil, sediment, and waste material cleanup goals were based on 10^{-6} excess-cancer risk. A chemical-specific soil and sediment goal was selected for cPAHs as 10 mg/kg. Additional soil/sediment levels were developed for other organic-contaminated areas including PCP 1.2 mg/kg.

Institutional Controls

Not applicable.

NPL Rank: 744

SMITH'S FARM, KY

First Remedial Action
September 29, 1989

The Smith's Farm site is a 560-acre property in a rural area of Bullitt County, Kentucky. The site is bordered on the north, east, and west by forested hills and on the south by a residential area. Within the 560-acre property there is a 37.5-acre landfill that, until recently, was permitted by the state for the disposal of solid waste. The owner of this landfill was cited at various times by the state for permit violations. The property also includes an 80-acre area upgradient of the permitted landfill on a mile-long ridge between two intermittent creeks where the unpermitted disposal of drums containing hazardous waste occurred over a 20-year period. EPA investigations from 1979 to 1984 resulted in the removal of 6,000 surface drums containing hazardous waste including PCB-contaminated waste. This remedy addresses contaminated on-site soil, sediment, and drums within the 80-acre area. A second operable unit will address the remaining potential threats associated with the landfill, deep ground-water aquifers, and other suspected areas of drum disposal. The primary contaminants of concern affecting the soil and sediment are organics including PCBs and PAHs, and metals including lead.

The selected remedial action for this site includes excavation and on-site incineration of approximately 26,200 cubic yards of contaminated soil, surface drums, buried drums, and fill material from Area B (as defined in the RI/FS), and approximately 5,200 cubic yards of contaminated on-site sediment from the valley streams; solidification/fixation of approximately 50 percent of the treated material followed by placement of all treated or solidified material in Area B; incineration of a small volume of hot spot material in Area A and consolidation of waste and construction of a RCRA cap over Area A; construction of a leachate-collection system to collect leachate from Area A; access restrictions (fencing) around contaminated areas; ground-water monitoring for up to 27 years; maintenance of the RCRA cap and the leachate collection system; and leachate removal and disposal for up to 30 years. The estimated present worth cost for this remedy is $26,900,000, which includes O&M costs of $1,330,000.

Performance Standards or Goals

Action levels for contaminated soil and/or sediment were determined based on an excess lifetime cancer risk of 10^{-5} with the exception of lead which was based on a hazard index less than 1. Specified goals include PAHs 5 mg/kg, PCBs 2 mg/kg, and lead 500 mg/kg.

Institutional Controls

Not applicable.

NPL Rank: 249

STAUFFER CHEMICAL CO. (COLD CREEK PLANT), AL

First Remedial Action
September 27, 1989

The Stauffer Chemical Co. (Cold Creek Plant) site is in Bucks, Mobile County, Alabama, approximately 20 miles north of Mobile, Alabama. The area is predominantly industrial, with a few small rural residential communities within a few miles of the site. The Mobile River borders the site to the east. The Cold Creek plant began operating in 1966 under the ownership of the Stauffer Chemical Company and is currently owned and operated by ICI Americas, Inc. Until 1974, an unknown amount of sludge and solid wastes containing a variety of herbicides and pesticides were placed in two waste disposal sites, referred to as the Cold Creek North and South Landfills. Both were closed in 1974 with geomembrane caps and side-wall liners. One clay-lined lagoon was used for neutralization of wastewater until 1975, and was closed in 1978. A new membrane-lined pond was constructed to replace it and is currently in use. Under a consent agreement with EPA, Stauffer completed a remedial investigation in May 1988, which identified contamination of the soil, pond sludges, swamp sediment, and ground water. Although there are four media of concern at the Stauffer site, this remedial action addresses the contaminated ground water, because ground water is the source for drinking water for the area. Additional RODs are planned for the source control operable units and the Cold Creek Swamp. The primary contaminants of concern affecting the ground water are VOCs including carcinogenic compounds such as carbon tetrachloride, and other organic compounds including pesticides.

The selected remedial action for the ground-water operable unit at this site includes a modified ground-water intercept and treatment system with surface-water discharge. This alternative involves continued operation of the existing intercept and treatment system, which consists of aeration via spray nozzles with discharge to a treatment pond and then to the Mobile River; installation of additional extraction wells, based on ground-water quality characteristics, water-table gradients, and pumping activities at the site and adjacent properties; design and implementation of modifications to the treatment system; and monitoring of effluent, ground-water concentrations, and pumping rates. Further investigation and treatability studies are necessary before EPA can determine the remedial action for the source units (soil and pond sediment) and the swamp. Bench and/or pilot-scale testing of *in situ* treatment alternatives for some of the source units, such as a wastewater treatment pond, is appropriate as part of the remedial design. A range of treatment technologies including thermal desorption and vapor extraction is being considered. The estimated total capital cost for this remedial action is $3,119,200, which includes O&M costs. Specific O&M costs were not provided.

Performance Standards or Goals

Ground water will meet state and federal ARARs including MCLs and risk reference doses (RfDs) developed by EPA. Chemical-specific clean-up goals include carbon tetrachloride 5 ug/l (MCL). Surface-water discharge must meet concentration limits specified in the NPDES permit.

Institutional Controls

Not applicable.

NPL Rank: 753

STAUFFER CHEMICAL CO. (LEMOYNE PLANT), AL

First Remedial Action
September 27, 1989

The Stauffer Chemical Co. (LeMoyne Plant) site is in Axis, Mobile County, Alabama, approximately 20 miles north of Mobile, Alabama. The area is predominantly industrial, with a few small rural residential communities within a few miles of the site. The Mobile River borders the site to the east. The LeMoyne facility was previously owned by the Stauffer Chemical Company, which began operations in 1953. Now the RCRA-permitted facility is currently owned and operated by Akzo Chemicals, Inc., which purchased the facility in 1987. Multi-product organic and inorganic chemicals are manufactured at the facility. From 1965 to 1974, under the operation of Stauffer, waste from the plant was placed in an unlined landfill located approximately one mile east of the main plant. The waste included 11,000 to 12,000 tons of brine muds in addition to plant refuse, used samples, and absorption oil. The landfill was closed in 1975 with an impermeable membrane cap and side-wall liner. Wastewaters from the processes were held in ponds, some of which discharged to the Cold Creek Swamp. All of the ponds except one are clay lined and have been closed under the direction of the state. New membrane-lined ponds were installed during the 1970s to replace the closed ponds. Under a consent agreement with EPA, Stauffer completed a remedial investigation in May 1988, which identified contamination of the soil, pond sludge, swamp sediment, and ground water. Although there are four media of concern at the Stauffer site, this remedial action addresses the contaminated ground water, because ground water is the source for drinking water for the area. Additional RODs are planned for the source control operable units and the Cold Creek Swamp operable unit. The primary contaminants of concern affecting the ground water are VOCs including carcinogenic compounds such as carbon tetrachloride, and other organic compounds including pesticides.

The selected remedial action for the ground-water operable unit at this site includes a modified ground-water intercept and treatment system with surface-water discharge. This alternative involves continued operation of the existing intercept and treatment system, which consists of aeration via spray nozzles with discharges to a treatment pond and then to the Mobile River; installation of additional extraction wells, based on ground-water quality characteristics, water-table gradients, and pumping activities at the site and adjacent properties; design and implementation of modifications to the treatment system; and monitoring of effluent, ground-water concentrations, and pumping rates. Further investigation and treatability studies are necessary before EPA can determine the remedial action for the source units (soil and pond sediment) and the swamp. Bench and/or pilot-scale testing of *in situ* treatment alternatives for some of the source units, such as a wastewater treatment pond, is appropriate as part of the remedial design. A range of treatment technologies including thermal desorption and vapor extraction is being considered. The estimated total capital cost for this remedial action is $3,119,200, which includes O&M costs. Specific O&M costs were not provided.

Performance Standards or Goals

Ground water will meet state and federal ARARs including MCLs and risk reference doses (RfDs) developed by EPA. Chemical-specific clean-up goals include carbon tetrachloride 5 ug/l (MCL). Surface-water discharge must meet concentration limits specified in the NPDES permit.

Institutional Controls

Not applicable.

NPL Rank: 473

SYDNEY MINE SLUDGE PONDS, FL

First Remedial Action - Final
September 29, 1989

The Sydney Mine Sludge Ponds site occupies 9.5 acres of a 1,700-acre former phosphate mining site in Brandon, Hillsborough County, Florida. From 1973 to 1981, the county rented the site for disposal of septic wastes, waste automotive oils, grease trap wastes, and manufacturing cutting oils. An estimated 16 million gallons of wastes were deposited in three small pits. An EPA site investigation in 1979 identified organics and heavy metal contamination in monitoring wells near the waste pits. Sampling was also performed in Turkey Creek, which flows through the mine site about a mile from the waste pits. Upstream and downstream sediment samples exhibited elevated levels of metal. Disposal operations ended in September 1981 when the State denied issuance of a second operation permit for the site. The State and county began a two-phase cleanup effort in 1984. The first phase included construction of a slurry wall around the waste pits; excavation and on-site incineration of approximately 10,900 cubic yards of pit wastes; and pumping and onsite treatment of ground water. The second phase included excavation of approximately 15,000 cubic yards of contaminated soil with on-site treatment by air-drying followed by off-site disposal. This operable unit addresses ground-water contamination at the site. The primary contaminants of concern affecting the ground water are VOCs including benzene, toluene, TCE, and xylenes.

The selected remedial action for this site includes continued ground-water pumping with on-site treatment by air stripping and spray irrigation on land adjacent to the waste disposal site; evaluation of the existing ground-water pumping and treatment system and implementation of any necessary modifications to improve the operation; continued ground-water monitoring; and implementation of deed and ground-water use restrictions. The estimated present worth cost for the selected remedy is $2,448,000 which includes an annual O&M cost of $576,000.

Performance Standards or Goals

The ground-water remediation goals are based on state primary drinking water standards (PDWS) or PMCLs. Chemical-specific goals were provided for nine chemicals of concern including benzene 1 ug/l (PDWS) and toluene 2,000 ug/l (PMCL).

Institutional Controls

Deed restrictions will be implemented to restrict ground-water use onsite and within a reasonable distance of the site.

REGION 5

(Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin)

NPL Rank: 717

ADRIAN MUNICIPAL WELL FIELD, MN

First Remedial Action - Final
September 29, 1989

The Adrian Municipal Well Field site is in Adrian, Nobles County, Minnesota, a city which relies solely on ground water for its municipal water supply. In 1983, the state detected VOC contamination in two of the six wells at the site, and by 1985 the city had replaced the VOC-contaminated wells with two new wells. Subsequent ground-water sampling indicated that petroleum releases from underground storage tanks (UST) are sources for soil and ground-water contamination. Although ground-water contaminant concentrations exceed federal and state drinking water and surface water standards, no further action will be taken by the Superfund program because the program does not have the authority to address clean up of petroleum releases. EPA will, however, formally transfer the site to its UST program in October 1989 for further action. There are no costs associated with this remedial action.

Performance Standards or Goals

Not applicable.

Institutional Controls

Not applicable.

NPL Rank: 337

ALSCO ANACONDA, OH

First Remedial Action
September 8, 1989

The Alsco Anaconda site is a 4.8-acre former sludge disposal area in Gnadenhutten, Tuscarawas County, Ohio. The site lies within the Tuscarawas River's 50-year and 100-year floodplains and neighbors the Alsco Anaconda aluminum manufacturing plant which has operated since 1948. Contamination at the site occurred from 1965 to 1978 when wastewater and wastewater treatment sludge from the plant, containing hazardous aluminum processing wastes (FO19), were disposed of in an unlined settling basin and a sludge pit. In 1978, the plant owners began dewatering the treatment sludge prior to disposal of sludge off site in the settling basin and a former swamp area. This ROD is the first of two operable units at the site and addresses remediation of the contaminated soil and sludge. Because leachate from the sludge may have contaminated the ground water and surface water, a subsequent ROD will address the appropriate remedial action for those media. The primary contaminants of concern affecting the soil and sludge are organics including PCBs, and metals including chromium, cyanide, and arsenic.

The selected remedial action for this site includes excavating 50 cubic yards of sludge contaminated with greater than 500 mg/kg of PCBs followed by off-site incineration and disposal; excavating 8,820 cubic yards of aluminum processing waste sludge and underlying soil from the settling basin and sludge pit contaminated with less than 500 mg/kg of PCBs followed by off-site treatment and disposal or reuse; backfilling and revegetating excavated areas; and implementing institutional controls including site access and deed restrictions. The estimated capital cost for this remedial action is $4,161,066 with no associated O&M costs.

Performance Standards or Goals

Soil clean-up goals will meet clean closure levels which require soil and sludge to be excavated until remaining soil contaminant concentrations attain a cumulative excess cancer-risk level below 10^{-6} and a cumulative HI value of less than one for critical effect. Chemical-specific clean-up goals were not specified but will be established during the remedial design.

Institutional Controls

Site access and deed restrictions will implemented.

NPL Rank: 764

AUTO ION CHEMICALS, INC., MI

First Remedial Action
September 27, 1989

Auto Ion Chemicals, Inc. site is a former plating waste treatment and disposal facility occupying approximately 1.5 acres of vacant, fenced land in Kalamazoo, Michigan. The site is bounded to the north, east, and west by commercial/industrial facilities and lies adjacent to and within the floodplain of the Kalamazoo River. Ground water at the site is not currently used as a source of drinking water. From 1964 to 1973 the facility received chrome and cyanide plating waste. Heavy metals were precipitated from the plating waste and deposited in an on-site lagoon, and wastewater was discharged to the sanitary sewer. Leaks and spills from storage tanks, lagoon seepage, and other site activities resulted in soil contamination. In 1983 EPA conducted an emergency surface removal and, in 1986, they demolished the site structures which housed tanks and storage facilities. This first operable unit represents a source control remedial action for the soil. A second operable unit will address ground-water contamination. The primary contaminants of concern affecting the soil are organics including PAHs, and metals including arsenic, chromium, and lead.

The selected remedial action for this site includes excavation and off-site stabilization of approximately 7,200 cubic yards of contaminated soil; off-site disposal of treated soil in an approved land disposal area; and replacement of the excavated soil with clean fill. The estimated capital cost for this remedial action is $3,332,988, with an estimated annual O&M cost of $5,900.

Performance Standards or Goals

Soil posing a carcinogenic health risk greater than 10^{-6} will be excavated and treated to meet RCRA land disposal restrictions for soil contaminated with F006 waste. The treated soil must pass the TCLP test prior to off-site land disposal. Chemical-specific contaminant goals were not specified.

Institutional Controls

Not applicable.

NPL Rank: 834

BIG D CAMPGROUND, OH

First Remedial Action - Final
September 29, 1989

The Big D Campground site is in Kingsville, Ashtabula County, Ohio. The site consists of a 1.2-acre landfill created out of a former sand and gravel quarry. From 1964 to 1976 the site owner accepted approximately 28,000 cubic yards of hazardous materials for disposal which included up to 5,000 drums containing solvents, caustics, and oily substances. A 1986 remedial investigation identified the landfill as the primary source of contamination in soil outside the landfill and ground water underlying the landfill. Ground-water contamination is of significant concern because it is migrating towards the drinking water supply wells of nearby residences and Conneaut Creek which is adjacent to and south of the site. The primary contaminants of concern affecting the soil and ground water are VOCs including PCE and TCE, other organics, and metals including chromium and lead.

The selected remedial action for this site includes removing and incinerating up to 5,000 buried drums, bulk wastes, and up to 30,000 cubic yards of contaminated soil followed by on-site disposal of nonhazardous ash residue; pumping and treatment of 40,000,000 to 60,000,000 gallons of ground water using an on-site granular activated carbon system followed by on-site discharge to Conneaut Creek; and ground-water and surface-water monitoring. The estimated present worth cost for this remedial action is $39,000,000, which includes annual O&M costs of $320,000.

Performance Standards or Goals

This remedial action will reduce health risks identified in the ground water to a cumulative Hazard Index of 1.0 or less and a cumulative carcinogenic risk of 10^{-6} or less. Ground-water clean-up goals are based on MCLs and include TCE 5 ug/l and chromium 50 ug/l.

Institutional Controls

Deed and land use restrictions will be implemented.

NPL Rank: 182

BOWERS LANDFILL, OH

First Remedial Action - Final
March 24, 1989

The 12-acre Bowers Landfill site is in rural Pickaway County, Ohio, within the Scioto River floodplain. Fifteen residences lie within a 0.5-mile radius of the site. Information on the types and quantities of waste disposed of at the site is not readily available; however, landfill operations, which started in 1958, consisted solely of municipal refuse disposal until 1963. From 1963 to 1968, however, industrial refuse and chemical wastes were also disposed of at the site. Operations ended in 1968. The primary contaminants of concern affecting the soil, sediment, debris, and ground water are VOCs including PCE and benzene, other organics including PAHs and PCBs, metals including lead and chromium, and other inorganics.

The selected remedial action for this site includes removal of surface vegetation and debris such as domestic waste and drums followed by off-site disposal at a hazardous waste landfill or solid waste landfill if wastes are determined to be nonhazardous; erosion controls including surface regrading in areas prone to flooding and erosion; excavation and dewatering of drainage ditch sediment followed by on-site disposal; replacement of the discharge pipe; construction of a soil and clay cap with quarterly inspections for leachate and gas formation; implementation of site access and ground-water use restrictions; and ground-water monitoring. The estimated present worth cost for this remedial action is $4,300,000, which includes annual O&M costs of $116,000.

Performance Standards or Goals

Chemical-specific clean-up goals were not provided; however, clean-up levels will be based on MCLs where available and a 10^{-6} cancer risk for all other contaminants.

Institutional Controls

Site access and ground-water use restrictions will be implemented at the site.

NPL Rank: 684

BYRON SALVAGE YARD, IL

Third Remedial Action
June 30, 1989

The Byron Salvage Yard site is in rural Ogle County, Illinois and is approximately 3 miles southwest of the city of Byron. The site, which includes the Byron Salvage Yard and Dirk's Farm, is bordered by a forest preserve district to the north, an operating nuclear plant to the southeast, residential property to the south, and an open field to the west. The site is bisected by two 15 to 30 feet deep ravines draining surface-water runoff through the ravine waterways to the south branch of Woodland Creek, which flows to the Rock River. During the 1960s, the salvage yard owner accepted miscellaneous wastes and debris for disposal including drums of electroplating wastes, oil sludges, cutting wheels, solvents, and scrap metal. Industrial waste dumping reportedly occurred on the site during periods of heavy rainfall so that most of the waste would be carried off site by the resulting surface water runoff. In 1976, the Illinois EPA documented the presence of cyanide and heavy metals in soil, surface water, and ground water in and around the site. In 1986 the state initiated clean-up activities which included excavating buried drums from the ravines; removing surface drums; excavating soil heavily contaminated by heavy metals or organics; and excavating soil with concentrations 100 mg/kg or greater of cyanide. *In situ* treatment of cyanide-contaminated soil less than 100 mg/kg was performed but low levels of cyanide still remain. Water quality sampling, performed in 1984, revealed that off-site ground water was contaminated with VOCs, primarily TCE. The two aquifers which underlie and surround the site contain elevated levels of VOCs, metals, and cyanide. Private residential water supply wells that were affected by the contaminated ground water were temporarily supplied with bottled drinking water. In 1986, an EPA-approved emergency action led to the installation of in-house carbon filtration units at 10 residences in the Rock River Terrace subdivision located a 1/2 mile northwest of the site. A 1986 state ROD extended the municipal water supply system from Byron to the Rock River Terrace subdivision. This operable unit addresses the ground-water contamination emanating from the site and is the third of four operable units. The primary contaminants affecting the ground water are VOCs including benzene, PCE, and TCE, metals including arsenic, chromium, and lead, and cyanide.

The selected remedial action for this site includes removing all wastes generated during the remedial investigation; adding a one-foot soil cover to the affected portions of the site and regrading and revegetating the new surface; monitoring surface and ground water; plugging and abandoning monitoring wells no longer in use; providing an alternate source of drinking water by extending the water main of the municipal system to 27 additional residences; and implementing institutional controls. The estimated present worth cost is $1,1080,000, which includes annual O&M costs of $16,000.

Performance Standards or Goals

Because an alternate water supply will be provided, MCLs for ground-water contaminants will not be exceeded at the tap for affected residents. In lieu of MCLs, EPA is establishing clean-up levels based on alternate concentration limits (ACLs) which will be set at contaminant concentrations currently found in the aquifers. Maximum concentration limits, for Ambient Water Quality Criteria and/or Illinois Water Quality Standards, will be attained in a nearby pond and river.

Institutional Controls

Institutional controls will be implemented to preclude future use of the ground water in undeveloped areas where the ground water is contaminated due to the site. These controls may include deed restrictions or mandatory hookups to public water supplies, plugging and abandoning residential wells, and/or other such actions.

NPL Rank: 668

CEMETERY DUMP, MI

Second Remedial Action - Final
September 29, 1989

The 4-acre Cemetery Dump site is a former sand and gravel pit in Rose Township, Oakland County, Michigan. During the late 1960s or early 1970s, approximately 300 to 600 drums, containing paint sludges, solvents, PCBs, and oils, were illegally dumped and buried on site. A 1985 ROD addressed the soil cleanup which included excavation and off-site disposal of visually-contaminated soil and drum fragments. Soil which was not visually contaminated was sampled and backfilled with clean soil into the excavated areas. Subsequent soil and ground-water sampling indicated that zinc contaminants in the ground water exceed the federal secondary MCL, a nonenforceable standard based on taste and odor, not protection of health. Zinc contamination, however, is most likely a result of monitoring well construction materials. No other contaminants exceed federal or state environmental standards.

The selected remedial action for this site is no further action because previous remedial activities appear to provide adequate protection to human health and the environment. Ground water will be monitored annually, and a 5-year review will be performed to ensure that the site continues to pose no threat to human health and the environment. There are no costs associated with this no action remedy.

Performance Standards or Goals

Not applicable.

Institutional Controls

Not applicable.

NPL Rank: 653

CLIFFS/DOW DUMP, MI

First Remedial Action - Final
September 27, 1989

The municipally owned 2-acre Cliffs/Dow Dump site is in a wooded recreational area adjacent to the Dead River in Marquette, Michigan. From 1954 until the early 1960s, wastes generated by the Cliffs-Dow Chemical Company's charcoal manufacturing plant were deposited at the site. The wastes, which included tar and tar-contaminated fill materials, were deposited to fill a small bog depression. The 200 cubic yards of exposed tar deposits are the primary source of contamination in the soil; however, the remaining 9,400 cubic yards of fill material containing charcoal and wood intermingled with approximately 200 cubic yards of tar, are also a contamination source. Results of pilot studies indicate that ground water is undergoing *in situ* biodegradation as it flows downgradient of the fill and poses no risk to human health or the environment. The primary contaminants of concern affecting the soil are VOCs including benzene, toluene, PCE, and xylenes, and other organics including PAHs and phenol.

The selected remedial action for this site includes excavation and off-site incineration of 200 cubic yards of exposed tars; excavation of 9,400 cubic yards of fill material intermingled with tars, and segregation followed by off-site incineration of 200 cubic yards of buried tars encountered during the excavation; forced aeration biological treatment of the 9,200 cubic yards of residual contaminated fill material after replacement in the excavated area; installing a soil cover and revegetation of bioremediated fill area; implementation of institutional controls including deed restrictions preventing new well installation and disturbance of fill material until health-based goals have been achieved; and ground-water and air monitoring. The estimated present worth cost for this remedial action is $2,842,165, which includes estimated annual O&M costs of $63,280.

Performance Standards or Goals

Ground-water contaminant levels, which are already below levels of concern, will further decrease through biodegradation and natural attenuation once the source material is removed. EPA's Superfund Public Health Evaluation Manual was used to develop health-based goals for source areas; however, no chemical-specific goals were provided.

Institutional Controls

Deed restrictions will be implemented to prevent the future use of ground water, including the establishment of drinking water wells within the vicinity of the contaminated ground-water boundaries, and will also prohibit disturbances of the fill materials during the biological treatment process until health-based goals have been achieved.

NPL Rank: 396

CROSS BROTHERS PAIL RECYCLING (PEMBROKE), IL

First Remedial Action - Final
September 28, 1989

The Cross Brothers Pail Recycling site is a former pail and drum recycling operation located in Pembroke Township, Kankakee County, Illinois. The 20-acre site, approximately half of which was used for waste disposal, is in a semi-residential area interspersed with small farms. Recycling operations, which involved draining empty drums and pails containing paints, dyes, and inks onto the ground, resulted in the formation of a waste residue layer approximately 6 inches thick over 10 acres of the property. In addition, crushed pails and drums were buried in 10 trenches located around the site. Operations continued at the site from 1961 until 1980 when the state closed the site and ordered a cleanup. An Initial Remedial Measure was signed in 1985 that required clearing the disposal area of all vegetation and removing 6,438 tons of contaminated surficial soil, 542 drums containing wastes, and 572 empty drums. From 1986 to 1989, the state conducted additional studies to define the nature and extent of ground-water and residual soil contamination. The site can be divided into two areas: a 6.5-acre area characterized by small local areas of soil contamination and a 3.5-acre area that contains contamination throughout the unsaturated zone (approximately 33,800 cubic yards of soil). Ground-water contamination is the principal threat at the site. The primary contaminants of concern affecting the soil and ground water are VOCs including benzene, PCE, TCE, toluene, and xylenes, and other organics including PCBs.

The selected remedial action for this site has been divided into two operable units. The first involves resampling a localized PCB-contaminated soil area followed by excavation and off-site incineration of approximately 5 cubic yards (dependent upon resampling results) of soil with a PCB level exceeding 10 mg/kg. The second operable unit addresses ground-water and soil remediation. The 6.5-acre area will be covered with a 6-inch vegetative cover, and the 3.5-acre area will be covered by 6 inches of gravel. Ground water will be pumped and treated on site with discharge onto the 3.5-acre gravel area via an irrigation system, thus establishing a "cleansing loop" and inducing soil flushing through the area of VOC contamination. Deed and access restrictions will be implemented. The estimated present worth cost for this remedial action is $2,076,500, which includes an annual O&M of $59,235 for 15 years.

Performance Standards or Goals

Ground-water clean-up levels will meet currently promulgated MCLs, a cumulative excess lifetime cancer risk not exceeding 10^{-6}, and a hazard index ratio less than or equal to one. No chemical-specific ground-water clean-up goals were provided. PCB-contaminated soil will be excavated such that a level less than 10 mg/kg (based on TSCA Spill Policy) remains on site.

Institutional Controls

The site will be secured through the installation of fencing and initiating a deed notification requirement identifying EPA and state concerns regarding activities at the site.

NPL Rank: 652

E.H. SCHILLING LANDFILL, OH

First Remedial Action - Final
September 29, 1989

The E.H. Schilling Landfill site is in Hamilton Township, Lawrence County, Ohio. The site is a 2.7-acre landfill on a larger tract of land. The predominantly rural area neighboring the site includes approximately 50 residences, which are between 0.25 mile and 1.5 miles from the site. The landfill was created by constructing a dam across a small valley. Both the landfill cover and dam have been described as inadequate, and leachate containing hazardous substances is being released through and beneath the dam. From 1969 to 1980, the landfill operators accepted both nonhazardous and hazardous wastes including styrene, phenol, acetone, alcohol, wastewater treatment sludge, coal tar compounds, and cumene. Results from a 1988 investigation reveal that soil and sediment contamination is limited to the area immediately adjacent to the dam, and ground-water contamination is limited to the monitoring wells immediately surrounding the landfill and the monitoring wells downgradient of the dam. Contamination appears to be due to leachate runoff. The primary contaminants of concern affecting the soil, sediment, and ground water are VOCs including benzene, other organics including PAHs, pesticides, and phenol, and metals including arsenic.

The selected remedial action for this site includes excavation of 500 cubic yards of sediment and 750 cubic yards of surface soil for consolidation in the landfill; construction of a 2.7-acre RCRA cap to contain 100,000 cubic yards of landfill waste; construction of a clay berm to improve dam stability; construction of a perimeter cut-off wall to eliminate the lateral flow of ground water into the landfill waste; construction of an interceptor drain outside the cut-off wall to drain ground water away from the landfill; dewatering the landfill of 7,000,000 gallons of leachate and treating the leachate using metal precipitation, air stripping, and carbon adsorption to remove organics and sulfide precipitation to remove inorganics, followed by discharge to surface water; treatment and discharge of an additional 1,000,000 gallons of wastewater generated during the remedial action; ground-water monitoring; and implementation of access and institutional controls. The estimated capital cost for this remedial action is $6,444,000, with an estimated annual O&M cost of $99,000 for 30 years.

Performance Standards or Goals

Soil will be excavated and consolidated to achieve a cumulative risk of less than 10^{-6} carcinogenic risk and a cumulative noncarcinogenic hazard index less than or equal to one. Ground water will be treated if it exceeds action levels which have been established as a cumulative cancer risk of less than 10^{-6} and a cumulative noncarcinogenic hazard index less than or equal to one.

Institutional Controls

Institutional controls include site access and deed restrictions.

NPL Rank: 638

GALESBURG/KOPPERS CO., IL

First Remedial Action - Final
June 30, 1989

The Galesburg/Koppers Co. site is a 105-acre area located approximately 2 miles south of the city of Galesburg in Knox County, Illinois. The land surrounding the site is sparsely populated with the Burlington Northern Railroad yard to the north, a landfill to the east, and four residences and a lumber yard to the south and west. Farmland abuts these areas. Burlington Northern Railroad Company operated the site as a railroad tie treating plant from 1907 to December 1966. In 1966, the Koppers Company, Inc. leased the production plant from Burlington Northern and resumed operation of the facility. Treatment operations consisted of pressure treatment of the railroad ties using a mixture of creosote and coal tar or creosote and fuel oil. From 1971 to 1976, pentachlorophenol (PCP) was used in the treatment process. Key contaminated areas at the site include a slurry pond, a northern and southern creosote lagoon, a PCP-contaminated lagoon, a waste pile storage area, two backfilled drainage ditches, and two former spray wastewater fields. Contamination has been found in soil, ground water, surface water, and on-site and off-site sediment. This ROD addresses all contaminated media. These actions, in combination with remedial actions at the Steagall Landfill site, are intended to eliminate off-site surface-water and sediment contamination as well. The primary contaminants of concern affecting the soil and ground water are organics including PCP, phenols, and PAHs.

The selected remedial action for this site includes excavation and on-site consolidation of approximately 15,200 cubic yards of contaminated soil with on-site biological treatment of soil and implementation of a biological monitoring program; construction of shallow ground-water interceptor trenches and deep pumping wells with pumping and on-site pretreatment of shallow and deep ground water using an existing wastewater treatment system to achieve clean-up objectives, discharging treated ground water to a publicly owned treatment works (POTW) for final treatment or on-site treatment should the POTW pretreatment standards not be achieved; ground-water monitoring; and implemention of site access and land use restrictions. The estimated present worth cost for this remedial action is $4,286,844, which includes an estimated annual O&M of $170,012.

Performance Standards or Goals

No chemical-specific clean-up goals were established for soil at the site. The soil will be excavated six inches beyond visible contamination. Samples will be taken after excavation to assess the mitigative efforts and to confirm remediation to health-based levels. Additionally, soil will be treated to background toxicity levels. Clean-up goals for ground water were based on a 10^{-6} excess carcinogenic risk goal.

Institutional Controls

Site access and land use restrictions will be implemented for the area of contamination in accordance with the anticipated consent decree.

NPL Rank: 536

HEDBLUM INDUSTRIES, MI

First Remedial Action - Final
September 29, 1989

Hedblum Industries site, an automotive parts manufacturing plant, is approximately one mile southwest of the town of Oscoda, in AuSable Township, Iosco County, Michigan. In addition to the plant, the site consists of a 10-acre industrial park, a wetland area, and residences including the AuSable Heights subdivision. Ground water flows beneath the plant and subdivision and discharges via a bayou into the AuSable River. Between 1968 and 1972, the previous plant operators discharged cooling water, rinse water, and approximately 4,000 gallons of waste TCE onto the ground. In 1973 VOCs were detected in residential wells in the AuSable subdivision. Contaminated wells were replaced with deeper wells which by 1977 also showed traces of contamination. Subsequently, the Oscoda Township Municipal Supply System was extended to residents through the installation of a new water main. An underground storage tank containing TCE, TCA, and PCE was removed from the site in 1980. The primary contaminants of concern affecting the ground water are VOCs including benzene, toluene, xylenes, TCE, and PCE, and metals including lead.

The selected remedial action for this site includes ground-water pumping and treatment using activated carbon adsorption with discharge to the bayou; and ground-water and soil monitoring. The estimated present worth cost for this remedial action is $1,379,000, which includes an annual O&M cost of $264,000 over four to five years.

Performance Standards or Goals

Ground water will meet SDWA MCLs. Target clean-up levels for ground water include benzene 5 ug/l, TCE 5 ug/l, and lead 50 ug/l.

Institutional Controls

Not applicable.

NPL Rank: 175

INDUSTRIAL EXCESS LANDFILL, OH

Second Remedial Action - Final
July 17, 1989

The 300-acre Industrial Excess Landfill site is in Uniontown, Stark County, Ohio. Several hundred residences are within a half mile of the site, and all residences and businesses in the Uniontown area rely on ground water from private well supplies. Surface water at the site flows to Metzger Ditch which is located along the eastern border of the site. The site was operated as a mixed industrial and refuse landfill from 1966 until 1980. Large amounts of fly ash and liquid wastes including latex and spent organic solvents were disposed of in the landfill between 1968 and 1972. To prevent the spread of contaminants associated with these wastes, several emergency actions have been undertaken. In 1986, an active methane extraction system was installed to prevent the off-site migration of explosive levels of methane gas. In April 1987, EPA installed air strippers in eight residences and two businesses due to the presence of low levels of volatile organic compounds. In September 1987, EPA signed a ROD to provide an alternate water supply to 100 homes west of the site to ensure that the community received safe drinking water while the final remedial action for the site was implemented. This ROD represents the final remedial action for the site and addresses the source area, gases generated within the source area, and contaminated ground water. The primary contaminants of concern affecting the soil, sediment, and ground water are VOCs including benzene, vinyl chloride, and PCE, other organics including cPAHs, and metals. Air contamination by methane gas is also present at the site.

The selected remedial action for this site includes installing a multilayer RCRA cap over the site to prevent surface-water infiltration; expanding the existing methane venting system to accommodate the potential increase of landfill gas due to the cap; extracting and treating approximately 256 million gallons of contaminated ground water by air stripping, carbon adsorption, and flocculation/sedimentation/filtration to achieve compliance with Clean Water Act NPDES discharge criteria for surface water discharge; continuing the pumping of ground water to maintain a lowered water table and protect ground water from additional contamination by the landfill; treating surface water from ponds at the site, if necessary; and dredging sediment from the ponds and ditch and incorporating them under the cap; multimedia monitoring; and institutional controls restricting future use of the site. The estimated present worth cost for this selected remedial action is $18,548,000, which includes an estimated annual O&M cost of $440,000.

Performance Standards or Goals

The selected remedy will ensure that landfill gas concentrations beyond the site boundary will not exceed 5 percent methane. Ground-water cleanup is based on a 10^{-6} excess cancer level and will be treated to achieve MCLs in the aquifer and discharged in compliance with Clean Water Act NPDES requirements. Specific ground-water goals include benzene 5 ug/l and vinyl chloride 2 ug/l. Permit limits are established in accordance with Ohio EPA Aquatic Life Quality Criteria for discharge to Metzger Ditch. Acute and chronic limits for the ditch discharge were provided in the ROD.

Institutional Controls

Institutional controls will be imposed to restrict future use of the site property. Future construction or public use of the land will be prohibited.

NPL Rank: 808

IONIA CITY LANDFILL, MI

First Remedial Action
September 29, 1989

The Ionia City Landfill site is a 20-acre municipally owned landfill in the southeast corner of Ionia, Michigan. The site is bordered by the Grand River to the south, a tributary to the Grand River to the east, and a light commercial/ residential area to the north. The site lies within the 100-year floodplain of the Grand River. The landfill was operated from the 1950s until about 1969, during which time industrial, commercial, and municipal wastes were disposed of at the site, including drummed liquids and solids from industrial sources. Drums of ignitable liquid wastes were reportedly burned until 1965. A state investigation in 1981 revealed exposed drums containing paint wastes, thinners, and industrial solvents as well as elevated levels of metals. Furthermore, VOC-contaminated and metal-contaminated ground water was detected. EPA investigations began in 1982 and revealed VOC contamination in the Grand River tributary surface water. Follow-up investigations by EPA led to an immediate removal action in 1984-85 by the city, under an administrative order, which included fencing a portion of the site, removing and disposing of exposed drums, covering depressed areas, and stabilizing areas of erosion. Current site risks result from subsurface wastes (or point source) from a 1/4-acre area in the northern section of the landfill. The estimated total waste volume is 5,000 cubic yards consisting of badly deteriorated buried drums and associated wastes, and contaminated soil. In addition there is a contaminant plume in an underlying shallow aquifer. The first operable unit addresses the point source area. A second operable unit addressing ground water has been deferred until the completion of the ground-water monitoring plan. The primary contaminants of concern affecting the soil and debris are VOCs including vinyl chloride and methyl chloride, other organics, and metals including chromium.

The selected remedial action for this site includes *in situ* vitrification of the defined point source area and an adjacent margin of safety zone, including an off-gas collection and treatment system; access restrictions; ground-water monitoring; institutional controls to restrict site use; and upgrading the landfill cover and repairing the side slopes followed by revegetation. The estimated present worth cost for this remedial action is $3,630,525, which includes an estimated annual O&M cost of $112,750 for year one and $51,000 for years two to ten. If a pilot test indicates that the selected remedy is inadequate, a contingency alternative of partial excavation with on-site incineration will be implemented.

Performance Standards or Goals

Target clean-up levels for the soil-refuse matrix to determine the extent of excavation will not be established; instead, the extent of excavation will be based on the extent of buried drums and additional sampling.

Institutional Controls

Site use restrictions will be implemented.

NPL Rank: 678

KYSOR INDUSTRIAL CORP., MI

First Remedial Action - Final
September 29, 1989

The Kysor Industrial Corp. facility is a large truck parts manufacturing plant in the Cadillac industrial park in the city of Cadillac, Wexford County, Michigan. Approximately 40 industries operate in the 1-square-mile industrial park including Northernaire, another Superfund site. The Northernaire site will be addressed by the ground-water remediation portion of this action as well. There are several private residences including a trailer park within the industrial park, and another residential neighborhood lies adjacent to the northern boundary of the park. The city of Cadillac's water supply well field is located near the center of the park, and ground water beneath the site generally flows towards the city wells. The Clam River flows through the southeast portion of the site draining runoff from the site. The Kysor facility commonly uses solvent cleaners and degreasers; past disposal practices included dumping barrels of spent solvent directly on the soil behind the plant. Kysor excavated approximately 700 cubic yards of soil in 1981 after contaminants were discovered in ground water samples. Ground-water contamination has since been detected throughout the shallow and intermediate aquifers underlying the park. At present the deep aquifer (in which the Cadillac city well field is located) is not affected by this contamination. The remaining soil contamination is relatively localized and is from 6 to 25 feet in depth. The primary contaminants of concern affecting the soil and ground water are VOCs including toluene, TCE, PCE, and xylenes, and metals including chromium.

The selected remedial action for this site includes a two-stage ground-water pumping and treatment system using carbon adsorption for the removal of chromium and air stripping with vapor-phase carbon adsorption for the removal of VOCs and discharge to the Clam River; *in situ* soil vacuum extraction with air pollution control equipment; ground-water monitoring; and institutional controls including site access and ground water and land use restrictions. The estimated present worth cost for this remedial action is $16,000,000, which includes present worth O&M costs of $5,000,000 over 60 years.

Performance Standards or Goals

Ground water will meet or exceed state and SDWA MCL standards. Target clean-up levels for ground water include xylene 440 ug/l, toluene 40 ug/l, PCE 1 ug/l, TCE 5 ug/l, and chromium (hexavalent) 50 ug/l. Soil will meet state, RCRA, and CAA standards. Target clean-up levels for soil include xylene 141 mg/kg, toluene 724 mg/kg, and TCE 0.07 mg/kg.

Institutional Controls

Institutional controls will be established including site access and ground-water and land use restrictions.

NPL Rank: 569

LASKIN/POPLAR OIL CO., OH

Third Remedial Action - Final
June 29, 1989

The 9-acre Laskin/Poplar Oil Co. site is in Jefferson Township, Ashtabula County, Ohio. Included on the site are: a residence, a greenhouse complex, a boiler house/garage containing four boilers, a smokestack, four oil storage pits, one underground and 32 above ground oil storage tanks, a retention pond, a freshwater pond, and miscellaneous small buildings. In the 1960s, storage pits and tanks were installed to store waste oil for the boilers that heated the greenhouses. The Poplar Oil Company continued to accept the waste oil throughout the 1960s and 1970s. In 1981, EPA found PCBs in on-site ground water and soil which resulted in several emergency actions that included draining and regrading 2 retention ponds, diverting surface runoff to other retention ponds, removing off-site and incinerating 302,000 gallons of waste oil, treating and discharging off-site 430,000 gallons of contaminated surface water, and solidifying 205,000 gallons of sludge. From 1985 to 1986, the Poplar Oil Company removed an additional 250,000 gallons of waste oil and wastewater in response to an administrative order. Two additional orders were issued ordering workplan development and incineration of materials in the pits, tanks, and heavily contaminated soil. The primary contaminants of concern affecting the soil, on-site structures, and debris are organics including PCBs, PAHs, pesticides, and dioxin, and metals including lead.

The selected remedial action for this site includes draining on-site freshwater and retention ponds with off-site discharge and refilling; thermally treating contaminated soil, ash, and debris from the boiler house area with on-site disposal of ash if the ash can be delisted, otherwise off-site disposal in a RCRA landfill; demolishing and thermally treating or decontaminating dioxin-contaminated structures; constructing an up-gradient ground-water diversion trench; installing a multi-layer cap over contaminated soil exceeding a 10^{-6} excess cancer-risk level; monitoring surface and ground water; and imposing access and land use restrictions. The estimated present worth cost for this remedial action is $11,000,000, which includes present worth O&M costs of $1,000,000.

Performance Standards or Goals

No specific clean-up goals were provided; however, remediation goals will prevent exposure to contaminated soil and debris exceeding a 10^{-6} cancer-risk level or a total hazard index greater than 1.

Institutional Controls

Land use and access restrictions will be implemented to prohibit site use, land development, and ground-water extraction.

NPL Rank: 69

MIAMI COUNTY INCINERATOR, OH

First Remedial Action - Final
June 30, 1989

The Miami County Incinerator site is in Concord Township, Ohio. The 65-acre site is approximately 1,500 feet west of the Great Miami River; the Eldean Tributory of the river runs across the northwest corner of the site. The site consists of the incinerator building and adjacent property, including a former scrubber wastewater lagoon, an ash disposal pit, an ash pile, a liquid disposal area, and trench and fill landfill areas north and south of the Eldean Tributory. Operations began in 1968, when large quantities of spent solvents, oils, and drummed and bulk industrial sludges were accepted for disposal. The facility generated scrubber wastewater and ash quench water, which were disposed of in the wastewater lagoon. Incinerator fly ash and bottom ash, non-combustible materials, and unburned refuse were disposed of in a landfill north of the tributary, and an estimated 104,000 to 150,000 barrel-equivalents of liquid waste were dumped or buried on site. After closure of the facility in 1983, the Ohio EPA found detectable levels of chlorinated hydrocarbons in drinking water wells near the site. Three residences, the Miami County Highway Garage, and the incinerator facility were supplied with alternate water supplies in 1986. The primary contaminants of concern affecting the soil and ground water are VOCs including PCE, toluene, and TCE, other organics including PCBs, PAHs, dioxin, and pesticides, and metals including lead.

The selected remedial actions for this site are specific to each area of contamination and include excavation and on-site consolidation of ash wastes and contaminated soils onto the landfills with capping of landfills and previously excavated areas; pumping and treatment of ground water with discharge to POTW; vapor/vacuum extraction of liquid disposal area using carbon filters; continued testing of soils, ash, and tributary sediment; and provision of an alternate water supply for area residents and businesses. The estimated present worth for this remedial action is $19,400,000, which includes an estimated O&M cost of $4,666,000.

Performance Standards or Goals

Specific clean-up levels have not been established at this time; however, they will be based on MCLs, a hazard index of 1, a 10^{-5} cancer-risk level at the waste boundary (i.e., edge of cup), and a 10^{-6} cancer-risk level at the nearest receptor.

Institutional Controls

Deed and land use restrictions will be implemented to prevent any future use of ground water.

NPL Rank: 262

MIDCO I, IN

First Remedial Action - Final
June 30, 1989

The MIDCO I site is a 4-acre, abandoned industrial waste recycling, storage, and disposal facility in Gary, Indiana. The surrounding area is partially rural, including wetlands. Residential neighborhoods lie to the west, south, and east, with some residents living as close as 900 feet from the site. Twelve drinking water wells have been identified within approximately one mile of the site. The Calumet Aquifer, one of the two major aquifers underlying the site and providing water to these wells, is highly susceptible to contamination from surface sources. Recycling, storing, and disposing of industrial wastes began at the site sometime before June 1973. Within a three-year period, the site owners accepted and stockpiled approximately 6,000 to 7,000 55-gallon drums containing bulk liquid waste, and four bulk tanks, each 4,000-10,000 gallons. The facility closed in December 1976 after a fire burned approximately 14,000 drums of chemical waste. Operations resumed in October 1977 under new ownership. By February 1979, the new owners abandoned the facility, leaving thousands of drums and waste chemicals unattended. By January 1980, an estimated 14,000 drums were still stockpiled on site. In June 1981, severe flooding caused water in the area to drain west into a neighboring city; contact with the flood water reportedly resulted in skin burns. In 1982, EPA initiated a surface removal action which included removing extensive surface wastes, an underground tank, and the top one foot of contaminated soil. Because these activities did not address the contaminated subsurface soil, sediment, and ground water, EPA has initiated this first remedial action to address the above-referenced contaminated media. The primary contaminants of concern affecting the soil, sediment, and ground water are VOCs including benzene, toluene, and TCE, other organics including PCBs, phenols, and PAHs, and metals including chromium and lead.

The selected remedial action for this site includes soil vapor extraction followed by treatment of 12,400 cubic yards of contaminated soil and subsurface materials using solidification/stabilization and on-site disposal; excavation and on-site solidification/stabilization of approximately 1,200 cubic yards of contaminated sediment in surrounding wetlands; covering the site in accordance with RCRA landfill closure requirements; ground-water pumping and deep well injection in a Class I well if EPA grants a petition to allow land disposal of waste prohibited under RCRA; if a petition is not approved, ground water will be treated using air stripping and a liquid-phase granular activated carbon polish system to meet EPA requirements (LDR treatment standards), followed by deep well injection or reinjection into the aquifer; ground-water monitoring; and implementation of deed and access restrictions. The estimated present worth cost for this remedial action is $13,989,000, which includes annual O&M costs of $525,000, if ground water is treated; or $10,728,000, which includes annual O&M costs of $188,000, if ground water is not treated.

Performance Standards or Goals

Clean-up action levels were provided for soil and ground water. Soil and sediment will be treated if they exceed any of the following risk-based levels: cumulative lifetime carcinogenic risk equal to 10^{-6}; cumulative chronic noncarcinogenic index equal to 1.0; or subchronic risk index equal to 1.0. Ground water will be pumped and treated if it exceeds any of the following risk-based levels: cumulative lifetime cancer risk equal to 10^{-5}; Cumulative Noncarcinogenic Index equal to 1.0; Subchronic Risk equal to 1.0; primary MCLs; or chronic AWQC (for aquatic wildlife) multiplied by a dilution factor of 3.9. If only one constituent poses a cancer risk equal to or greater than 10^{-5}, the MCL, if promulgated, will be the clean-up action level. Chemical-specific goals were not provided for soil, sediment, or ground water.

Institutional Controls

Institutional controls will include site access and deed restrictions.

NPL Rank: 865

MIDCO II, IN

First Remedial Action - Final
June 30, 1989

The MIDCO II site is a 7-acre storage and disposal facility in Gary, Indiana. The surrounding area is predominantly used for industrial purposes, and includes 34 other potential hazardous waste sites. The underlying aquifer is highly susceptible to contamination from surface sources because of the high water table; however, in the vicinity of the site, the aquifer is used primarily for non-drinking water purposes. The same operator as at another Superfund site, MIDCO I, began waste operations, including drum storage at MIDCO II during the summer of 1976. Following a major fire at the MIDCO I site in January 1977, MIDCO transferred the operations from the MIDCO I site to the MIDCO II site. Operations included temporarily storing bulk liquid and drum wastes; neutralizing acids and caustics; and disposing of wastes by dumping wastes into on-site pits, which allowed wastes to percolate into the ground water. One of these pits, the filter pit, had an overflow pipe leading into a ditch, which drained into the nearby Grand Calument River. By April 1977, approximately 12,000 to 15,000 55-gallon drums of waste materials were stored on site. Additionally, an estimated ten badly deteriorated and leaking tanks were holding wastes including oils, oil sludges, chlorinated solvents, paint solvents, paint sludges, acids, and spent cyanides. In August 1977, a fire at the site destroyed 50,000 to 60,000 drums. Although most drums were badly damaged a substantial number of drums, including 75 to 100 drums containing cyanide, survived the fire. EPA conducted a preliminary investigation resulting in the installation of a 10-foot high fence around the site. In 1984 and 1985, EPA conducted emergency removal activities including repairing and extending the site fence; removing most of the remaining drums, tanks, and debris from the site's surface; and removing the sludge pits and filter pit contents. The resulting PCB-contaminated soil pile was removed and disposed of in an off-site hazardous waste landfill in early 1986, and most of the cyanide-contaminated pile was also removed. Removal activities ended in January 1986. The primary contaminants of concern currently affecting the soil, sediment, and ground water are VOCs including benzene, toluene, TCE, and xylenes, other organics including PCBs, and metals including arsenic, chromium, and lead.

The selected remedial action for this site includes excavation and treatment of 35,000 cubic yards of contaminated soil and waste materials using solidification/stabilization followed by on-site disposal; excavation and on-site solidification/ stabilization of 500 cubic yards of contaminated sediment; covering the site in accordance with RCRA landfill closure requirements; ground-water pumping and deep well injection in a Class I well if EPA grants a petition to allow land disposal of waste prohibited under RCRA; if a petition is not approved, ground water will be treated using air stripping and a liquid phase granular activated carbon polish system to meet EPA requirements (LDR treatment standards), followed by deep well injection or reinjection into the aquifer; ground-water monitoring; and implementing deed and access restrictions. The ground-water treatment and underground injection portions of the remedial action may be combined with the remedial action for MIDCO I. The estimated present worth cost for the remedial action is $18,596,400, which includes annual O&M cost of $733,000, if ground water is treated; or $14,419,000, which includes annual O&M costs of $301,000, if ground water is not treated.

Performance Standards or Goals

Clean-up action levels were provided for soil, sediment, and ground water. Soil and sediment will be treated if they exceed any of the following risk-based levels: cumulative lifetime carcinogenic risk equal to 10^{-5}; cumulative chronic noncarcinogenic index equal to 1.0; or subchronic risk index equal to 1.0. Ground water will be pumped and treated if it exceeds any of the following risk-based levels: cumulative lifetime carcinogenic risk equal to 10^{-5}; cumulative noncarcinogenic index equal to 1.0; subchronic risk

equal to 1.0; primary MCLs; or chronic AWQC for protection of aquatic life multiplied by a factor of 3.6. If only one constituent poses a cancer risk equal to or greater than 10^{-5}, the MCL, if promulgated, will be the clean-up action level. Chemical-specific goals were not provided for soil, sediment, or ground water.

Institutional Controls

Institutional controls will include site access and deed restrictions.

NPL Rank: 40

NEW BRIGHTON/ARDEN HILLS, MN

Fourth Remedial Action (Amendment)
August 11, 1989

The New Brighton/Arden Hills site is an area of organic solvent contamination in ground water northwest of Minneapolis, Minnesota. The site includes the cities of New Brighton, Arden Hills, and St. Anthony as well as the Twin Cities Army Ammunition plant. This ROD amends a June 1986 ROD calling for the installation of a new well to provide part of the drinking water supply to New Brighton. Because of major changes in site conditions, EPA has concluded that a new well is no longer necessary to protect human health in New Brighton. Originally it was anticipated that low contamination levels in Well #7 (one of nine municipal wells) could not be assured and that a replacement well in a deeper aquifer was needed to provide an alternate supply of water. However, further data from Well #7 indicate contamination is not increasing. Moreover, a large water supply will be provided by the U.S. Army to New Brighton as part of a litigation settlement, and a system has been installed by the U.S. Army to prevent further contamination from the suspected sources. Therefore, EPA believes it is no longer necessary or cost effective to complete the project. There are no contaminants of concern affecting the ground water associated with Well #7.

The selected remedial action for this ROD amendment is no further action for the Well #7 operable unit and ceasing the installation of a ground-water supply well remedy selected in a June 1986 ROD.

Performance Standards or Goals

Because the objectives of the operable unit affected was to provide an alternate water supply, rather than cleanup of the site, clean-up standards are not applicable for the amendment.

Institutional Controls

Not applicable.

NPL Rank: 40

NEW BRIGHTON/ARDEN HILLS, MN

Seventh Remedial Action
August 11, 1989

The New Brighton/Arden Hills site, also known as the Twin Cities Army Ammunition Plant (TCAAP) site, is in New Brighton, Minnesota. Land use bordering the four square-mile site is largely residential. Past disposal of ammunition manufacturing wastes on site resulted in contamination of ground water beneath and downgradient of the site. A total of 14 waste disposal locations have been identified and assigned as Sites A through K. During remedial investigations at Site D, soil was discovered to be contaminated with PCBs and other organic and metal contaminants. A soil gas extraction system was implemented to remove the source of volatile organic contamination and reduce the potential of migration to ground water. In implementing the soil gas extraction system, PCB-contaminated soil was removed, stockpiled near Site D, and sealed with a plastic liner material. This interim remedy addresses the treatment and disposal of contaminated soil that is stockpiled near Site D. The primary contaminants of concern affecting the soil are VOCs including TCE and PCE, other organics including PCBs, and metals including arsenic and lead.

The selected remedial action for the site includes on-site treatment of approximately 1,400 cubic yards of stockpiled soil using mobile infrared thermal treatment technology; analysis of treated soil to ensure the PCB treatment goal is met, followed by placement of treated soil in an area near Site D; discharge of treated scrubber wastewater to the TCAAP sanitary sewer system and ultimately to a POTW; decontamination and removal of equipment used in the treatment process; and air monitoring during soil treatment. The estimated total cost for the selected remedy is $1,200,000.

Performance Standards or Goals

The treatment goal for soil is PCBs 2 mg/kg and is consistent with Toxic Substances Control Act treatment levels.

Institutional Controls

Not applicable.

NPL Rank: 438

NINTH AVENUE DUMP, IN

Second Remedial Action - Final
June 30, 1989

The Ninth Avenue Dump is a 17-acre, inactive chemical and industrial waste disposal site in Gary, Indiana. There is industrial, commerical, and residential development in the surrounding area. There are approximately 60 industrial and residential water supply wells within 1 mile of the site. Interconnecting ponds and wetlands areas border the waste disposal areas to the north, west, and south. The wetlands areas to the east and to the south of the site are relatively undisturbed. Hazardous waste disposal occurred at the site from the early to mid-1970s, with some filling associated with clean-up activities continuing until 1980. Industrial, construction, demolition, and chemical wastes were accepted at the site. Specific industrial wastes which were accepted at the site include oil, paint, solvents and sludges, resins, and flammable, caustic, and arsenic-contaminated materials. A state inspection in 1975 revealed that there were approximately 10,000 55-gallon drums at the site. Additionally, the state estimated that 500,000 gallons of liquid industrial waste were dumped, and 1,000 drums were buried on site and in contact with ground water. As a result of 1975 state orders and 1980 EPA orders to initiate surface cleanup, the site operator removed drums, tank cars, and some contaminated soil from the site's surface. The first ROD, signed in September 1988, addressed remediation of an oil layer floating on the ground-water surface and will include construction of a slurry wall around the contaminated portion of the site and excavation and on-site storage of contaminated soil. This second and final remedial action addresses the remaining threats to the site which include contaminated soil, sediment, fill material, ground water (generally on site), and oil collected during the first operable unit. The primary contaminants of concern affecting the soil, sediment, fill material, and ground water are VOCs including benzene, TCE, and toluene, other organics including PAHs and PCBs, and metals including lead.

The selected remedial action for this site includes excavating approximately 36,000 cubic yards of the most severely oil-contaminated waste and fill materials from the area inside the slurry wall, on-site thermal treatment of excavated waste, fill, and previously extracted oil, followed by filling the excavated area with incinerator and ground-water treatment process residues, discarded drums, contaminated sediment removed from on- and off-site ponds, and trench spoils; covering the area contained by the slurry well with a RCRA cap; pumping and treatment of ground water inside the slurry wall with reinjection of most of the ground water within the slurry wall to promote soil flushing; pumping and treatment of contaminated ground water outside the slurry wall with reinjection or discharge to surface water; dismantling, decontaminating, and removing the oil storage unit constructed under the first operable unit; continued long-term ground-water monitoring; air monitoring during remedial activities; and implementing institutional controls to protect the site and restrict ground-water use. The estimated present worth cost for this remedial action is $22,209,000 which includes an annual O&M cost of $489,000.

Performance Standards or Goals

Soil excavation is not designed to clean the area to meet health-based clean-up levels but rather to remove the most highly contaminated fill material and to ensure the long-term effectiveness of the containment and ground-water components of the remedy. Chemical-specific treatment standards for soil were not provided. Target clean-up levels for ground water are based on MCLs or a 10^{-5} cumulative carcinogenic risk, whichever is more stringent, for carcinogens; and MCLs, MCLGs, or an hazard index of 1, whichever is more stringent, for noncarcinogens.

Institutional Controls

Deed and access restrictions will be implemented to prohibit use of ground water under the site and to protect the cap.

NPL Rank: 64

NORTHERNAIRE PLATING, MI

Second Remedial Action - Final
September 29, 1989

The Northernaire Plating facility is a former electroplating facility in the Cadillac industrial park in the city of Cadillac, Wexford County, Michigan. Approximately 40 industries operate in the 1-square mile industrial park including Kysor Industrial, another Superfund site. The Kysor Industrial site will be addressed by this action as well. There are several private residences including a trailer park within the industrial park, and another residential neighborhood lies adjacent to the northern boundary of the park. The city of Cadillac water supply well field is located near the center of the park, and ground water beneath the site generally flows towards the city wells. The Clam River flows through the southeast portion of the site draining runoff from the site. The Northernaire Plating facility provided custom chromium and nickel plating finishes to automobile and other metal parts. Improper waste handling and faulty sewer systems are believed to be responsible for releasing toxic compounds (including hexavalent chromium, chromium, and cyanide) to the soil which have subsequently leached from the soil to the ground water. A 1985 ROD addressed the soil contamination and included excavation and off-site disposal of contaminated soil and sewer sediment. Ground-water contamination has since been detected throughout the shallow and intermediate aquifers underlying the park. At present the deep aquifer (in which the Cadillac city well field is located) is not affected by this contamination. The primary contaminants of concern affecting the ground water are VOCs including toluene, TCE, PCE, and xylene, and metals including chromium.

The selected remedial action for this site includes a two-stage ground-water pumping and treatment system using carbon adsorption for the removal of chromium and air stripping with vapor-phase carbon adsorption for the removal of VOCs and discharge to the Clam River; ground-water monitoring; and institutional controls including site access and ground-water and land use restrictions. The estimated present worth cost for this remedial action is $16,000,000, which includes present worth O&M costs of $5,000,000 over 60 years.

Performance Standards or Goals

Ground water will meet or exceed state and SDWA MCL standards. Target cleanup levels for ground water include xylene 440 ug/l, toluene 40 ug/l, PCE 1 ug/l, TCE 5 ug/l, and chromium (hexavalent) 50 ug/l.

Institutional Controls

Institutional controls will be established including site access and ground-water and land use restrictions.

NPL Rank: 136

OTT/STORY/CORDOVA CHEMICAL CO., MI

First Remedial Action
September 29, 1989

The Ott/Story/Cordova Co. site is in Dalton Township, Muskegon County, Michigan. Beginning in 1957, various specialty organic chemical manufacturers operated at the site, producing intermediate items used in making pharmaceuticals, dyestuffs, and agricultural chemicals. Soil and water contamination was noted as early as the 1960s, probably resulting from discharge of production vessel clean out wastes and wastewaters to on-site unlined lagoons, and drums of waste that were accumulated on site. In 1977, several thousand cubic yards of lagoon sludge and several thousand drums were removed by the state, and in 1982 an alternate water supply was provided to residents in the vicinity of the site. Subsequent investigations detected significant degradation of Little Bear Creek and its unnamed tributary, which flow past the site to the east, as a result of contaminated ground water. Due to the complexity of the site, the cleanup will be organized into two distinct operable units. This first operable unit addresses the interception of contaminated ground water entering the Little Bear Creek system. The second operable unit will address contaminated soil, possible ground-water remediation, source control, and air and water monitoring. The primary chemicals of concern affecting the ground water and surface water are VOCs including benzene, PCE, TCE, toluene, vinyl chloride, and xylene, other organics including PCBs and pesticides, and metals including arsenic.

The selected remedial action for this site includes pumping and treatment of ground water that would otherwise enter the Little Bear Creek system using UV-oxidation, carbon adsorption, biological treatment (activated sludge), filtration with discharge to surface water, and environmental monitoring. The estimated present worth cost for this remedial action is $11,751,000, which includes estimated annual O&M costs of $1,500,000 to $1,600,000 for years one to five.

Performance Standards or Goals

Effluent quality and stream discharge will meet state NPDES levels that are dependent on the final discharge point. ARARs pertaining to ground-water restoration will be addressed in a subsequent overall ground-water operable unit.

Institutional Controls

Not applicable.

NPL Rank: 87

OUTBOARD MARINE CORP., IL

First Remedial Action (Amendment)
March 31, 1989

The Outboard Marine Corp. site is on the west shore of Lake Michigan in Waukegan, Illinois. A marine products manufacturing plant operated at the site for approximately 20 years until production ended in the early 1970s. From 1961 to 1972 hydraulic fluid containing PCBs was used at the plant in the die cast works. This fluid was later discharged to Slip 3 of the harbor, a parking lot north of the plant, and three areas known as the North Ditch, Oval Lagoon, and Crescent Ditch. There is an estimated 700,000 pounds of PCBs on site and approximately 300,000 pounds in Waukegan Harbor. In 1984, EPA began engineering design work for the selected remedial actions presented in a 1984 ROD to clean up contaminated soil and sediment at the site. During 1985, however, all actions were suspended due to litigation between Outboard Marine Corporation (OMC) and EPA regarding EPA access to OMC's property. Section 122 of SARA specifically addressed access problems and upon its effective date, negotiations with OMC resumed for implementation of the remedy. After negotiations between EPA and OMC were completed, a consent decree was signed in 1986 by OMC. Under the consent decree most portions of the remedial action described in the 1984 ROD remain unchanged. An on-site treatment step was added, however, to meet the SARA preference for treatment requirement. The primary contaminants of concern affecting the soil and sediment are organics including PCBs.

The selected remedial action for this site includes construction of a cutoff wall and slurry wall to isolate Slip 3 and form a containment cell; construction of a new slip to replace Slip 3, and relocation of Larsen Marine; removal and treatment using a chemical extraction process or thermal treatment of sediment in Slip 3 exceeding 500 mg/kg PCBs and soil and sediment exceeding 10,000 mg/kg PCBs from the Crescent Ditch/Oval Lagoon Area; dredging of upper harbor sediment above 50 mg/kg and placement of contaminated sediment in the new Slip 3 containment cell; construction of a west containment cell for treatment residues and lower concentration PCB-contaminated soil; construction of an east containment cell around the parking lot area; construction of a temporary, on-site water treatment facility for dredged water; construction of a permanent water treatment facility; on-site treatment of containment cell water followed by discharge to either a POTW or an on-site location; capping of all containment cells; and ground-water monitoring. The estimated capital cost for this remedial action is $19,000,000; O&M costs were not provided.

Performance Standards or Goals

A PCB clean-up level of 50 mg/kg was established based on site-specific data. Hot spots for soil and sediment have been defined as greater than 500 mg/kg PCBs in the Crescent Ditch/Oval Lagoon and 10,000 mg/kg PCBs in Slip 3. These correspond to "muck" layers below which PCBs have not significantly penetrated. The on-site treatment system is an extraction process that must result in a 97 percent PCB removal level.

Institutional Controls

Not applicable.

NPL Rank: 781

WAITE PARK WELLS, MN

First Remedial Action - Final
September 28, 1989

The 45-acre Waite Park Wells site is in Waite Park, Stearns County, Minnesota, 1,500 feet east of the Sauk River. Waite Park municipal wells #1 and #3 served the city until December 1984 when routine sampling detected organic contamination in the ground water. The contaminated plume extends east-southeast from the Electric Machinery Manufacturing Company to the wells which are situated in the northeast corner of the Burlington Northern Superfund site. In January 1985, the state issued a health advisory to residents to discontinue using municipal water for drinking and cooking. A water hook up with St. Cloud, Minnesota was completed in February 1985 to provide the 3,500 Waite Park residents with an alternate water supply. In February 1988, the five responsible parties at the site funded a municipal water treatment system and wells #1 and #3 were returned to service. Remedial investigations did not identify any significant soil contamination at the site in the vicinity of the Electric Machinery Company; however, ground-water contamination was identified in the shallow aquifer, and to a lesser extent, in the deep aquifer. This ROD represents the final response action for the Electric Machinery portion of the Waite Park Wells site. The primary contaminants of concern in the ground water are VOCs including PCE and TCE.

The selected remedial action for the site includes ground-water pumping and on-site treatment of the contamination plumes of both the shallow and deep aquifers using packed towers aeration (air stripping); discharge of treated ground water from the packed tower aeration system to the Sauk River under an NPDES permit; and surface-water monitoring and long-term ground-water monitoring. The estimated present worth cost for this remedial action is $913,000. O&M costs were not provided.

Performance Standards or Goals

Ground-water risk reduction will be achieved by continuing to pump and treat until the more restrictive of Safe Drinking Water Act MCLs or the state's Recommended Allowable Limits (RALs) for each VOC in the shallow and deep aquifers are met. Chemical-specific cleanup levels include PCE 6.6 ug/l (RAL) and TCE 5 ug/l (MCL). Surface-water discharge to the Sauk River will comply with Clean Water Act Ambient Water Quality Criteria. Chemical-specific discharge goals include PCE 8.9 ug/l and TCE 123 ug/l. In addition, discharges to Sauk River will comply with NPDES permit standards.

Institutional Controls

Not applicable.

NPL Rank: 132

WAUCONDA SAND & GRAVEL, IL

Second Remedial Action - Final
March 31, 1989

The 74-acre Wauconda Sand & Gravel site includes 52 acres of permitted and unpermitted landfill areas and is located in Lake County, Illinois, north of the village of Wauconda. The area neighboring the site includes agricultural land, residential properties including 12 homes within one mile of the landfill, and two new residential developments. Most residences use well water but the wells lie outside the ground-water flow boundaries of the moderately contaminated shallow aquifer, which lies directly beneath the site. A deeper aquifer, which is connected to the shallow aquifer and is the predominant source of drinking water for area residents, does not appear to be contaminated. From 1941 to mid 1978, the site owner accepted primarily nonhazardous municipal, residential, commercial, and industrial wastes; there are, however, an estimated 30,000 cubic yards of hazardous wastes on site. The landfill was closed in July 1978 and was subsequently covered by a layer of clay and soil. Since the late 1970s, leachate has been discharging to a nearby creek, and surface-water sampling taken from this creek has revealed low concentrations of VOCs, PCBs, and metals. In a 1985 ROD, EPA determined that a leachate collection system was needed to prevent further ground-water contamination. This ROD, the second and final operable unit, further characterizes ground-water quality via long-term monitoring to ensure that existing measures are protective of human health and the environment. The primary contaminants of concern affecting the ground water, surface water, and air are VOCs including vinyl chloride and benzene, metals including arsenic and lead, and methane.

The selected remedial action for this site includes long-term monitoring of ground water, surface water, and air emissions with possible evaluation of additional remedial alternatives and a ROD amendment if action levels are exceeded; further upgrade of the site cap and possible relocation of a nearby creek; installation and operation of an improved venting system with possible air emissions treatment; continued operation and/or maintenance of the leachate collection and venting systems, site cap, fence, and monitoring well network; and implementation of institutional controls to restrict ground-water use. The estimated present worth cost for this remedial action is $12,155,606, which includes annual O&M costs of $174,500.

Performance Standards or Goals

SDWA MCLs and State Public and Food Processing Standards are considered ARARs for off-site ground-water quality. If off-site ground water exceeds an MCL or a 10^{-5} cumulative cancer-risk level for lifetime drinking water usage (excluding arsenic and vinyl chloride) and the representative background concentrations, additional investigations will be performed, possibly resulting in a ROD amendment. The leachate collection system will continue to operate until action levels are established and attained. Air emissions will be controlled and treated if the incremental risk to nearby residents is greater than 10^{-6} lifetime exposure.

Institutional Controls

Institutional controls will be implemented to restrict the use of ground water from the shallow aquifer.

NPL Rank: 905

WAUSAU GROUND WATER CONTAMINATION, WI

First Remedial Action
December 23, 1988

The Wausau Ground Water Contamination site, also known as the Wausau Water Supply site, encompasses an area in the northern section of the City of Wausau, Marathon County, Wisconsin. The site contains five of six production wells in the City Well Field and is located on both sides of the Wisconsin River. Production wells CW6, CW7, and CW9 are located in a predominantly residential area on the west side of the river and are collectively referred to as the West Well Field. The remaining two wells, CW3 and CW4, are located in a predominantly industrial section of the city on the east side of the river and are referred to as the East Well Field. The wells supply nearly all the potable water for approximately 33,000 people, as well as irrigation and industrial water to surrounding areas. In 1982, the city discovered that wells CW3, CW4, and CW6 were contaminated with VOCs. Since that time, several systems have been implemented to reduce VOC levels in the water supply. Initially, uncontaminated water from CW9 and CW7 was blended with water from CW3, CW4, and CW6 to dilute the VOC concentrations. However, increasing VOC concentrations resulted in regulatory limits being exceeded. In 1983, EPA granted funds to help design and install a packed tower VOC stripper, and in June 1984 installed a granular activated carbon (GAC) treatment system on CW6 in response to a continued increase in VOC concentration. CW6 previously had been pumped and discharged directly into Bos Creek to block the contaminated plume from reaching CW7 and CW9 to the north, but this resulted in surface-water and sediment contamination in Bos Creek. Water from CW6, CW3, and CW4 has been pumped to the city water treatment plant following the installation of VOC stripper towers at the plant during the summer and fall of 1984. However, there is a significant risk of plume migration because CW6 remains the sole interceptor well blocking contamination of the remaining West Well Field. Currently, the city continues to blend treated water with water from uncontaminated supply wells to ensure low VOC levels in its water supply. The scope of this expedited operable unit is limited to the contaminant plume affecting CW6 in the West Well Field. The primary contaminants of concern affecting the West Well Field at the site are VOCs including TCE.

The selected remedial action for this site includes ground-water pumping and treatment using air stripping with discharge to the Wisconsin River, ground-water monitoring, and provision for implementation of an additional extraction well as necessary. The estimated present worth cost for this remedial action is $750,000 with estimated annual O&M costs of $105,000 for year one and $81,000 for subsequent years.

Performance Standards or Goals

Remedy addresses plume management through pumping and treatment of ground water. Effluent levels to be determined by the state will satisfy the Best Available Technology requirements of the CWA.

Institutional Controls

Not applicable.

NPL Rank: 905

WAUSAU GROUND WATER CONTAMINATION, WI

Second Remedial Action - Final
September 29, 1989

The Wausau Ground Water Contamination site, also known as the Wausau Water Supply site, is in Wausau, Marathon County, Wisconsin. The site includes six city ground-water production wells along the east and west sides of the Wisconsin River. These wells supply drinking water to 33,000 people and are used for industry in the area. Three primary source areas of ground-water contamination have been identified: a municipal landfill, the Wausau Chemical Company, and the Wausau Energy Company. The landfill, which is on the west side of the site, operated from 1948 to 1955 and accepted almost all commercial, industrial, and residential waste generated within Wausau. The landfill appears to be the predominant source of TCE contamination in the underlying aquifer. On the east side of the river the Wausau Chemical and Wausau Energy companies are suspected sources of soil and ground-water contamination due to spills from past operations. Wausau Chemical, a bulk solvent distributer, was responsible for spilling 1,000 gallons of PCE-contaminated waste in 1983 alone. Wausau Energy, a petroleum bulk storage and disposal center, has reportedly contaminated soil and ground water with petroleum by-products. To provide sufficient water of acceptable quality, EPA temporarily installed a granular activated carbon treatment system on one well in 1984 and VOC stripping towers at the municipal water treatment plant to treat water from two contaminated wells. The city has been blending treated water with uncontaminated water to reduce VOC levels. As an interim remedy, EPA signed a 1989 ROD implementing ground-water contamination controls, which included pumping and treatment at one of the landfill source areas followed by discharge into the Wisconsin River, to prevent the contaminant plume from migrating to the source of the river. The primary contaminants of concern affecting the soil and ground water are VOCs including PCE and TCE.

The selected remedial action for this site includes treating contaminated soil using an *in situ* soil vapor extraction (SVE) system and treating gases emitted from the SVE system using vapor phase carbon filters, and continued pumping and treatment of ground water using existing air strippers with modified pumpage rates. The estimated present worth cost for this remedial action is $738,000, which includes present worth O&M costs of $482,000.

Performance Standards or Goals

Performance goals for this remedial action are based on the state ground water standards which include PCE 1.0 ug/l and TCE 1.8 ug/l.

Institutional Controls

Not applicable.

NPL Rank: 812

WEDZEB ENTERPRISES, INC., IN

First Remedial Action - Final
June 30, 1989

The 0.75-acre Wedzeb Enterprises, Inc. site is located in Lebanon, Indiana, in a mixed residential and light industry neighborhood. About 300 houses are located within 500 feet of the site perimeter. Originally, two warehouses, one of which was used as a storage facility for electrical capacitors and transformers containing polychlorinated biphenyls (PCBs), were located on site. In May 1981, the warehouse used for storage was completely destroyed by fire, raising concerns about the release of PCBs into the environment and the potential formation of new compounds such as dioxins and furans. The warehouse contained an estimated 77 tons of electrical capacitors at the time, some of which exploded during the fire. In October 1987, EPA completed a removal action removing on-site debris and contaminated soil and replacing it with clean fill. The remediation of the sanitary sewer sediment in this action serves as a cautionary measure because contaminants may have been washed into the sewer lines during the fire, providing a source of long-term contaminant release to the Lebanon publicly owned treatment works (POTW). The primary contaminants of concern affecting the sewer sediment are organics including PCBs.

The selected remedial action for this site includes cleaning the sewer lines with hydraulic jets and vacuum pumping to remove contaminants, followed by filtering the resulting water and sediment to remove PCB-contaminated sediment, and discharging the water to the POTW; offsite incineration and disposal of the estimated two drums of sediment and 20 drums of remedial investigation generated waste if PCB levels are 50 mg/kg or greater, or off-site disposal only if PCB levels are below 50 mg/kg; and a television inspection of the pipeline to ensure structural integrity. The estimated present worth cost for this remedial action is $45,000; there are no O&M costs.

Performance Standards or Goals

In accordance with health-based guidance clean-up levels set forth in the TSCA Spill Policy, the PCB concentration in the sewer sediment will not exceed a 10 mg/kg level.

Institutional Controls

Not applicable.

NPL Rank: 606

WHITEHALL MUNICIPAL WELLS, MI

First Remedial Action - Final
September 29, 1989

The Whitehall Municipal Wells site is in Whitehall, Michigan, and includes production well three (PW3) which is the focus of this Record of Decision. PCE has been detected in the soil and ground water. The suspected source of the PCE is a nearby dry-cleaning operation which leaked PCE until the problem was corrected in 1981. In 1980, the state identified PW3 as the source of contamination in the municipal drinking water supply and recommended that the city use PW3 only on an emergency basis. The state continued to monitor the well, and until October 1988 the city used the well only on an as-needed basis at reduced pumping rates. Results from the remedial investigation conducted in 1988-89 revealed only low levels of contamination in the wells; no contaminant exceeded MCLs or MCLGs. In September 1989, the city permanently abandoned PW3 because of the well's poor production capacity, and because new wells and storage facilities built since 1980 have reduced the need for PW3.

The selected remedial action for this site is no further action because the findings of the remedial investigation indicated that contaminant levels in the site's wells do not exceed any state or federal drinking water standards or criteria and there is no longer a continuing source of contamination. There are no present worth or O&M costs associated with this remedial action.

Performance Standards or Goals

There are no applicable performance standards for this remedial action because a remedy of no further action was selected.

Institutional Controls

Not applicable.

NPL Rank: 496

WINDOM DUMP, MN

First Remedial Action - Final
September 29, 1989

The 11-acre Windom Dump site is a former municipal landfill in Windom, Cottonwood County, Minnesota. Land use in the vicinity of the site includes residential areas and commercial, industrial, and agricultural operations. City water supply wells northwest of the site lie downgradient of the landfill. Landfilling operations began in the 1930s and continued until 1974. During this period, paint sludges from a large manufacturing operation were disposed of along with municipal refuse, resulting in low levels of toxic substances contaminating an underlying aquifer that is used as a water supply. The primary contaminants of concern affecting the ground water are VOCs including benzene, PCE, and TCE, metals including arsenic, and other inorganics.

The selected remedial action for this site includes grading and capping the fill area with a two foot clay cap overlain by one foot of granular material, topsoil, and new vegetation; modifying the existing municipal water plant by installing additional aeration nozzles and structure venting; and ground-water monitoring. In the event that allowable contaminant limits are exceeded in the monitoring wells, a contingency plan including a ground-water pump and treatment system will be implemented. The estimated present worth cost for this remedial action is $865,000, which includes an annual O&M cost of $5,700 for 30 years.

Performance Standards or Goals

The municipal water treatment system will remove VOCs and maintain a 10^{-5} lifetime excess cancer risk and contaminant concentrations less than SDWA MCLs. Ground water will be pumped and treated if the ground water exceeds any single allowable contaminant limit. Specific intervention limits are based on state solid waste management rules and include TCE 7.8 ug/l, PCE 1.7 ug/l, benzene 3.0 ug/l, and arsenic 12.5 ug/l.

Institutional Controls

Not applicable.

REGION 6

(Arkansas, Louisiana, New Mexico, Oklahoma, Texas)

NPL Rank: 663

HOMESTAKE MINING CO., NM

First Remedial Action - Final
September 27, 1989

The Homestake Mining Co. (HMC) site consists of a uranium processing mill and two tailings embankments in Cibola County, New Mexico, about six miles north of Milan. The tailings embankments contain a combined total of 22 million tons of tailings material covering 225 acres. Four housing subdivisions are south and southwest of the mill with the nearest residence approximately 0.6 mile from the tailings embankments. In 1983, elevated levels of selenium were found in off-site ground water prompting EPA to require HMC, under a consent agreement, to supply municipal water to residents in the subdivision south of the mill. Furthermore, HMC implemented an aquifer protection and restoration program including ground-water injection/collection efforts at the site, which was subsequently formalized, modified and approved pursuant to requirements of the state. The restoration program continued to operate and has been largely successful in on-site containment of tailings seepage. This ROD addresses possible radon releases from the uranium mill operations into residential subdivisions. From 1987 to 1989, HMC, under an Administrative Order on Consent, conducted an investigation as to whether radon associated with the uranium mill tailings operation might be influencing outdoor and indoor radon levels in the subdivisions. Based on the results of HMC's investigation, EPA has determined that the uranium mill and tailings embankments at the site are not contributing significantly to off-site subdivision radon contamination and that it does not have authority under CERCLA to address radon levels due to natural soil concentrations. In June 1986, the Nuclear Regulatory Commission (NRC) resumed jurisdiction over uranium mills in the state and issued HMC a radioactive materials license. NRC intends to close the site pursuant to their regulations and will coordinate their requirements with EPA.

The selected remedial action for this site is no further action for the Radon Operable Unit. However, EPA is recommending radon reduction techniques to residents having elevated indoor radon levels.

Performance Standards or Goals

Not applicable.

Institutional Controls

Not applicable.

NPL Rank: 27

MOTCO, INC., TX

Second Remedial Action - Final
September 27, 1989

The 11-acre Motco, Inc. site is in La Marque, Galveston County, Texas. The site is on the Gulf Coastal Plain at the edge of a coastal marsh system and is within the 100-year tidal floodplain. Significant site features include seven unlined pits which have a total surface area of 4.6 acres and contain surface water, organic liquids, and various sludges, tars, and other solids. The pits were used by a styrene tar recycling business which operated from 1959 to 1961, and by an industrial chemical waste disposal facility from 1961 to 1968. EPA conducted three emergency response actions between 1981 to 1983 to treat and discharge excess pit surface water collected in dikes that were constructed by the Coast Guard in 1980. In 1984, an initial remedial measure (IRM) was conducted by EPA and included removal and off-site disposal of wastes from nine above ground storage tanks. The first operable unit for the site was issued in 1985 and dealt with source control measures including excavation of the on-site waste pits, which contained 12 million gallons of contaminated water and organic liquids, down to the sludge/soil interface plus one foot, and incineration of those wastes. This ROD represents the second and final operable unit, management of migration, for the site and addresses the subsurface beneath the waste pits and off-site contamination of the ground water, soil, and sediment. Ground water at the site is found in a transmissive zone and the underlying Upper Chicot aquifer. The primary contaminants of concern affecting the soil, sediment, and ground water are VOCs including benzene, other organics including PAHs, and metals including arsenic, chromium, and lead.

The selected remedial action for the site includes extraction and on-site treatment by best available technology (BAT) of contaminated shallow and deep ground water; extraction and incineration of approximately one to two million gallons of dense, non-aqueous phase organic liquids; installation of a ground-water gradient to impede further contaminant migration from shallow to deep ground water; implementation of ground-water compliance monitoring of the shallow and deep ground-water aquifers which would trigger more aggressive removal operations if indicator compounds exceed one-half MCL or a 10^{-6} risk level; excavation, consolidation, and on-site containment and capping of approximately 140,000 cubic yards of contaminated surface soil and sediment to a maximum depth of four feet; and implementation of deed restrictions and installation of additional fences around the site. The estimated total present worth cost for the selected remedy is $8,810,000, which includes an annual O&M cost of $453,000.

Performance Standards or Goals

Treatment of ground water using best available technology is expected to meet federal and state discharge standards; if discharge standards are not met, ground water will be sent to a wastewater treatment plant. Clean-up goals for the Upper Chicot Aquifer are SDWA MCLs or a 10^{-6} cancer risk level. Treatment of shallow, transmissive zone ground water will be to health-based numbers (HBNs), including total allowable for all PAHs 0.0028 ug/l. Soil/sediment excavation will be determined by a 10^{-6} risk level.

Institutional Controls

Deed restrictions will be implemented to prohibit land development.

NPL Rank: 920

PESSES CHEMICAL CO., TX

First Remedial Action - Final
December 22, 1988

The 4.2-acre Pesses Chemical Company site is located in Tarrant County, Ft. Worth, Texas. The site is situated in a light industrial and commercial area with approximately 19,500 people estimated to reside or work within a one-mile radius. The site is divided into two sections. The northern section is fenced and includes an occupied office building and brick warehouse as well as the former operations area composed of a metal warehouse, various equipment, a bag house, a storage yard, and two underground sumps. The southern portion contains the abandoned south field. In June 1979, the Pesses Company began operations to reclaim cadmium and nickel from dry-cell batteries and metal sludges without required construction of operation permits. During July and August 1979, excessive cadmium emissions were investigated by both the city and state air pollution control offices. After operations began again, cadmium emissions were measured as high as 2,900 percent above permit limits. In January 1981, the parent company declared bankruptcy and site operations were discontinued. In March 1983, a grass fire at the site resulted in toxic cadmium oxide fumes which hospitalized a firefighter. Approximately 1,500 deteriorating drums remained on site with heavy metal sludges, power, and empty battery cases. Consequently, in April 1983, EPA removed 3,400 cubic yards of soil, drummed material, and debris from the site and installed a clay cap in the south storage yard to prevent exposure to contaminated soil. Heavy metals contamination of airborne dust and surface-water runoff are the main potential threats at the site. In addition to soil contamination, two sumps in the southern portion contain 1,914 gallons of liquid contaminated with metals and 16.6 cubic yards of sludge contaminated with cadmium and nickel. Furthermore, limited off-site sedmium contamination of soil exists. The primary contaminants of concern affecting the soil, building, equipment, and debris are metals including lead.

The selected remedial action for this site includes the following: consolidation of wastes and contaminated off-site soil with incorporation into on-site soil, followed by *in situ* stabilization and installation of a concrete cap around the fenced portion of the site and a RCRA clay cap placed in the south field; decontamination of metal warehouse and equipment with resultant solid wastes combined with the soil remediation and wastes treated and discharged into the sewer system; off-site disposal of drums and debris as well as equipment which cannot be adequately cleaned and water above discharge requirements; and cleaning and sealing of sumps. The estimated capital cost for this remedial action is $1,100,000 with annual O&M of $7,000.

Performance Standards or Goals

Target soil action levels are cadmium 15 mg/l and nickel 100 mg/l based on a 10^{-6} carcinogenic-risk level.

Institutional Controls

Not applicable.

NPL Rank: 866

SHERIDAN DISPOSAL SERVICES, TX

First Remedial Action
December 29, 1988

The 110-acre Sheridan Disposal Services site is approximately nine miles northwest of the city of Hempstead in Waller County, Texas. The site is located on the 100-year floodplain of the Brazos River and is bordered by a lake to the south, farmland, and a community of 20 residences to the north. The Evangeline aquifer, which runs under the site, is used to meet the drinking water needs of several communities nearby. Sheridan Disposal Services operated as a commercial waste disposal facility from about 1958 to 1984 using steam distillation, open burning, incineration, and direct disposal into a waste lagoon to dispose of various organic and inorganic chemical and solid wastes. The site includes a 12 to 22-acre lagoon, a 17-acre dike surrounding the lagoon, a 42-acre evaporation/land irrigation system, and an incinerator and nine waste storage and treatment tanks located on the lagoon dikes. The primary contaminants of concern affecting the soil and sludge are VOCs including benzene and toluene, and other organics including PCBs.

The selected remedial action for the site includes excavation of all material with PCB concentrations greater than 25 mg/kg including 13,000 cubic yards of pond and dike soil, 31,000 cubic yards of pond sludge, and 300 cubic yards of floating oil and emulsion in the pond and storage tanks. This will be followed by on-site biotreatment of contaminated soil, sludge, and oil with stabilization and on-site disposal of residuals in the pond. If PCB concentrations in the residuals are less than 50 mg/kg, they will be placed under a RCRA-compliant cap. Residuals with PCB concentrations greater than 50 mg/kg PCB will be placed in a RCRA-compliant landfill in the pond area. In addition, the remediation requires capping the entire pond and dike area; decontamination and off-site disposal of tanks, drums, and debris; treatment to best available technology (BAT) of any contaminated wastewater and stormwater with discharge to the river; implementation of engineering controls to prevent bank erosion on the river; and ground-water monitoring. The estimated present worth cost for this remedial action is $27,956,000, which includes total O&M costs of $863,000.

Performance Standards or Goals

An action level for PCBs was established at 25 mg/kg based on a health-risk analysis and the TSCA Spill Policy. Waste residuals will be disposed of according to PCB levels.

Institutional Controls

Restrictions were implemented at the site to prevent ground-water use and to preserve the integrity of the cap.

NPL Rank: 866

SHERIDAN DISPOSAL SERVICES, TX

Second Remedial Action - Final
September 27, 1989

The 110-acre Sheridan Disposal Services site is nine miles northwest of Hempstead, Waller County, Texas. Agriculture and rangeland are the predominant land uses in the area. The site is within the 100-year floodplain of the Brazos River. Sheridan Disposal Services operated a commercial waste disposal facility at the site from 1958 to 1984. The facility treated a variety of organic, inorganic, and solid waste by stream distillation, open burning, and incineration. Significant site features include a lagoon which was used as a holding pond for overflow wastes and treatment residues, a 17-acre dike surrounding the lagoon, and a 42-acre evaporation and land irrigation system used for disposal of water accumulated on the lagoon. An incinerator and a group of nine former waste storage and treatment tanks are situated on the lagoon dikes. A source control ROD was issued in December 1988 and addressed risks associated with exposure to contaminated soil and sludge at the site. This remedial action represents the second of two operable units for the site and its goal is to prevent exposure to contaminated ground water and maintain protective levels in the river. The primary contaminants of concern affecting the ground water are VOCs including benzene, PCE, and TCE, and metals including arsenic.

The selected remedial action for this site is natural attenuation and the establishment of Alternate Concentration Limits (ACLs) as the site ground-water protection standards; ground-water monitoring to ensure ACLs are not exceeded; sampling and analysis of the Brazos River immediately upgradient and downgradient of the entry point of ground water into the river; implementation of ground-water use restrictions to ensure affected ground water is not consumed; and the implementation of a corrective action plan if ACLs are exceeded in the future. The estimated present worth cost for the selected remedy is $194,000, which is due entirely to O&M.

Performance Standards or Goals

EPA has set ACLs for contaminants detected in the ground water to meet drinking water criteria in the Brazos River. Chemical-specific ACL concentrations were selected for benzene 26 mg/l, TCE 26 mg/l, PCE 41 mg/l, and arsenic 260 mg/l.

Institutional Controls

Ground-water use at the site will be restricted to ensure that contaminated ground water is not consumed and that the integrity of the Brazos River as a hydraulic barrier to ground-water flow is maintained.

NPL Rank: 88

SOUTH VALLEY, NM

Fifth Remedial Action - Final
March 30, 1989

The South Valley/Edmunds Street site is a portion of the South Valley Superfund site - a large area in the southern part of the city of Albuquerque, New Mexico. The South Valley site surrounds a city municipal water well identified as San Jose-6. Within this larger area are a number of industrial properties owned and operated by different groups and individuals. The site has been divided into operable units to address soil and ground-water contamination resulting from current and historical industrial practices. The operable units include Edmunds Street Ground Water, Former Air Force Plant 83/GE, San Jose-6, and the final operable unit, Edmunds Street Source Control. Potential sources of ground-water contamination within the Edmunds Street property have been identified, but primary focus has been given to a drainage pit area which receives most of the drainage from the property. Investigations in all of the suspected potential contaminant source areas, however, revealed little soil contamination. Even if further migration of contaminants to ground water occurs, the ground-water treatment system developed in the previous Edmunds Street ground-water operable unit will be sufficient to address these concerns. There are no contaminants of concern affecting the soil at this site.

The selected remedial response for this final operable unit is no further action. Based on sampling data, the soil has been determined to contain contaminant levels below hazardous contaminant concentration limits and poses no risk to human health or the environment. The only further activities anticipated at the site are sampling of soil gases in the drainage pit area following the ground-water remedial action, and the precautions necessary to prevent any disturbance of drainage pit soil during the ground-water remediation. There are no remedial or O&M costs associated with this operable unit.

Performance Standards or Goals

Chemical-specific standards or goals are not applicable for this no action remedy.

Institutional Controls

Not applicable.

NPL Rank: 537

UNITED CREOSOTING CO., TX

Second Remedial Action - Final
September 29, 1989

The 100-acre United Creosoting Co. site is in Conroe, Montgomery County, Texas. The site currently is occupied by a distributing company, a construction company, and a residential subdivision. From 1946 to 1972, the United Creosoting Company operated a wood preserving facility at the site which used PCPs and creosote in the wood preservation process. PCP and creosote wastes were stored in two waste ponds on the property of the distributing company. During 1980, the county improved area roads using soil and waste pond backfill from the site. Because residents living near the improved roadways experienced health problems, the county sampled and compared leachate composition from the affected roadways and the site and determined that the leachate from both the site and the roadways were contaminated with PCPs. Roadway soil was subsequently removed and disposed of using land farm treatment. In 1983, due to contaminated stormwater runoff from the former waste pond areas, the property owner was directed under terms of an EPA Administrative Order to regrade contaminated soil, divert surface water drainage away from the residential portion of the site, and cap contaminated soil. This ROD specifies a final remedy for the contaminated soil and complements a 1986 ROD which determined that no action is necessary to remediate shallow ground water. The primary contaminants of concern affecting the soil are organics including PAHs, PCPs, and dioxins.

The selected remedial action for this site includes excavation and on-site treatment of 94,000 cubic yards of soil containing contaminants which exceed target action levels, using critical fluid extraction and recycling or discharging wastewater generated during the treatment process; incinerating and disposing of the liquid organic concentrate residues off site; spreading treated soil on commercial portions of the site; backfilling residential areas with clean fill; and air monitoring. The estimated present worth cost for this remedial action is $22,000,000 which includes present worth O&M costs of $19,750,000 for 30 years.

Performance Standards or Goals

Contaminated soil will be excavated and treated if soil exceeds established target action levels. The target action levels vary depending on whether the soil was excavated from the residential or commercial portion of the site. Specific target action levels for carcinogens in excavated soil include PAHs 330 ug/kg for the residential area and PAHs 40,000 ug/kg for the commercial area of the site. Target action levels for dioxins and furans in excavated soil are based on 2,3,7,8-TCDD 1 ug/kg for the residential area and 2,3,7,8-TCDD 20 ug/kg for the commercial area. Specific target action levels for noncarcinogens include PAHs 2,000 mg/kg and PCP 150 mg/kg.

Institutional Controls

Not applicable.

REGION 7
(Iowa, Kansas, Missouri, Nebraska)

NPL Rank: 100

ARKANSAS CITY DUMP, KS
Second Remedial Action - Final
September 19, 1989

The 200-acre Arkansas City Dump site, in Arkansas City, Cowley County, Kansas, abuts a levee to the west and south which separates the site from the Arkansas River. Between 1916 and 1927, an oil refinery was operated on site processing between 6,000 and 12,000 barrels of oil per day. After an explosion destroyed the refinery in 1927, the site was used as a municipal landfill. The refinery treated petroleum fractions with sulfuric acid to improve color and to remove asphaltenes, parafins, and resinous substances, generating acid sludge waste in the process. The sludge waste was disposed of on site in earthen pits in the north waste area and remediation of this area was addressed in a 1988 Record of Decision (ROD), as operable unit one. The second and final operable unit addresses the remainder of the site, which contains subsurface petroleum contaminants trapped in the soil below the water table as a result of petroleum spills. Results from remedial investigations revealed only low levels of soil and ground-water contamination due to on-site disposal of municipal wastes. These contaminants, however, are not being released in significant concentrations and do not pose a significant threat to human health or the environment.

The selected remedial action for this site is no further action. Because EPA lacks jurisdiction or authority under CERCLA/SARA to undertake remedial action for petroleum-related contaminant releases, no further action will be taken under the Superfund program. There are no costs associated with this no action remedy.

Performance Standards or Goals

Not applicable.

Institutional Controls

Not applicable.

Group: 4

CHEMPLEX CO., IA

First Remedial Action
September 27, 1989

The Chemplex Co. site is in Clinton County within five miles of Clinton, Iowa, and includes a landfill, a wastewater treatment plant, and an adjacent facility which manufacturers high and low density polyethylene. Several residences with private wells are located around the site and a tributary to Rock Creek lies to the west and southwest of the site. Rock Creek eventually discharges to the Mississippi River just above the Upper Mississippi River Wildlife Refuge. The direction of ground-water flow beneath the site appears to be toward the southwest, although a mounding effect is causing ground water to flow radially from the center of the landfill. From 1968 to 1978, the landfill area was used for disposal of various plant wastes including black oily sludge, scrap polyethylene, construction debris, and carbonate sludge. The debutanized aromatic concentrate (DAC) area, which consists of a pit and DAC product storage and loading areas, was contaminated by DAC spillage. In 1987, waste was reportedly removed from the pit and disposed of in a RCRA-permitted landfill. Wastes and spills have contaminated the soil and ground water underneath the landfill and DAC areas. This first operable unit will address the plumes of ground-water contamination. A subsequent operable unit remedy for this site will address the cleanup of soil and other ground-water remediation that may be required. The primary contaminants of concern affecting the ground water are VOCs including benzene, toluene, xylenes, TCE, and PCE, and other organics including carcinogenic and noncarcinogenic PAHs.

The selected remedial action for this first operable unit includes pumping and pretreatment of ground water followed by treatment of pretreated ground water at the existing on-site biological activated sludge wastewater treatment plant with discharge to the Mississippi River via Rock Creek, and implementation of ground-water use restrictions. The estimated present worth cost for this remedial action is $2,622,000, which includes an annual O&M cost of $219,600 for 30 years.

Performance Standards or Goals

Ground-water clean-up goals were derived from Health Advisory Levels (HALs), Negligible Risk Levels (NRLs), CWA Water Quality Criteria (WQC) and SDWA Maximum Contaminant Levels (MCLs). Specific goals include benzene 1.0 ug/l (NRL), toluene 2,000 ug/l (HAL), PCE 10 ug/l (HAL), TCE 3.0 ug/l (NRL), and xylene 10,000 ug/l (MCL).

Institutional Controls

Institutional controls will be used to restrict use of ground water until remedial actions achieve cleanup of the contaminated ground water to required levels. In addition, deed restrictions will be implemented to prevent the sale of the landfill or a change in land use without state approval.

NPL Rank: 55

CHEROKEE COUNTY, KS

Second Remedial Action - Final
September 18, 1989

The Cherokee County site is a lead and zinc mining area in the southeastern corner of Kansas. The 25 square-mile Galena subsite is one of six subsites within the Cherokee County site and consists of large areas covered by mine wastes, water-filled subsidence craters, and open mine shafts. Many of the shafts are direct conduits to the shallow ground-water aquifer which is the sole source of drinking water for approximately 1,050 persons residing outside of the Galena city limits. The approximately 3,500 Galena residents receive their water supply from two deep aquifer wells. EPA began investigations of the Galena subsite in 1985 and determined that the shallow ground-water aquifer and surface water were contaminated with elevated concentrations of metals. EPA Region 7 responded by installing water treatment units on several private wells. The first operable unit for this site was signed in 1987 and provided for the pumping of water from existing deep aquifer wells and subsequent distribution of the water to affected local residents through a pipeline network. This ROD represents the second of two operable units and addresses the threat of contamination to the shallow ground-water aquifer and surface water. The primary contaminants of concern affecting the ground water and surface water are metals including cadmium, lead, and zinc.

The selected remedial action for this site includes the removal, consolidation, and on-site placement in mine pits, shafts, and subsidences of surface mine wastes; diversion and channelization of surface streams with recontouring and vegetation of land surface; and investigation of deep aquifer well quality followed by plugging all abandoned and inactive wells and rehabilitating active wells, if necessary. The estimated present worth cost for this remedial action is $8,295,215, which includes an annual O&M cost of $14,963.

Performance Standards or Goals

The selected remedy provides action levels for the selective placement of mine wastes below ground. Chemical-specific action levels include lead 1,000 mg/kg, cadmium 25 mg/kg, and zinc 5,000 mg/kg.

Institutional Controls

Institutional controls will include deed restrictions prohibiting future mining or excavation on the affected properties.

NPL Rank: 234

DOEPKE DISPOSAL (HOLLIDAY), KS

First Remedial Action - Final
September 21, 1989

The Doepke Disposal (Holliday) site is an inactive industrial-waste landfill located east of Holliday, Johnson County, Kansas. The 80-acre site is within 500 feet of the Kansas River and lies upstream of the well field and Kansas River water intakes that supply water to approximately 200,000 county residents. Additional features bordering the site include an inactive landfill and an active landfill. During the 1950s and early 1960s, the site was used as a landfill for residential refuse. In 1963, Doepke Disposal Service, Inc. leased the property and operated a commercial and industrial waste landfill until 1970, when the state shut down the operation. Materials such as fiberglass, fiberglass resins, paint sludges, spent solvents, metal sludges, soaps, and pesticides were reportedly disposed of at the landfill. In 1966, fire debris and up to 374 drums of solvents and organochlorine and organophosphate pesticides were disposed of at the site as a result of a fire at a Kansas City chemical plant. Initially, wastes and residues brought to the site were burned, however, in the late 1960s burning operations ceased and solid wastes were buried on site and liquids were disposed of in two surface impoundments. In 1977, rock material excavated during the construction of an interstate was dumped on site and in some cases over the deposited waste. The current owner uses portions of the site for storage of clay, crushed shales, and crushed limestone. The primary contaminants of concern affecting the soil and ground water are VOCs including benzene, toluene, and xylene, other organics including PAHs, PCBs, and pesticides, and metals including chromium and lead.

The selected remedial action for this site includes removal and off-site treatment of approximately 96,000 gallons of liquids currently ponded underground in former surface impoundments; construction of a multilayer cap over the majority of the waste disposal area; collection of ground-water seepage and off-site treatment at a POTW, as necessary; ground-water monitoring; and implementation of deed and access restrictions. The estimated present worth cost for this remedial action is $5,970,000, which includes an estimated annual O&M cost of $107,000 for 30 years.

Performance Standards or Goals

No clean-up criteria were established for soil because soil is going to be capped. Ground-water standards for ground-water seepage treatment and/or discharge were based on federal water quality criteria for protection of aquatic life and state water quality standards and were determined for four metals and five organic pesticides.

Institutional Controls

Deed and site access restrictions will be implemented as part of this remedial action.

Group: 10

FINDETT CORP., MO

First Remedial Action
December 28, 1988

The Findett Corp. site is located just north of the city of St. Charles, in St. Charles County, east-central Missouri. The site lies 3.2 miles south of the Mississippi River and is within the floodplain. Land use in the site vicinity is primarily agricultural, but also includes a small industrial park containing Findett Corporation, Cadmus Corporation, and several other commercial and light industrial establishments. In addition, there are several residences within approximately 1,000 feet northeast and 1,500 feet south of the site. The Elm Point Wellfield, the primary drinking water supply for St. Charles, is located 1,800 feet northeast of the site. Until 1980, Findett Corporation reclaimed heat transfer fluids or oils, some of which contained PCBs, and received waste solvents for reclamation or recycling. Subsequently, Findett has custom blended or manufactured organic chemicals for other companies. The Findett site originally came to EPA's attention when Findett Corporation reported handling PCBs at the site. There is PCB-contaminated soil at the Findett facility as well as at the adjacent Cadmus Corporation facility. The Elm Point Well Field is also at risk of contamination by releases from the site. Findett conducted several voluntary PCB soil cleanups pursuant to EPA Administrative Orders in 1981 and 1982; however, PCBs as well as VOCs remain in the soil in concentrations above recommended levels. In addition, ground-water investigations revealed substantial VOC contamination in the shallow aquifer near the contaminant sources and in the deep aquifer tapped by the nearby well field as a drinking water source. The primary contaminants of concern affecting the soil and ground water are VOCs, and other organics including PCBs.

The selected remedial action for this site includes on-site ground-water pumping and treatment using air stripping with discharge to the publicly owned treatment works (POTW), and excavation of contaminated soil with either off-site disposal or treatment. The estimated present worth cost for this remedial action is $8,306,000 with annual O&M cost of $398,000.

Performance Standards or Goals

Contaminated soil will be removed and either disposed of off site or treated. Ground water will be treated to remove organic contaminants before it is discharged to the sewage treatment plant. Individual contaminant goals were not provided for either soil or ground water.

Institutional Controls

Not applicable.

NPL Rank: 386

HASTINGS GROUND WATER CONTAMINATION, NE

First Remedial Action
September 26, 1989

The Hastings Ground Water Contamination site is a contaminated aquifer in the vicinity of the city of Hastings, Adams County, Nebraska. The site consists of several source areas, referred to as subsites, contaminated with various chlorinated volatile industrial chemicals. This ROD addresses the Well Number Three subsite which consists of a ground-water plume contaminated with carbon tetrachloride emanating from a former grain storage facility. The state first identified volatile organic contamination in Well Number Three in 1983. Between 1986 and 1989, EPA conducted a field investigation which identified the grain storage area as the source of ground-water contamination, probably resulting from accidental spills of liquid fumigants used during grain storage. This interim source control operable unit was developed to reduce the migration and volume of volatile contaminants present in the soil. The primary contaminants of concern in the soil which impact the ground water are VOCs including carbon tetrachloride and chloroform.

The selected remedial action for this site includes utilization of *in situ* soil vapor extraction to remove approximately 400 pounds of VOCs from the soil; treatment of vapor emissions by a vapor phase granular activated carbon system; and replacement of spent granulated activated carbon filters followed by off-site disposal at an approved treatment facility for regeneration or incineration. The estimated capital cost for this remedial action is $874,000 with an annual O&M of $154,000.

Performance Standards or Goals

This interim source control action is not designed to restore the aquifer to drinking water standards; therefore, no clean-up levels have been established for ground water at this time. Clean-up effectiveness will be based on the volume of volatile contaminants recovered from the soil. It is estimated that the soil vapor extraction method will recover approximately 400 pounds of VOCs.

Institutional Controls

Not applicable.

NPL Rank: 571

JOHNS' SLUDGE POND, KS

First Remedial Action - Final
September 22, 1989

The Johns' Sludge Pond site is in a relatively undeveloped area in the city of Wichita, Sedgwick County, Kansas. The 0.5-acre site, which lies within the 500-year floodplain of the nearby Little Arkansas River, neighbors a large rail yard, an interstate highway, a large borrow pit, and farm land. The city of Wichita owns approximately one third of the site as a result of condemnation for highway drainage. During the 1950s and 1960s, the Super Refined Oil Company used the sludge pond for the disposal of waste oil and up to 15,000 cubic yards of oily sludge generated by the oil recycling and reclamation operation. Because sulfuric acid was used to refine waste oil for recycling, the wastes dumped into the pond were very acidic. Additionally, high lead concentrations and low PCB concentrations (less than 50 ppm) were also detected in the sludge. As surface water flowed into the pond, an extremely acidic layer of water formed on top of the sludge which often overflowed into nearby surface waters. The city subsequently built berms to prevent further surface runoff. In 1983, EPA ordered the city to undertake interim clean-up activities which consisted of excavating and solidifying the sludge using cement kiln dust with redeposition of the treated sludge into a compacted clay-lined cell followed by capping using a compacted clay cap. Surface- and ground-water monitoring following the interim action have not detected any contaminant levels that would require further action.

The selected remedial action for this site includes a no further action scenario. Previous interim remedial activities were adequate to protect human health and the environment. There are no costs associated with this no action remedy. The city will continue to provide post-closure maintenance. The county will continue to provide post-closure monitoring.

Performance Standards or Goals

Land use controls, in deed restrictions, have been instituted preventing or controlling future site uses which could damage the effectiveness of the remedy.

Institutional Controls

Not applicable.

NPL Rank: 687

KEM-PEST LABORATORIES, MO

First Remedial Action
September 29, 1989

The Kem-Pest Laboratories site is a former pesticide manufacturing facility approximately three-miles northeast of Cape Girardeau, Cape Girardeau County, Missouri. This six-acre site is in a rural area devoted primarily to agricultural activities. Contamination at the site resulted from the manufacturing of pesticide products from 1965 until 1977. Production activities took place in an on-site concrete block formulation building. Sewage and plant wastes were disposed of in an on-site lagoon which was backfilled with clay in 1981. EPA investigations beginning in 1981 have identified pesticide and volatile and semi-volatile organic contamination in soil, sediment in drainage channels, and in ground water. This operable unit addresses contaminated soil and sediment. Future operable units will address ground water and the formulation building. The primary contaminants of concern affecting the soil and sediment are VOCs including xylenes, other organics including organochlorine and pesticides, and metals including arsenic.

The selected remedial action for this site includes excavating approximately 4,050 cubic yards of contaminated soil and sediment with off-site disposal in a RCRA-approved commercial hazardous waste landfill; sampling to verify that the extent of excavation is sufficient to meet health-based clean-up goals; and backfilling the excavated area with clean soil and revegetating. The estimated present worth cost for this remedial action is $2,600,000 with no O&M required.

Performance Standards or Goals

Contaminated soil and sediment will be excavated down to a level consistent with a 10^{-5} cancer risk level. Chemical-specific goals were provided for ten pesticides and for arsenic.

Institutional Controls

Not applicable.

NPL Rank: 517

SOLID STATE CIRCUITS, INC., MO

First Remedial Action - Final
September 27, 1989

The Solid State Circuits, Inc. (SSC) site, a former industrial and manufacturing facility, is located in Republic, Missouri, approximately twelve miles southwest of Springfield. The approximately 1/2-acre site has residential areas to the east, west, and south, and light industry and warehousing to the north and south. The city of Republic obtains its drinking water from three municipal wells (two, three, and four) which draw from the deepest of three underlying aquifers. The site currently consists of a former manufacturing building, two air strippers, and an excavated yard area (from prior removal actions). Uses of the facility since 1902 included milling, refrigeration, printed circuit board manufacturing, and photoprocessing, as well as other, unknown activities. The major wastes generated appear to have been cleaning solvents used in the circuit board process and wastewaters from the circuit board activities. Sampling by the state in 1982 revealed contamination with TCE in Municipal Well Number One, 500 feet south of the site. The SSC site was identified as a possible source. Subsequent actions by MDNR, EPA, SSC, and the city included pumping tests, several major soil and debris excavations and removals (thereby eliminating the source of contamination), and taking Municipal Well Number One out of service. This ROD addresses the ground-water contamination found in all three aquifers. Contamination was found in the ground water, water in utilities, and air. The primary contaminants of concern are VOCs, particularly TCE.

The selected remedial action for this site includes ground-water pumping and on-site treatment using existing air strippers, discharging the treated water to a POTW, plume control via pumping, and BACT (as required) for air emissions, and air and water monitoring. The estimated present worth cost for this remedial action is $4,629,000, which includes an annual O&M cost of $445,300.

Performance Standards or Goals

The target for the ground-water extraction process is a 10^{-6} cancer risk and a hazard indices (HI) ratio of less than one. All ground water with a TCE level exceeding 5 ug/l will be remediated at a POTW. Ground water with TCE levels above the POTW pretreatment standard of 200 ug/l will be treated in the on-site air strippers before discharge to the POTW. The POTW must meet the state NPDES average monthly discharge limit of TCE 2 ug/l.

Institutional Controls

City ordinances will prevent new drinking well construction in or near the plume to prevent ingestion of contaminated water.

NPL Rank: 154

LAWRENCE TODTZ FARM, IA

First Remedial Action - Final
November 4, 1988

The 2.7-acre Dupont Impoundment at the Todtz Farm site is part of the 12-acre parcel of land known as the Todtz Farm Landfill, which is located on a 120-acre farm 1.25 miles west of Camanche, Iowa. Originally a sand and gravel mine, the landfill received municipal waste from 1969 to 1975. In 1971, Dupont constructed the impoundment in the northwest corner of the landfill and disposed of an estimated 4,300 tons of wet end cellophane process wastes from 1971 until its closure in 1975. Impoundment wastes are periodically in direct contact with the ground water beneath the site, which flows southeasterly toward the Mississippi River. Domestic wells and the municipal water supply wells for Camanche located downgradient of the site may be affected by contamination from the site. In addition, several ponds and lakes in the vicinity are potential receptors for contaminated runoff and recharge. The primary contaminants of concern affecting the ground water are VOCs including toluene, carbon disulfide, tetrahydrofuran, and benzene, and metals including arsenic, lead, and chromium.

The selected remedial action for this site includes installation of a soil cover over the Dupont Impoundment; implementation of institutional controls including deed and land use restrictions; provision of an alternate water supply for an affected residence by relocating an existing well; and ground-water monitoring. EPA has determined that further remedial actions will be immediately implemented if ground-water trigger levels provided in the ROD are met or exceeded. If ground-water monitoring indicates that contaminant levels exceed the less stringent chemical-specific action levels provided in the ROD, ground-water pumping and treatment will be implemented; if the more stringent action levels are exceeded, a treatability study of the impoundment waste will be conducted and either a permanent treatment remedy of the impoundment material or a cap and slurry wall containment system will be implemented. The estimated present worth cost for this remedial action is $1,030,000 with present worth O&M cost of $510,000. If trigger levels are met or exceeded, the estimated present worth cost of the remedy would be $2,500,000.

Performance Standards or Goals

Not applicable unless chemical-specific action levels (based on MCLs) provided in the ROD are exceeded in ground-water monitoring wells.

Institutional Controls

Deed and land use restrictions will be implemented to prevent the sale and future development of the site without further remedial action or consideration of impacts to public health and the environment. Access restrictions will include fencing.

NPL Rank: 804

VOGEL PAINT & WAX CO., IA

First Remedial Action - Final
September 20, 1989

The Vogel Paint & Wax Co. (VPW) site is an approximately two-acre disposal area 2 miles southwest of the town of Maurice, in Sioux County, Iowa. Adjacent land uses are primarily agricultural; however, several private residences are within one-quarter mile of the site. An intermittent stream flows through the site and discharges to the West Branch Floyd River one mile away. A surficial sand and gravel aquifer underlies the site and supplies nearby private wells and the Southern Sioux County Rural Water System, located a mile and one half southeast of the site. Paint sludge, resins, solvents, and other paint manufacturing wastes were disposed of at the site between 1971 and 1979. The disposal area is on two acres of an 80-acre tract owned by VPW. Liquid wastes were poured into trenches along with filled or partially filled drums and other debris and capped with one to two feet of soil. VPW records indicate that approximately 43,000 gallons of aliphatic and aromatic hydrocarbons and 6,000 pounds of metals waste were buried at the site. The disposal area was covered with clay in 1984. The primary contaminants of concern affecting the soil and ground water are VOCs including benzene, toluene, and xylenes, and metals including chromium and lead.

The selected remedial action for this site includes excavation of contaminated soil and separation of solid and liquid wastes; on-site bioremediation of 3,000 cubic yards of the contaminated soil in a fully contained surface impoundment unit, or on-site thermal treatment if soil contains high metal content; stabilization of treated soil, if necessary to prevent leaching of metals, followed by disposal in the excavated area; off-site incineration, recycling, or disposal of solid and liquid wastes; recycling of leachate and off-site treatment at POTW of excess leachate; ground-water pumping and treatment using air stripping with discharge of treated water to a nearby stream; and ground-water and air monitoring. VOC emissions to the atmosphere from both the soil and ground-water clean-up actions will be controlled by carbon adsorption, if necessary. The estimated present worth cost for this remedial action is $1,851,000 which includes an annual O&M cost of $54,600.

Performance Standards or Goals

Soil treatment will achieve leaching standards and ground water will be treated to health-based levels. Ground-water clean-up goals are based on SDWA MCLs/MCLGs or state action levels. Specific ground-water clean-up levels include benzene 0.001 mg/l (state), toluene 2.0 mg/l (MCLG), xylenes 10.0 mg/l (MCLG), chromium 0.10 mg/l (MCL), and lead 0.005 mg/l (MCLG).

Institutional Controls

Not applicable.

REGION 8

(Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming)

Group: 11

BURLINGTON NORTHERN RAILROAD (SOMERS TIE-TREATING PLANT), MT

First Remedial Action - Final
September 27, 1989

The 80-acre Burlington Northern Railroad (Somers Tie-Treating Plant) site is a former railroad tie treatment facility in Somers, Flathead County, Montana. Residential areas border the site on three sides and wetlands are located along Flathead Lake, 1,200 feet to the east, and in a slough area adjacent to the plant. Flathead Lake is currently the source of the Somers municipal drinking water supply. Burlington Northern operated the treatment plant from 1901 to 1986 and generated wastewater primarily consisting of stream condensate containing zinc chloride and creosote which was discharged to a lagoon south of the treatment building. Overflow from the lagoon flowed through an open drainage ditch to a pond which formed in a swamp area adjacent to the ditch, and eventually into the lake. Contaminated soil and sediment areas in addition to the drainage ditch, swamp pond, and lagoon include a drippage area along the railroad tracks where treated ties were removed from the treatment building, a slough area where treated ties were stored, and a beach area extending into Flathead Lake. Ground water in the vicinity of the lagoon and the swamp pond is also contaminated. In May 1985, EPA performed an emergency removal action and removed approximately 3,000 cubic yards of contaminated soil and 100,000 gallons of contaminated water from the swamp pond and drainage ditch areas. The excavated areas were backfilled and covered, and excavated soil was transferred to an off-site RCRA-regulated facility to await treatment. Contaminated water was treated on-site to recover usable materials. The primary contaminants of concern affecting the soil, sediment, and ground water are organics including creosote constituents such as PAHs and phenols, and metals including zinc.

The selected remedial action for this site includes excavation and on-site biological treatment of 11,700 cubic yards of contaminated soil and sediment from all source areas except the beach area; on-site restoration or replacement of wetlands areas; installation and operation of an innovative hot water flushing system and a water treatment system using ozone/uv or peroxide/uv in the lagoon and swamp pond areas to treat creosote contaminated ground water, and *in situ* biological treatment to degrade residual contaminants in the ground water and contaminants adsorbed onto the aquifer matrix; ground water will be reinjected or discharged to a POTW; ground-water monitoring; and implementation of temporary institutional controls to restrict ground-water use. The estimated total present worth cost for this remedial action is $12,031,000, which includes an annual O&M cost of $661,000 for years one to two, $811,000 for years three to ten, and $72,000 for years eleven to thirty. The present worth cost includes remediation of beach sediment. Under the selected action, beach sediment are left in place. Reducing this cost by a volume ratio gives approximately $11,000,000.

Performance Standards or Goals

Soil exceeding concentrations of cPAHs 3.6 mg/kg, total PAHs 1,875 mg/kg, zinc 15,750 mg/kg, or total phenols 3,000 mg/kg will be excavated. The established excavation levels for total cPAHs in soil is based on a 10^{-5} risk level. The initial soil treatment goal is based on a 10^{-4} risk level and will be achieved by reducing total cPAHs to 36 mg/kg (BDAT level). Treatment will be continued until the decrease in total PAHs has been less than 20 percent per year or background levels have been reached. The goal of the continued treatment is a risk level of 10^{-6}. Chemical-specific ground-water clean-up goals are based on the risk assessment,

CWA water quality criteria, and SDWA MCLs and include cPAHs 0.03 ug/l (WQC), total PAHs 0.30 ug/l (10^{-5} risk-based level), phenol 2,500 ug/l (WQC), benzene 5 ug/l (MCL), and zinc 110 ug/l (WQC).

Institutional Controls

Institutional controls will be designed to prohibit construction of new wells downgradient from the contaminated aquifer until ground-water quality returns to acceptable levels.

NPL Rank: 528

LIBBY GROUND WATER CONTAMINATION, MT

Second Remedial Action
December 30, 1988

The Libby Ground Water Contamination site (also known as the Champion Mill site or the Libby Pesticide site) is on the Champion International Corporation lumber and plywood mill in the city of Libby, Lincoln County, Montana. Champion is the third owner of the facility, which has been in operation since 1946. The area around the site includes residential areas and businesses. The site is bordered on the west by Flower Creek, on the east by Libby Creek, and on the north by the Kootenai River. The city and surrounding areas have a population of approximately 11,000. The contaminated soil/ source area is within the confines of the facility; however, ground-water contamination extends well into the city of Libby. Wood treating fluids and their constituents, including creosote and PCP, are the contaminants of concern at the site. They are found in soil and sediment at several different locations, including former waste pits, tank storage areas, and butt dip and treatment sites. The contamination is the result of spent fluids, overflow of treatment tanks, and spills. In addition to creosote and PCP, certain carrier fuels or oils were used at the site and contributed VOC contaminants. Investigations at the site were initiated by the state in 1979 after a residential well was found to smell of creosote. A ROD signed in September 1986 provided an alternate water source to residents whose wells were contaminated. The site has been divided into three operable units; however, they require concurrent remediation. The operable units are the soil/source area within the confines of the facility; the upper aquifer, historically used for drinking water and irrigation but currently severely contaminated; and the lower aquifer, highly contaminated with oil and non-aqueous phase liquids (NAPL). The primary contaminants of concern affecting the soil, sediment, and ground water at the site are VOCs including benzene, other organics including dioxin, PAHs (creosote constituents), PCP, metals including arsenic, and oil.

The selected remedial actions for this site have been developed based on operable units. The selected remedial action for the soil/source area includes excavation and consolidation of approximately 30,000 cubic yards of unsaturated soil and debris in the waste pit area, followed by a two-step enhanced biodegradation process composed of enhanced natural biodegradation and subsequent transfer to a land treatment unit consisting of a 3.5-acre lined treatment cell for land farming and final deposition; *in situ* bioremediation treatment of saturated soil in the waste disposal pit using a closed loop system involving ground-water pumping and physical treatment in a fixed-bed bioreactor with reinjection through a rock percolation bed, and *in-situ* biodegradation stimulation to prevent further leaching of source material to ground water (recovered NAPL will be processed in an oil/water separation and stored on site for recycling and incineration); and capping of the waste pit, butt dip, and tank farm areas. The selected remedial action for the upper aquifer includes *in situ* ground-water bioremediation of the upper aquifer that is separate from the process used in the saturated zone of the waste pit area. The selected remedial action for the lower aquifer includes implementation of a pilot test for the oil-contaminated lower aquifer using biorestoration in conjunction with oil recovery and oil dispersion techniques (this is an interim remedy for the lower aquifer); implementation of institutional controls including deed, land use, and ground-water restrictions; and on-site ground-water monitoring. The estimated present worth cost of this remedial action is $5,777,000 with annual O&M of $670,200 for year two, $521,200 for years three to five, $232,200 for years six to eight, and $80,000 for nine to thirty.

Performance Standards or Goals

Treatment of soil and debris will attain total cPAHs 88 mg/kg based on a 10^{-5} risk level; napthalene 8.0 mg/kg, phenanthrene 8.0 mg/kg, pyrene 7.3 mg/kg, and PCP 37.0 mg/kg all based on

best demonstrated available technology (BDAT) concentrations; and combined chlorinated dibenzo dioxins and dibenzo furans 0.001 mg/kg. Saturated zone (i.e., ground water below the waste pit area) and upper aquifer ground-water treatment will attain total noncarcinogenic PAHs 400 ng/l, total cPAHs 40 ng/l, PCP 1.05 mg/l, benzene 5 ug/l (MCL), and arsenic 50 ug/l (MCL). Other organics/inorganics are not to exceed a 10^{-5} risk level. Treatment levels were not provided for the lower aquifer because an interim remedy is being used; therefore, an ARAR waiver is applicable.

Institutional Controls

Remedy will implement deed, land use, and ground-water use restrictions to prevent sale without acknowledgement of on-site hazardous wastes, future development, and drilling drinking water wells.

NPL Rank: 629

MONTICELLO RADIOACTIVELY CONTAMINATED PROPERTIES, UT

First Remedial Action - Final
September 29, 1989

The Monticello Radioactively Contaminated Properties site, also known as the Monticello Vicinity Properties, is a federally-owned, abandoned vanadium and uranium mill area in the city of Monticello, San Juan County, Utah. Land use in the area is residential, however, there is limited commercial use as well. Milling of vanadium and uranium occurred from 1944 to 1960. Throughout the operating period, mill tailings were used in the city of Monticello for construction purposes including fill for open lands; backfill around water, sewer, and electrical lines; sub-base for driveways, sidewalks, and concrete slabs; backfill against basement foundations; and as sand mix in concrete, plaster, and mortar. Currently, the site consists of a dismantled vanadium and uranium mill, and stabilized mill tailings piles. The Monticello Radioactively Contaminated Properties were accepted into the Department of Energy's Surplus Facilities Management Program in 1980 for remedial action. The Vicinity Properties were formally included on the NPL in 1986 and, therefore, must comply with requirements of CERCLA. In October 1989, the Millsite itself was also listed on the NPL. DOE established an official list of Vicinity Properties designated for remedial action based on radiological surveys conducted from 1971 to 1984. As of March 1989, 91 properties had been identified to be included in the Monticello Vicinity Properties. Of these 91 properties, 53 remedial actions have been completed and 12 additional properties are slated for remedial action in 1989. Approximately 100,000 cubic yards (135,000 tons) of contaminated construction debris and wind blown deposited contamination is estimated to be within the Vicinity Properties. The primary contaminants of concern in construction material and debris are thorium^{230}, radium^{226}, and radon^{222} contained in the vanadium and uranium mill tailings.

The selected remedial action for this site includes excavation and removal of residual radioactive material from affected properties and restoration/reconstruction using clean materials, or modification of existing structures to isolate radiation sources from inhabitants; filling and regrading excavated areas; and disposal and temporary storage of all contaminated material at the Monticello Millsite. The millsite is addressed separately under a 1988 Federal Facilities Inter-agency Agreement. The estimated present worth cost of this remedial action is $65,000 per Vicinity Property for 91 "included' properties, or $5,915,000.

Performance Standards or Goals

Cleanup will ensure that the concentration of radium^{226} in land averaged over 100 square meters shall not exceed the background level of 2 pCi/g by more than 5 pCi/g averaged over the first 15 cm of soil or 15 pCi/g averaged over 15 cm thick layers of soil more than 15 cm below the surface. In addition, in an occupied or habitable building the level of gamma radiation shall not exceed background by more than 20 microroentgens per hour. These goals are based on the Uranium Mill Tailings Radiation Control Act of 1978.

Institutional Controls

Not applicable.

NPL Rank: 36

SAND CREEK INDUSTRIAL, CO

First Remedial Action
September 29, 1989

The Sand Creek Industrial site is in Commerce City, Adams County, Colorado. Land use in the vicinity of the site is industrial, including trucking firms, petroleum and chemical production, and supply companies, warehouses, small businesses and several residences. The site contains the property and buildings of the Colorado Organic Chemical Company (COC) and approximately 13 residences. Production wells north and downgradient of the study area are the source of water supply to the county. Pesticide manufacturing operations began at COC in the 1960s. Fires in 1968 and 1977 and improper pesticide storage practices resulted in high levels of organiphosphate pesticides, chlorinated hydrocarbons, and thermally-altered pesticides being released at the site. In 1978, COC removed some contaminated soil, and in 1984 COC removed drums of waste, excess product, and contaminated soil, and installed fencing at the site in response to an EPA order. This ROD represents the first of five planned operable units for the site and addresses soil, buildings, and tanks contaminated by pesticides, volatile organics, and metals. The primary contaminants of concern affecting the soil, on-site buildings, and tanks are VOCs including TCE and PCE, and other organics including pesticides.

The selected remedial action for the site includes *in situ* vacuum extraction to remove VOCs from contaminated soil and on-site treatment of off-gas by air stripping; excavation and off-site incineration of approximately 1,000 cubic yards of soil contaminated with greater than 1000 mg/kg halogenated organic compounds (HOC), with off-site residual disposal in a RCRA landfill; backfilling of excavated areas with clean soil; demolition and off-site disposal of buildings in conformance with land disposal regulations; and ground-water monitoring at the site for 30 years following remediation. The estimated present worth cost for the selected remedy is $5,349,600.

Performance Standards or Goals

Acceptable site-specific soil concentrations (action levels) were calculated for VOCs using a soil-water leaching model which assumed ground-water concentration corresponding to SDWA MCLs or a 10^{-6} cancer risk level. Chemical-specific clean-up levels were provided for PCE 1,095 ug/kg and TCE 285 ug/kg. ARARs specify the clean-up objectives for the pesticide 2, 4-D, an HOC. LDRs have established treatment of HOCs $\geq$ 1,000 mg/kg based on BDAT, which for 2,4-D is incineration.

Institutional Controls

Not applicable.

NPL Rank: 300

WOODBURY CHEMICAL CO., CO

Second Remedial Action - Final
September 29, 1989

The Woodbury Chemical Co. site is in Commerce City, a northern suburb of Denver, Colorado, and neighbors a primarily industrial area which includes automobile salvage yards and a petroleum refinery. From the 1950s to 1971, the Woodbury Chemical Company operated a pesticide formulation facility that was destroyed by fire in 1965 but subsequently rebuilt. Contaminated rubble and debris from the fire were disposed of on a 2.2-acre vacant lot east of the Woodbury facility. During a 1985 remedial investigation of the 2.2-acre lot, EPA identified high levels of pesticides and metals in surface and subsurface soil. Although EPA issued a ROD later that year, site clean up was delayed due to the discovery of significant additional contamination at the Woodbury facility and adjacent properties to the west and north of the facility. As a result of the discovery of additional contamination, EPA determined it would be more cost effective to simultaneously implement the clean-up activities at the 2.2-acre lot, the Woodbury chemical facility, and adjacent properties. The selected remedial action addressed in this ROD incorporates and builds upon the 1985 ROD. The primary contaminants of concern affecting the soil are VOCs including PCE and TCE, other organics including pesticides, and metals including arsenic.

The selected remedial action for this site includes excavation and off-site incineration of 850 cubic yards of highly-contaminated soil followed by off-site disposal; excavation and off-site disposal of 11,520 cubic yards of less-contaminated soil at a RCRA-permitted landfill; and backfilling and revegetation of the excavated area. The estimated present worth cost for this remedial action is $6,962,600 which includes annual O&M costs of $31,400.

Performance Standards or Goals

Soil clean up will attain an excess lifetime cancer risk of 10^{-6}. Specific clean-up goals are based on ARARs and background levels and include arsenic 5^{-10} mg/kg, TCE 0.52 mg/kg, and PCE 1.9 mg/kg.

Institutional Controls

Not applicable.

REGION 9

(American Saomoa, Arizona, California, Guam, Nevada)

NPL Rank: 288

ATLAS ASBESTOS MINE, CA

First Remedial Action
July 19, 1989

The Atlas Asbestos Mine site is in Fresno County, California, and is being remediated concurrently with the Coalinga Asbestos Mine site. This ROD does not address the mines, but rather a separate area in the city of Coalinga, where asbestos from the Atlas-Coalinga mines was deposited to await handling and shipment. This 107-acre site has been designated as the first operable unit for the Atlas Asbestos Mine and the Coalinga Asbestos Mine sites. From the 1960s to the mid-1970s, extensive asbestos mining and milling took place in areas near the site, and until 1980 the site operated as an asbestos milling, manufacturing, storage, and transportation center. The site consists of four distinct areas: (1) the warehouse which was once a mining waste distribution center and which currently houses 1,600 cubic yards of mining waste; (2) a storage yard which contains asbestos-contaminated stacked pipes; (3) a shipping yard which was used as an asbestos distribution center by the Atlas Asbestos Company; and (4) the U.S. Asbestos Company which currently stores piles of asbestos-contaminated mining waste. In 1980, a state inspection revealed elevated levels of asbestos in the nearby aqueduct which suggested that the Atlas Asbestos Mine and Coalinga Asbestos Mine sites were probable asbestos sources. Subsequent sampling programs, conducted between 1983 and 1987, revealed that surface water and air also contained elevated levels of asbestos. As a result of these findings, EPA issued an Administrative Order to a major landowner, Southern Pacific Transportation Company (SPTC), requiring SPTC to conduct an additional remedial investigation and a feasibility study and to perform interim measures to stabilize the site. Because airborne emissions of asbestos pose the greatest threat to neighboring residents, this remedial response will limit the amount of asbestos and nickel released from the soil and emitted into the air. The primary contaminants of concern affecting the soil and debris are metals including nickel, and other inorganics including asbestos and mining wastes.

The selected remedial action for 'this site includes excavating and consolidating 14,500 cubic yards of asbestos, chromium, and nickel-contaminated soil and building debris; constructing an underground waste management unit (WMU) to contain and dispose of contaminated soil and waste on site; capping the WMU area; regrading the excavated area; decontaminating debris; monitoring soil moisture content, ground water, air, and personnel; and implementing institutional controls. The estimated present worth cost for this action ranges between $1,500,000 to $2,500,000, which includes annual O&M costs of $35,000.

Performance Standards or Goals

All contaminated soil and mining wastes will be cleaned up to at or below background levels for nickel, and at or below one area percent asbestos using polarized light microscopy.

Institutional Controls

Deed restrictions will be implemented to prevent disturbing the cap and to prevent releasing asbestos fibers or nickel contaminants into the air.

NPL Rank: 665

BECKMAN INSTRUMENTS (Porterville Plant), CA

First Remedial Action - Final
September 26, 1989

The Beckman Instruments (Porterville Plant) site, which includes the Beckman plant and surrounding study area, is in the city of Porterville, California. The 12-acre Beckman plant has manufactured electronic instrument assemblies and circuit boards since 1967. Wastewater from industrial processes including electroplating and degreasing, contains spent halogenated solvents, inorganic and acid solutions, salts, metal-laden solutions, and plating bath sludges. From 1974 to 1983, wastewater was discharged to an on-site solar evaporation pond; however, since 1983, wastewater has been treated on site. Ground water in the vicinity of the pond was used for domestic and agricultural purposes until 1983 when ground water was found to be contaminated. Beckman subsequently closed the pond, provided alternate water supplies to approximately 300 residents in the area, and began ground-water pumping and treatment using air stripping in 1985. Additionally, soil beneath the former pond as well as near a former pesticide operation area are known to be contaminated with elevated levels of lead. The primary contaminants of concern affecting the soil and ground water are VOCs including TCE, and metals including lead.

The selected remedial action for this site includes excavation and off-site disposal of lead-contaminated soil; continued operation of the ground-water pumping and treatment system for the upper aquifer; pumping and treatment of ground water from upper aquitard and lower aquifer using air stripping; off-site discharge of all treated water into infiltration basins or irrigation canals; and ground-water monitoring. The estimated present worth cost for the selected remedy is $4,740,000. This estimate does not include costs for continued operation of the existing pumping and treatment system.

Performance Standards or Goals

Soil contaminated with lead above 200 mg/kg will be excavated and disposed of off site. Ground-water cleanup will attain state or federal MCLs or state action levels. Chemical-specific ground-water clean-up goals include TCE 5 ug/l (MCL).

Institutional Controls

Not applicable.

NPL Rank: 289

COALINGA ASBESTOS MINE, CA

First Remedial Action
July 19, 1989

The Coalinga Asbestos Mine site is in Fresno County, California, and is being remediated concurrently with the Atlas Asbestos Mine site. This ROD does not address the mines, but rather a separate area in the city of Coalinga, where asbestos from the Atlas-Coalinga mines was deposited to await handling and shipment. This 107-acre site has been designated as the first operable unit for the Atlas Asbestos Mine and the Coalinga Asbestos Mine sites. From the 1960s to the mid-1970s, extensive asbestos mining and milling took place in areas near the site, and until 1980 the site operated as an asbestos milling, manufacturing, storage, and transportation center. The site consists of four distinct areas: (1) the warehouse which was once a mining waste distribution center and which currently houses 1,600 cubic yards of mining waste; (2) a storage yard which contains asbestos-contaminated stacked pipes; (3) a shipping yard which was used as an asbestos distribution center by the Coalinga Asbestos Company; and (4) the U.S. Coalinga Company which currently stores piles of asbestos-contaminated mining waste. In 1980, a state inspection revealed elevated levels of asbestos in the nearby aqueduct which suggested that the Coalinga Asbestos Mine and Atlas Asbestos Mine sites were probable asbestos sources. Subsequent sampling programs, conducted between 1983 and 1987, revealed that surface water and air also contained elevated levels of asbestos. As a result of these findings, EPA issued an Administrative Order to a major landowner, Southern Pacific Transportation Company (SPTC), requiring SPTC to conduct an additional remedial investigation and a feasibility study and to perform interim measures to stabilize the site. Because airborne emissions of asbestos pose the greatest threat to neighboring residents, this remedial response will limit the amount of asbestos and nickel released from the soil and emitted into the air. The primary contaminants of concern affecting the soil and debris are metals including nickel, and other inorganics including asbestos and mining wastes.

The selected remedial action for this site includes excavating and consolidating 14,500 cubic yards of asbestos, chromium, and nickel-contaminated soil and building debris; constructing an underground waste management unit (WMU) to contain and dispose of contaminated soil and waste on site; capping the WMU area; regrading the excavated area; decontaminating debris; monitoring soil moisture content, ground water, air, and personnel; and implementing institutional controls. The estimated present worth cost for this action ranges between $1,500,000 to $2,500,000, which includes annual O&M costs of $35,000.

Performance Standards or Goals

All contaminated soil and mining wastes will be cleaned up to at or below background levels for nickel, and at or below one area percent asbestos using polarized light microscopy.

Institutional Controls

Deed restrictions will be implemented to prevent disturbing the cap and to prevent releasing asbestos fibers or nickel contaminants into the air.

NPL Rank: 305

COAST WOOD PRESERVING, CA

First Remedial Action - Final
September 29, 1989

The 8-acre Coast Wood Preserving (CWP) site is an active wood preserving facility in a rural, agricultural area three miles south of Ukiah, California. Wood preserving operations began at the site in 1971 and since then near-surface soil contamination has occurred primarily as a result of drippings. Investigations by CWP beginning in the early 1970s revealed elevated chromium and arsenic concentrations in near-surface soil and elevated chromium concentrations in ground water particularly near the main treatment and storage areas. In addition, off-site migration of chromium has occurred via ground water. A number of measures have been implemented by CWP to improve overall site conditions including extending the area covered by surface paving, erecting canopies over the wood treatment area, and constructing berms to divert and control surface runoff from treated wood storage areas. In addition, interim remedial measures were conducted in 1983 to intercept and limit migration of chromium in ground water including constructing a slurry cutoff wall along the eastern site boundary, a ground water extraction trench immediately upgradient of the slurry wall to recycle ground water back into the operation, and a ground water extraction well and an injection well in the area of highest contamination. As a result of these interim measures, health risks via exposure to contaminated soil and ground water have been significantly reduced. The primary contaminants of concerns for soil and ground water are metals including arsenic and chromium.

The selected remedial action for this site includes paving exposed soil; onsite treatment of soil after site closure in 10 years using the best available technology at the time; plume control and aquifer remediation via ground water pumping and reuse in CWP's operations to the extent possible or electrochemical treatment of excess ground water which cannot be recycled followed by discharge to the Ukiah Sewage Treatment Plant and/or reinjection; ground water monitoring; and development of a contingency plan for off-site ground-water remediation if needed. The estimated total cost for the source control component of the remedy is $1,000,000. The total cost of the ground water remedy was not provided; however, the estimated O&M cost for the ground water remedy was estimated as $19,500 for a 20 year period.

Performance Standards or Goals

Post-closure remedial measures for soil include on-site treatment of contaminated soil to a depth of 1.5 feet for areas containing greater than 100 mg/kg of total chromium and 15 mg/kg (background level) of arsenic. In high contamination areas, the depth of excavations is expected to be 5 feet. Ground water will be treated to remove metal contamination in compliance with state and Federal clean-up standards including arsenic 50 ug/l (MCL) and chromium 50 ug/l (MCL).

Institutional Controls

A deed of restriction on real property will be developed.

Group: 16

FAIRCHILD SEMICONDUCTOR (Mountain View Plant), CA

First and Second Remedial Actions
June 9, 1989 - June 30, 1989

The Fairchild Semiconductor (Mountain View Plant) site is one of three Superfund sites that are being remediated concurrently. The other two sites are Intel (Mountain View Plant) and Raytheon. The sites are located in the Middlefield/Ellis/Whisman (MEW) Study Area in Santa Clara County in the city of Mountain View, California. Land use in the area is primarily light industrial and commercial, with some residential areas. There are no natural surface drainage features within or surrounding the site; most of the runoff is intercepted by a storm drain system and discharged to an off-site creek. Various industrial activities were conducted in the vicinity of the site, including semiconductor manufacturing, metal finishing operations, parts cleaning, aircraft maintenance, and other activities requiring the use, storage, and handling of a variety of chemicals, particularly solvents. Site investigations at several of these facilities during 1981 and 1982 revealed significant soil and ground-water contamination by toxic chemicals, primarily VOCs. The primary cause of the contamination was leaking storage tanks and lines, and poor management practices. Before and during additional site investigations, which were conducted under a 1985 Consent Order, interim clean-up activities were conducted at the site by Fairchild, Intel, and Raytheon. These included tank removals, soil removal and treatment, well sealing, construction of slurry walls, and hydraulic control and treatment of local ground water. The primary contaminants of concern affecting the site are VOCs including TCE, TCA, PCE, toluene, and xylenes, and other organics including phenols.

The selected remedy for this site includes *in situ* vapor extraction with treatment by vapor phase GAC of contaminated soil found within the Fairchild and Raytheon slurry walls. There may be some limited soil excavation and treatment by aeration for some areas outside of the slurry walls, with on-site disposal of residues in the excavated area; ground-water pumping and treatment using air stripping, and in some cases liquid phase GAC, with emissions controls consisting of GAC vapor phase carbon units, followed by reuse of the ground water (reuse options including reinjection are being developed) and, if necessary, discharge to surface water; sealing of any conduits or potential conduits to protect the deep aquifer; and ground-water monitoring. The present worth cost for this remedial action is $49,000,000 to $56,000,000, which includes O&M costs.

Performance Standards or Goals

The clean-up goals for soil are based on ensuring the success of the ground-water clean-up goal (attaining MCLs) in the shallow aquifers. Individual goals include TCE 1 mg/kg inside the slurry walls and TCE 0.05 mg/kg outside the slurry walls. Ground-water clean-up goals for the shallow aquifers, which are not currently used for drinking water, are based on MCLs and a 10^{-4} to 10^{-5} excess cancer risk and include TCE 5 ug/l (MCL); goals for the deep aquifers, which are used for drinking water, are based on a 10-6 cumulative cancer risk and include TCE 0.8 ug/l. Attainment of these levels will also assure cleanup of other VOCs to at least their respective MCLs.

Institutional Controls

Not applicable.

NPL Rank: 310

FAIRCHILD SEMICONDUCTOR (South San Jose Plant), CA

First Remedial Action - Final
March 20, 1989

The Fairchild Semiconductor (South San Jose Plant) site is a former semiconductor manufacturing facility in San Jose, California. Operations were conducted at the site from April 1977 until it closed in October 1983. In late 1981, Fairchild Semiconductor Corporation discovered that an underground organic solvent waste tank had failed, resulting in soil and on- and off-site ground-water contamination by a mixture of solvents. TCA contamination was discovered exceeding drinking water standards in a public drinking water supply well located approximately 1,800 feet downgradient from the site. The well was subsequently destroyed and sealed; however, several wells remain active downgradient. Fairchild has been investigating and cleaning up soil and ground-water pollution at the facility since contamination was first detected in 1981. Interim actions taken by Fairchild include source removal and on-site soil cleanup (removal of defective tank and excavation of 3,389 cubic yards of contaminated soil), installation of a slurry wall around the perimeter of the site, conducting pilot studies for on-site aquifer flushing and *in situ* soil vapor extraction, hydraulic containment of the plume with on-site and limited off-site ground-water treatment using air stripping, and implementation of ground-water conservation measures. Although the interim clean-up actions have significantly decreased the size and contamination of the plume, some areas outside the slurry wall still exceed state drinking water action levels, and on-site soil and ground water still contain high concentrations of chemicals. This ROD provides a final remedy which addresses on-site soil and ground water, and off-site ground-water contamination. The primary contaminants of concern affecting the soil and ground water are VOCs including PCE, TCA, DCE, and xylenes.

The selected remedial action for this site includes on-site soil vapor extraction (aeration); on-site shallow ground water and off-site ground water from well RW-25 pumping and treatment using air stripping, followed by off-site reinjection of treated ground water and discharge to surface water after aquifer reuse capacity has been exhausted; deep ground water from off-site wells RW2 and RW22, followed by discharge of untreated ground water to surface water via storm drains; conducting laboratory and field study of biodegradation of on-site chemicals; implementing institutional controls including deed restrictions to limit ground-water and land use; and ground-water monitoring. The estimated present worth cost for this remedial action is $9,393,100 which includes total O&M costs of $7,231,700.

Performance Standards or Goals

The soil remediation goal is 1 mg/kg for VOCs including PCE, TCA, and xylenes; however, this goal will be re-evaluated based on treatability test results. Off-site ground water will attain a hazard index of 0.25 which will be achieved by reducing DCE concentrations to below detection (i.e., <1ppb) and TCA concentrations to 25 ppb. On-site ground-water clean-up goals are provided for the seven contaminants of concern. Individual goals based on DHS drinking water action levels or MCLs, whichever is more stringent, include TCA 200 ug/l, DCE 6 ug/l, and xylenes 620 ug/l. Other clean-up levels were based on proposed state MCLs or the oral reference dose in the IRIS and include PCE 2 ug/l (proposed state MCL).

Institutional Controls

Implementation of deed restrictions to restrict land and ground water use and protect the integrity of the slurry wall.

NPL Rank: 284

FIRESTONE TIRE & RUBBER CO., (Salinas Plant), CA

First Remedial Action
September 13, 1989

The 256-acre Firestone Tire (Salinas Plant) site is in an agricultural are in Salinas, California. The facility was operated as a tire manufacturing plant from 1963 to 1980, in which a variety of chemicals and chemical formulations were used including solvents and surfactants. In 1983, as part of the requirements for the closure of a RCRA-regulated storage area at the facility, Firestone conducted an environmental investigation and determined that some chemicals had been released to the soil and ground water. Sampling indicated that a plume of VOC-contamination extends about 2-1/2 miles northwest of the former facility. Consequently, on-site and off-site ground water pumping and treatment was initiated to further reduce chemical migration. Furthermore, evaluation of potential sources of contamination resulted in cleaning and removing storage tanks and above-ground facilities, as well as excavating 5,300 cubic yards of inorganic- and organic-contaminated soil for final disposition offsite. This final remedy provides for additional cleanup of ground water under the site and as much as 2-1/2 miles from the site. Soil analytical data indicated that the residual risk from soil contamination after remedial measures had been implemented warranted no further soil remediation. The primary contaminants of concern affecting the ground water are VOCs including 1,1-DCA, 1,1-DCE, 1,1,1-TCA, TCE, PCE, benzene, toluene, and xylenes.

The selected remedial action for the site includes pumping and treatment of ground water at the existing treatment facility using carbon adsorption and air stripping, with offsite discharging of treated ground water to surface water; ground water monitoring to ensure that the ground water plume is declining; crop testing to ensure that there is no plant uptake of the contaminants; and developing a contingency plan for water in the deep aquifer in case of contamination. The estimated present worth cost for this remedial action is $1,742,000, which includes an estimated O&M cost of $1,517,000 for 3-1/2 years.

Performance Standards or Goals

Cleanup levels for ground water will be based on chemical-specific ARARs, a cumulative health index of 1 for noncarcinogens, or a carcinogenic risk of 10^{-6} depending on which is more stringent. Chemical-specific goals include benzene 0.7 ug/l (State), 1,1-DCA 5.0 ug/l (State), TCE 3.2 ug/l (10^{-6} risk level), PCE 0.7 ug/l (10^{-6} risk level), 1,1-DCE 6.0 ug/l (HI=1), toluene 20 ug/l (HI-1), and xylene 70 ug/l (HI=1).

Institutional Controls:

Not applicable.

Group: 11

IBM (San Jose Plant), CA

First Remedial Action - Final
December 15, 1988

International Business Machines (IBM) owns and operates a data processing machine manufacturing facility in the Santa Teresa Basin in San Jose, California. IBM has operated the facility since December 1956 using organic chemicals including TCA, acetone, xylenes, and petroleum naphthas. The organic chemicals have been handled and stored on site in drums, and aboveground and underground tanks. In addition, waste organic solvents were stored in concrete or steel underground tanks or drums; however, the concrete tanks were designed only to store organic wastes. In October 1980, while excavating tanks in Tank Farm No. 1, IBM discovered soil contaminated with organics. Investigations in November 1981 revealed extensive ground-water contamination. The ground-water plume is more than three miles long and more than 180 feet deep. Fourteen active or potentially active water supply wells are downgradient of the plume; however, none of these public wells has been found to contain VOCs above state and federal drinking water standards. Nineteen sources of soil and ground-water contamination have been identified, including tank overflows, spillage from drum handling, and tank and pipeline fitting failures. Actions have been taken to prevent further solvent migration from the IBM source areas, including removing underground storage tanks which were replaced with aboveground tanks, and excavating more than 23,000 cubic yards of contaminated soil. Interim remedial measures begun in November 1982 to clean up the plume have included off- and on-site ground-water pumping with discharge of untreated ground water to storm drains. The primary contaminants of concern affecting the soil and ground water are VOCs including TCA, toluene, and xylenes, and other organics.

The selected remedial action for this site includes on-site soil vapor extraction; on-site shallow and deep ground water and off-site deep ground-water pumping and treatment using air stripping, followed by on-site discharge of treated ground water to the aquifer and off-site discharge to surface water after the reuse capacity of the aquifer is exhausted. Remedial action costs for this remedy were not provided.

Performance Standards or Goals

The soil remediation goal is 1 mg/kg for all contaminants of concern. Ground-water treatment goals were provided for contaminants of concern in the upper and lower aquifers. The chemical-specific goals for ground water are based on state action levels, and EPA reference doses and lifetime health advisories. Individual goals include TCA 200 ug/l (state), toluene 100 ug/l (state), and xylenes 200 ug/l (state) in the upper aquifer zone, and a hazard index of 0.25 with TCA 50 ug/l in the deeper aquifer zones.

NPL Rank: 879

INTEL CORP. (Mountain View Plant), CA

First Remedial Action
June 9, 1989

The Intel Corp. (Mountain View Plant) site is one of three Superfund sites that are being remediated concurrently. The other two sites are Fairchild Semiconductor (Mt. View) and Raytheon. The sites are located in the Middlefield/Ellis/Whisman (MEW) Study Area in Santa Clara County in the city of Mountain View, California. Land use in the area is primarily light industrial and commercial, with some residential areas. There are no natural surface drainage features within or surrounding the site; most of the runoff is intercepted by a storm drain system and discharged to an off-site creek. Various industrial activities were conducted in the vicinity of the site, including semiconductor manufacturing, metal finishing operations, parts cleaning, aircraft maintenance, and other activities requiring the use, storage, and handling of a variety of chemicals, particularly solvents. Site investigations at several of these facilities during 1981 and 1982 revealed significant soil and ground-water contamination by toxic chemicals, primarily VOCs. The primary causes of the contamination were leaking storage tanks and lines, and poor management practices. Before and during additional site investigations, which were conducted under a 1985 Consent Order, interim clean-up actions were conducted at the site by Fairchild, Intel, and Raytheon. These included tank removals, soil removal and treatment, well sealing, construction of slurry walls, and hydraulic control and treatment of local ground water. The primary contaminants of concern affecting the site are VOCs including TCE, TCA, PCE, toluene, and xylenes, and other organics including phenols.

The selected remedy for this site includes *in situ* vapor extraction with treatment by vapor phase GAC of contaminated soil found within the Fairchild and Raytheon slurry walls. There may be some limited soil excavation and treatment by aeration for some areas outside of the slurry walls with on-site disposal of residues in the excavated area; ground-water pumping and treatment using air stripping, and in some cases liquid phase GAC, with emissions controls consisting of GAC vapor phase carbon units, followed by reuse of the ground water (reuse options including reinjection are being developed) and, if necessary, discharge to surface water; sealing of any conduits or potential conduits to protect the deep aquifer; and ground-water monitoring. The present worth cost for this remedial action is $49,000,000 to $56,000,000, which includes O&M costs.

Performance Standards or Goals

The clean-up goals for soil are based on ensuring the success of the ground-water clean-up goal (attaining MCLs) in the shallow aquifers. Individual goals include TCE 1 mg/kg inside the slurry walls and TCE 0.05 mg/kg outside the slurry walls. Ground-water clean-up goals for the shallow aquifers, which are not currently used for drinking water, are based on MCLs and a 10^{-4} to 10^{-5} excess cancer risk and include TCE 5 ug/l (MCL); goals for the deep aquifers, which are used for drinking water, are based on a 10^{-6} cumulative cancer risk and include TCE 0.8 ug/l. Attainment of these levels will also ensure cleanup of other VOCs to at least their respective MCLs.

Institutional Controls

Not applicable.

NPL Rank: 704

KOPPERS CO., INC. (OROVILLE PLANT), CA

First Remedial Action - Final
September 13, 1989

The Koppers Co., Inc. (Oroville Plant) site is a 200-acre operating wood treating plant in Butte County, California, just south of Oroville. The site is bordered on the west by a Louisiana-Pacific Corporation facility, which is also a Superfund site, and lies within the floodplain of the Feather River, which runs 3,000 feet to the east. Land use in the vicinity of the site is mixed agricultural, residential, commercial, and industrial. Although there is a history of wood treating operations at the site, wood treating operations were greatly expanded in 1955 when Koppers Company, Inc. became the owner and operator. Chemical preservatives including pentachlophenol (PCP), creosote, and chlorinated copper arsenate solution have been used in the wood treating processes. Wastewater discharge and other site activities have resulted in contamination of unlined ponds, soil, and debris. In 1971, PCP was detected in on-site ground water and, in 1972, in residential wells to the southwest. Pursuant to a state order, Koppers conducted clean-up activities from 1973-74, including ground-water pumping and discharge to spray fields and off-site disposal of contaminated debris, and process changes, including construction of a wastewater treatment plant. In 1986, Koppers provided an alternate water supply for domestic uses to affected residents. In 1987, an explosion and fire occurred at a PCP wood treatment process facility prompting EPA to issue a removal order requiring cleanup of fire debris and removal and stabilization of surface soil. This ROD addresses the remaining contamination in on-site soil, and ground water affected by site contamination. The primary contaminants of concern affecting the soil and ground water are VOCs including toluene, xylenes, and benzene, other organics including PAHs, PCP, and dioxins/furans, and metals including arsenic and chromium.

The selected remedial action for this site includes a soil component and a ground-water component. The soil remedy includes four discrete soil treatment areas: *in situ* biodegradation of 110,000 cubic yards of PCP-contaminated soil; excavation and soil washing of 200,000 cubic yards of soil contaminated with wood treating wastes with redisposal of treated soil on site and treatment of residual contamination in the washing fluid in an on-site treatment facility; installation of a low permeability cap over the wood treating process area and downgradient extraction wells with future treatment of 20,000 cubic yards of contaminated soil beneath this area as soil becomes accessible during equipment change or ceasing of operations; and excavation and chemical fixation of 4,000 cubic yards of soil contaminated with metals, followed by on-site disposal. The ground-water remedy includes pumping and treatment of approximately 22,000,000 cubic yards of ground water using activated carbon, and reinjection of treated waste to the ground water, and formalization of the provision of an existing alternate water supply and extension, if needed, of the water supply during implementation of the remedy. The estimated present worth cost for this remedial action is $77,700,000, which includes an estimated present worth O&M cost of $37,100,000.

Performance Standards or Goals

The soil clean-up goals for the major contaminants at the site are PCP 17 mg/kg, dioxin/furans 0.030 ug/kg, background for arsenic and chromium, and cPAHs 0.19 mg/kg. Soil goals were set to meet 10^{-6} cancer-risk targets. Remedial objectives for ground water are the more stringent of 10^{-6} cancer risks or state action levels. Specific goals include PCP 2.2 ug/l, cPAHs 0.007 ug/l, dioxins 0.00000053 ug/l or the lowest available detection limit, and background levels for arsenic and chromium.

Institutional Controls

Not specified.

NPL Rank: 283

LITCHFIELD AIRPORT AREA, AZ

Second Remedial Action - Final
September 26, 1989

The Litchfield Airport site, also known as the Phoenix-Goodyear Airport Area site, covers approximately 35 square miles and, except for the airport, is almost entirely in the city of Goodyear. The surrounding area is primarily agricultural, however, residential development is anticipated in the near future. A ground-water divide running under the area effectively divides the site into a northern and southern area. Between 1981 and 1983, the state discovered that the ground water was contaminated with solvents, metals, and VOCs. Sampling data identified contaminated areas in the northern and southern portions of the site due to on-site industrial activities and waste handling by the former Goodyear Aerospace Corporation (GAC), the former Litchfield Park Naval Air Facility, and UniDynamics, Phoenix, Inc. A 1987 ROD addressed ground water in an area of the southern portion of the site contaminated with VOCs. This ROD addresses soil (vadose zone) and ground-water remediation for the remainder of the site, with the exception of chromium-contaminated soil in the sludge drying beds at the former GAC facility. GAC owners are currently performing an expedited response action under an Administrative Order on Consent for the chromium sludge beds. The primary contaminants of concern affecting the soil and ground water are VOCs including TCE, toluene, and xylenes, and metals including arsenic, chromium, and lead.

The selected remedial action for the northern portion of the site includes treatment of soil with VOC soil gas levels greater than 1 ug/kg using soil vapor extraction (SVE); and ground-water pumping and treatment using air stripping, liquid phase granular activated carbon, and granular activated carbon polishing on the air emissions, followed by reinjection or discharge of treated ground water to the municipal water system. Remedial activities for the southern portion of the site include treatment of 284,100 square yards of VOC-contaminated soil using SVE; and ground-water pumping and treatment using air stripping and wellhead treatment, followed by discharge to the municipal water system. The estimated present worth cost for this remedial action ranges between $30,227,000 and $31,693,000. O&M costs will be determined during the remedial design.

Performance Standards or Goals

VOC- and metal-contaminated soil outside of the sludge pits will be removed until remaining levels will not cause or contribute to ground-water contamination in concentrations exceeding ground-water clean-up standards. Ground-water clean-up goals are based on SDWA Maximum Containment Levels (MCLs), state action levels (SALs) or CWA Ambient Water Quality Cirteria (AWQC). Chemical-specific ground-water clean-up goals include toluene 340 ugl (SAL), TCE 5 ug/l (MCL), xylenes 440 ug/l (SAL), arsenic 50 ug/l (MCL), chromium 50 ug/l (MCL), and lead 50 ug/l (MCL).

Institutional Controls

Not applicable.

NPL Rank: 119

NINETEENTH AVENUE LANDFILL, AZ

First Remedial Action - Final
September 29, 1989

The 213-acre Nineteenth Avenue Landfill is in an industrial area of Maricopa County, Phoenix, Arizona. The landfill is divided by the Salt River channel into two sections or cells. A 200-acre section, Cell A, lies north of the channel and a 13-acre section, Cell A-1, lies south of the channel. State permitted landfill operations were conducted from 1957 to 1979, during which time approximately nine million cubic yards of municipal refuse, solid and liquid industrial wastes, and some medical wastes and materials containing low levels of radioactivity were deposited in the landfill. Sampling of the landfill contents has revealed no concentrated sources of contamination; however, the State ordered the landfill closed in 1979 due to the periodic inundation of the landfill by flood waters from the Salt River channel. Subsequently, the city covered the site with fill, stockpiled soil for final capping, installed ground-water monitoring wells, built berms around the landfill, and installed a methane gas collection system. This remedial action is designed to mitigate threats resulting from flooding of the landfill, which has occurred intermittently since 1965. The primary contaminants of concern in the soil/refuse include VOCs such as toluene and xylenes. There is little risk to public health from ground-water pathways because ground-water contaminants are of small magnitude, and only limited migration has occurred off the site.

The selected remedial action for this site includes containing landfill wastes on-site by constructing an impermable cap and surface drainage structures over the landfill, as well as soil-cement levees along the river at the landfill boundary; widening the river channel; collecting and flaring landfill generated gases; instititutional controls and access restrictions; and air and ground-water monitoring. A contingency ground-water treatment plan will be implemented whenever ground-water standards are exceeded at the landfill boundary. The estimated present worth cost for this remedial action is $42,990,000, which includes an annual O&M cost of $1,010,000 for 30 years.

Performance Standards or Goals

Not applicable to landfill wastes. Ground water currently does not pose a risk to human health or the environment. If monitoring detects concentrations exceeding SDWA MCLs at the property boundary, a contingency plan will be implemented.

Institutional Controls

Institutional controls will be implemented but were not specified.

NPL Rank: 329

PURITY OIL SALES, INC., CA

First Remedial Action
September 26, 1989

The seven-acre Purity Oil Sales, Inc. site is in Fresno County, California, one-half mile south of the Fresno city limits. The site is located in a predominantly industrial area; however, there are adjacent residential properties, including three houses and a trailer park. The ground-water aquifer in the Fresno area has been designated as a sole-source aquifer. The shallow aquifer underlying the site is probably hydrogeologically connected with deeper aquifer zones providing domestic water supply for Fresno and the surrounding area. The Purity site operated as a used oil recycling facility from 1934 to the early 1970s. In 1976, a fire destroyed the main warehouse building. Equipment remaining, with the exception of seven steel above-ground storage tanks, was removed from the site, and the area was partially regraded. One of the remaining storage tanks is lined with asbestos. Waste pits filled with soil, debris, and rubble, cover most of the site. The state conducted a remedial investigation in 1982 during which time the EPA Emergency Response Team removed 1,800 cubic yards of hazardous oily and tarry materials from the site. This first of two planned operable units addresses the cleanup of the ground water and the removal and off-site disposal of storage tanks and tank contents. A future ROD will address contaminated soil. The primary contaminants of concern affecting ground water are VOCs including benzene and TCE, and metals. Contaminants of concern in the tank sludge are VOCs including benzene, toluene and xylenes, other organics including PCBs, PAHs, pesticides, and phenols, and metals including lead.

The selected remedial action for this site includes ground-water pumping and on-site treatment with greensand to remove metals and air stripping to remove VOCs; disposal of treated ground water by either reinjection into the aquifer, disposal in a canal or disposal in local infiltration basins; provision of an alternate water supply to affected private well owners; creation of a ground-water management zone to maintain ground-water levels; ground-water monitoring; removal, on-site solidification (if necessary), and off-site disposal of 22,500 gallons of contaminated sludge from the seven on-site steel tanks; and cleaning, dismantling, and off-site disposal of the tanks including appropriate off-site disposal of the asbestos walled tank. In addition, treatability studies will be conducted on the site soil to determine the effectiveness of several emerging treatment technologies. The estimated present worth cost for this remedial action is $11,660,000, which includes a total cost of $500,000 for removal of the steel tanks. A present worth O&M cost of $6,960,000 is included in the total present worth estimate.

Performance Standards or Goals

Ground-water treatment will meet federal and state SDWA MCLs and state action levels (SALs). Chemical-specific clean-up goals for ground water include benzene 1 ug/l (SAL) and TCE 5 ug/l (MCL).

Institutional Controls

Institutional methods to control well construction and pumping will be implemented to maintain ground water levels at the desired configuration.

NPL Rank: 880

RAYTHEON CORP., CA

First Remedial Action
June 9, 1989

The Raytheon Corp. site is one of three Superfund sites that are being remediated concurrently. The other two are Fairchild Semiconductor (Mt. View) and Intel (Mountain View Plant). The sites are located in the Middlefield/Ellis/Whisman (MEW) Study Area in Santa Clara County in the city of Mountain View, California. Land use in the area is primarily light industrial and commercial, with some residential areas. There are no natural surface drainage features within or surrounding the site; most of the runoff is intercepted by a storm drain system and discharged to an off-site creek. Various industrial activties were conducted in the vicinity of the site including semiconductor manufacturing, metal finishing operations, parts cleaning, aircraft maintenance, and other activities requiring the use, storage, and handling of a variety of chemicals, particularly solvents. Site investigations at several of these facilities during 1981 and 1982 revealed significant contamination by toxic chemicals, primarily VOCs, in soil and ground water. The primary causes of the contamination were leaking storage tanks and lines, and poor management practices. Before and during additional site investigations, which were conducted under a 1985 Consent Order, interim clean-up activities were conducted at the site by Fairchild, Intel, and Raytheon. Clean-up actions included tank removals, soil removal and treatment, well sealing, construction of slurry walls, and hydraulic control and treatment of local ground water. The primary contaminants of concern affecting the site are VOCs including PCE, TCE, TCA, toluene, and xylenes, and other organics including phenols.

The selected remedy for this site includes *in situ* vapor extraction with treatment by vapor phase GAC of contaminated soil found within the Fairchild and Raytheon slurry walls. There may be some limited soil excavation and treatment by aeration for some areas outside of the slurry walls, with on-site disposal of residues in the excavated area; ground-water pumping and treatment using air stripping, and in some cases liquid phase GAC, with emissions controls consisting of GAC vapor phase carbon units, followed by reuse of the ground water (reuse options including reinjection are being developed) and, if necessary, discharge to surface water; sealing of any conduits or potential conduits to protect the deep aquifer; and ground-water monitoring. The present worth cost for this remedial action is $49,000,000 to $56,000,000, which includes O&M costs.

Performance Standards or Goals

The clean-up goals for soil are based on ensuring the success of the ground-water clean-up goal (attaining MCLs) in the shallow aquifers. Individual goals include TCE 1 mg/kg inside the slurry walls and TCE 0.05 mg/kg outside the slurry walls. Ground-water clean-up goals for the shallow aquifers, which are not currently used for drinking water, are based on MCLs and a 10^{-4} to 10^{-5} excess cancer risk and include TCE 5 ug/l (MCL). Goals for the deep aquifers, which are used for drinking water, are based on a 10^{-6} cumulative cancer risk and include TCE 0.8 ug/l. Attainment of these levels will also ensure cleanup of other VOCs to at least their respective MCLs.

Institutional Controls

Not applicable.

Group: 7(F)

SACRAMENTO ARMY DEPOT, CA

First Remedial Action
September 29, 1989

The 485-acre Sacramento Army Depot (SAAD) site, 7 miles southeast of downtown Sacramento, California, is surrounded by land zoned as commercial and light industrial property. SAAD is an electronic maintenance and repair depot consisting of storage, maintenance, and office facilities. Present operations include shelter repair, electro-optics equipment repair, metal plating, and treatment of metal plating wastes. From approximately 1947 to 1972 paint sludges, oil, grease wood, trash, solvents and other industrial wastes were burned and disposed of on site in burn pits. SAAD has since removed most of the burned material from the burn pits. The burn pits were subsequently covered with soil and revegetated. Ground-water samples, collected by SAAD from 1981 to 1984, indicated that several chemical compounds were present at levels above drinking water standards in two areas. The primary contaminants of concern affecting the ground water are VOCs including TCE and PCE.

The selected remedial action for this interim remedy includes ground-water pumping and treatment using ultraviolet light/chemical oxidation followed by discharge to the regional treatment plant and industrial reuse of the treated ground water. The estimated capital cost of the remedy is $1,764,000 with an estimated annual O&M cost of $264,000.

Performance Standards or Goals

The overall quality of the ground water will be restored to meet current drinking water standards for TCE 5 ug/l (MCL) and for PCE 4 ug/l (state action level).

Institutional Controls

Not applicable.

NPL Rank: 390

SAN FERNANDO VALLEY (Area 1), CA

Second Remedial Action
June 30, 1989

The San Fernando Valley Basin (SFVB) Area 1 site is one of four Superfund sites (including SFVB Areas 2, 3, and 4) being remediated as one large site. The SFVB lies within the approximately 328,500-acre Upper Los Angeles River area. This remedial action is for the Burbank Well Field operable unit of the SFVB Area 1 site, located within the city of Burbank, California, and addresses a portion of the overall ground-water problem in the SFVB Areas 1, 2, 3, and 4 sites. The SFVB aquifer is an important source of drinking water for approximately 600,000 residents in nearby cities and is also used for commercial and industrial purposes. Contaminated ground water is difficult to replace in this area because water from the metropolitan water district, an alternate source of drinking water, may not always be available due to periodic drought conditions and state and federal water rights issues. Contaminated ground water in the SFVB wells was first discovered in 1980. Results of a ground-water monitoring program conducted from 1981 through 1987 revealed approximately 50 percent of the water supply wells in the eastern portion of the SFVB were contaminated with TCE and PCE at concentrations exceeding state and federal drinking water standards. All of Burbank's production wells have been shut down due to this VOC contamination. In 1987, the primary contaminant TCE was found in concentrations exceeding State Action Levels (SALs) in 48 percent of the SFVB's 120 production wells, and PCE levels exceeded SALs in 18 percent of the SFVB wells. In 1987, EPA selected a remedy to address another operable unit in Area 1, specifically the threat of contaminated public water supply wells located in the city of North Hollywood. The selected remedy for the North Hollywood operable unit included the construction of an extraction and aeration facility to pump and treat contaminated ground water in the North Hollywood area. The facility has been operational since March 1989. The remedy selected for the Burbank operable unit will control the migration of contaminated ground water in the SFVB where additional downgradient public water supply wells are threatened by contamination and will aid in aquifer restoration in the immediate Burbank area. The primary contaminants of concern affecting the ground water are VOCs including TCE and PCE.

The selected remedial action for this site includes pumping and treatment of ground water contaminated with TCE exceeding 100 ug/l or PCE exceeding 5 ug/l using air or stream stripping, with vapor phase GAC adsorption units if air stripping is used, and discharge to the municipal water supply distribution system, and ground-water monitoring. The estimated present worth cost for this remedial action is $69,000,000, which includes an estimated present worth O&M of $43,900,000 (for a 20-year period).

Performance Standards or Goals

The ground water will be treated to attain MCLs including TCE 5.0 ug/l, and State Action Levels (SALs) including PCE 4.0 ug/l for treatment plant effluent concentrations.

Institutional Controls

Not applicable.

NPL Rank: 306

SOUTH BAY ASBESTOS AREA, CA

Second Remedial Action - Final
September 29, 1989

The South Bay Asbestos Area site is at the northern end of the Santa Clara Valley and at the southern end of the San Francisco Bay, in San Jose, California. The 550-acre site includes the community of Alviso in the city of San Jose and neighbors a national wildlife refuge, marshland, and wetlands which support several endangered and threatened species. The land surrounding Alviso has been artificially raised with soil and debris fill, some containing asbestos to offset the effects of subsidence. From 1953 to 1982, the site operated as an asbestos-cement pipe manufacturing plant with asbestos-contaminated waste being disposed of on site in three landfills. In 1983, the state collected soil samples which revealed that asbestos was randomly distributed throughout Alviso, including the Alviso Rim levee. The state also determined that the Guadulupe River levee contained asbestos-contaminated waste debris and soil. Contaminated soil from the levee was removed and several emergency removal actions followed to reduce exposure to asbestos. To address the asbestos contamination at the site, EPA divided remedial activities into two ROD. The first ROD addressed contamination at the rim levee. This second and final ROD addresses the asbestos contamination found at the remainder of the site. The primary contaminant of concern affecting the soil, debris, and air is asbestos.

The selected remedial action for this site includes paving approximately 128,500 square yards of an asbestos-contaminated truck yard and industrial yard; controlling dust emissions through monthly wet sweeping of streets; off-site disposal of asbestos-contaminated debris; air monitoring; and implementation of deed restrictions and other institutional controls. The estimated present worth cost for this remedial action is $7,561,000 which includes annual O&M costs of $134,900 for 30 years.

Performance Standards or Goals

Paving will be required for target areas with high potential for soil disturbance and for areas which are found to contain greater than one area percent asbestos by polarized light microscopy.

Institutional Controls

Deed restrictions and other institutional controls will be implemented.

REGION 10
(Alaska, Idaho, Oregon, Washington)

NPL Rank: 394

COMMENCEMENT BAY, NEARSHORE/TIDEFLATS, WA
Second Remedial Action
September 30, 1989

The Commencement Bay, Nearshore/Tideflats site is in Tacoma, Pierce County, Washington at the southern end of the main basin of Puget Sound. The site encompasses an active commercial seaport and includes 10 to 12 square miles of shallow water, shoreline, waterways and adjacent land. Site contamination is the result of a long history of industrial activity in the area. More than 281 active industrial facilities are in the area and approximately 34 of those are NPDES permitted dischargers. Releases of hazardous substances to the marine environment have resulted in contamination of bottom sediment in the waterways of the Tideflats Industrial Area, and along the shoreline in the Nearshore Area. This ROD represents two of six operable units for the site and will address source control and marine sediment contamination in the Nearshore/Tideflats environment. Eight problem areas are being addressed independently by this remedy. The remaining operable units will address remedial response to releases of hazardous substances associated with the Tacoma tar pits and the ASARCO Tacoma smelter. The primary contaminants of concern affecting the sediment are organics including PCBs and PAHs, and metals including arsenic, mercury, lead, and zinc.

The selected remedial action for this site includes an 8-year active clean-up phase for source control and sediment remediation, and a 10-year natural recovery phase. Source control remediation includes the identification and control of sources of contamination into the marine environment at the site. Sediment remediation includes a combination of natural recovery for areas expected to recover naturally within a 10-year period after source control measures are implemented, and the utilization, as appropriate, of four active sediment control alternatives to remediate approximately 1,181,000 cubic yards of contaminated sediment. The four sediment confinement options include *in situ* capping, (placement of clean material on top of existing substrate), confined aquatic disposal (removal of contaminated sediments with confined disposal in shallow or open-water aquatic environments using capping with clean dredged material), confined nearshore disposal (removal and confined disposal in the nearshore environment with capping and diking), and removal and upland disposal (transferring dredged material to a land-based confinement facility. In addition, the remedy will implement site use restrictions and source and sediment monitoring. The estimated total cost for sediment remediation at the site is $32,300,000, which includes O&M costs for 10 years. Costs associated with source control activities are not included in this ROD because of the difficulty in determining what proportion of total source-related cost can be attributed directly to achieving remedial objectives.

Performance Standards or Goals

Sediment quality objectives will be achieved within 10 years following source control in each problem area. Sediment clean-up levels were developed for each of the confinement technologies using the apparent effects threshold (AET) approach. An AET is the sediment concentration of a chemical above which statistically significant biological effects are always observed. A sediment clean-up level of 150 ug/kg was derived for PCBs to attain a fish tissue concentration objective of 36 ug/kg which translates to a 10^{-5} individual lifetime risk factor for fish consumption. Other specific sediment

quality objectives include arsenic 57 mg/kg, lead 450 mg/kg, and PAHs 17,000 ug/kg.

Institutional Controls

Site use restrictions will consist mainly of public warnings and educational programs intended to reduce potential exposure to site contamination, particularly ingestion of contaminated seafood.

NPL Rank: 918

NORTHSIDE LANDFILL, WA

First Remedial Action - Final
September 30, 1989

The 345-acre Northside Landfill is in a mixed residential and agricultural area, in the northwest corner of the city of Spokane, Spokane County, Washington. The landfill has been used since the 1930s by the city of Spokane and a variety of private and public haulers for disposal of residential and light commercial refuse. The landfill is divided into four disposal units; refuse unit, a grease skimmings unit, an old open burn unit, and a sewage sludge unit. Only the refuse unit is active; however, this unit is scheduled to close by 1992. The western one third of the landfill lies over the large Spokane Valley-Rathdrum Prairie Aquifer (SVRPA). In 1978, EPA designated SVRPA as a sole source of water supply for the Spokane-Coeur d'Alene area. Investigations conducted in 1981 and 1983 indicated the presence of VOCs beneath the site and in off-site residential wells located northwest of the landfill. The city immediately supplied the 19 affected residences with bottled water and has since extended municipal water lines to the area. The primary contaminants of concern affecting the ground water are VOCs including PCE, TCA, and TCE. In addition, iron and lead exceed the secondary drinking water standards off site.

The selected remedial action for this site includes immediate closing of the inactive units of the landfill with final closing of the active portion by 1992; capping all disposal units; constructing an interim pumping and treatment facility for ground-water remediation until landfill closure effectively reduces contaminants to below the MCLs, followed by off-site discharge of treated water into the Spokane River; ground-water monitoring; providing an alternate supply of drinking water to residences affected by the contaminated ground water; implementing institutional controls to restrict site access, protect the landfill cap, and prevent construction of domestic wells in the contaminated plume; and controlling landfill gas emissions. The estimated present worth cost of this remedy is $30,000,000.

Performance Standards or Goals

The selected remedy is expected to control the migration of ground-water contaminants off site and meet MCLs or AWQC, whichever is applicable. Chemical-specific ARARs for ground water include TCA 200 ug/l (MCL) and TCE 5 ug/l (MCL). The performance criteria for PCE is stated as 5 ug/l.

Institutional Controls

Institutional controls will address the installation of new wells within the contaminated plume and restrict site access.

NPL Rank: 694

NORTHWEST TRANSFORMER, WA

First Remedial Action - Final
September 15, 1989

The Northwest Transformer site (NWT), a 1.6-acre former salvage yard, is approximately two miles south of Everson in Whatcom County, Washington. The site is in a rural area and is bordered by low-density residential areas to the north and east, and farmland to the south. The NWT site was used for transformer storage and salvage. Storage and salvage operations were conducted in an on-site barn where PCB-contaminated dielectric fluid was drained from the transformers before dismantling. Transformer casings and associated parts were incinerated on site, and some of the recovered oil was burned to heat the barn. Spillage and leakage of PCB-laden oil on the ground appeared to have occurred frequently, and some oil apparently was dumped directly into a seepage pit on site, contaminating soil and possibly ground water. EPA performed several soil and ground-water sampling studies between 1977 and 1985 and identified PCB concentrations as high as 38,000 mg/kg. In 1985, EPA performed an Immediate Removal Action to address the danger posed by PCB contamination, including removing 1,400 cubic yards of PCB-contaminated soil and debris, 6,660 gallons of PCB-contaminated liquids, several contaminated transformer casings, monitoring ground-water, and imposing site access restrictions. In 1987, sampling during an RI/FS identified sufficient PCB contamination in the soil to warrant further site remediation. This operable unit includes investigations of ground water and the on-site barn to determine whether either is sufficiently contaminated to merit a subsequent operable unit. The primary contaminant of concern affecting the soil is PCB.

The selected remedial action for this site includes excavation, consolidation, and treatment of approximately 1,200 cubic yards of soil with a PCB concentration greater than 10 mg/kg using *in situ* vitrification; placement of two feet of clean fill over the entire site; abandonment of an on-site well; and ground-water monitoring and sampling of the wood in the on-site barn to determine if a second operable is necessary to address PCB-contamination in these media. The estimated present worth cost for this remedial action is $771,000 for soil treatment only with no O&M required.

Performance Standards or Goals

The contaminated soil will be treated until the concentration of PCBs in the remaining residue is less than 1 mg/kg. This concentration is below the TSCA-required treatment concentration of 2 mg/kg PCBs in contaminated materials.

Institutional Controls

Not applicable.

APPENDIX

D

EPA Annual Report to Congress: Progress Toward Implementing CERCLA at EPA Facilities As Required by CERCLA Section 120(e)(5)

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Appendix
D

1.0 Introduction

Section 120(e)(5) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, requires each department, agency, or instrumentality responsible for compliance with section 120 of CERCLA to furnish an annual report to the Congress concerning its progress in implementing the requirements of that section.

Requirements of CERCLA Section 120(e)(5)

The annual reports to Congress required by section 120(e)(5) of CERCLA are to include, but need not be limited to, each of the following items:

(A) A report on the progress in reaching interagency agreements under CERCLA section 120(e)(2);

(B) The specific cost estimates and budgetary proposals involved in each interagency agreement;

(C) A brief summary of the public comments regarding each proposed interagency agreement;

(D) A description of the instances in which no agreement was reached;

(E) A report on progress in conducting remedial investigations and feasibility studies required by CERCLA section 120(e)(1) at National Priority List (NPL) sites;

(F) A report on conducting remedial actions at NPL sites; and

(G) A report on progress in conducting remedial action at facilities which are not listed on the NPL.

The annual report is also required to contain a detailed description, on a state-by-state basis, of the status of each facility subject to this section, including a description of the hazard presented by each facility, plans and schedules for initiating and completing response actions, enforcement status (where applicable), and an explanation of any postponement or failure to complete response actions.

Environmental Protection Agency Program

The Environmental Protection Agency (EPA) has given high priority to maintaining compliance with CERCLA requirements at its own facilities. To ensure compliance, EPA uses its Environmental Compliance Program to heighten regulatory awareness, identify potential compliance violations, and coordinate appropriate corrective action schedules at its laboratories and other research facilities.

As part of EPA's commitment to environmental compliance, the Environmental Compliance Program has instituted an environmental auditing program to accomplish many of its compliance objectives. Audits are conducted at EPA facilities to identify potential regulatory violations of federal (including CERCLA), state, and local statutes. By performing these detailed facility analyses, EPA is better able to assist the facilities in complying with environmental regulations.

2.0 EPA Progress in Meeting Requirements of CERCLA Section 120 During Fiscal Year 1989

EPA is required to report on progress in meeting the requirements of CERCLA section 120 in terms of interagency agreements, remedial investigation/feasibility studies at NPL sites, and remedial actions at NPL and non-NPL sites.

- EPA does not have any facilities listed on the National Priorities List (NPL). As a result, EPA has not entered into any Interagency Agreements (IAGs) for remediation that would require reporting under CERCLA sections 120(e)(5)(A), (B),(C), or (D).

- EPA did not have any facilities placed on the NPL during fiscal 1989, and has not been involved with remedial investigation/ feasibility study (RI/FS) or remediation activities that would require reporting under CERCLA sections 120(e)(5)(E) and (F).

- For purposes of CERCLA section 120(e)(5)(G), only the following facilities with past releases or documented contamination will be included in the discussion.

a. Environmental Photographic Interpretation Center, Virginia

The EPA Environmental Photographic Interpretation Center (EPIC) is located on the Army's Vint Hills Farm Station in Warrenton, Virginia. The Army, as owner of the facility, has conducted a PA/SI and a contamination survey. The status of NPL ranking and subsequent remedial action by the Army is being researched.

EPIC has submitted a PA per direction from the Environmental Compliance Program to ensure that its past activities are disclosed for congressional and public review.

b. Region 2 Environmental Service Division Laboratory, New Jersey

The Region 2 laboratory occupies several buildings on the Raritan Depot installation in Edison, New Jersey. Originally, the Department of Defense (DOD) owned the site and used it for munitions testing and storage. GSA took possession of the property in 1961 and in 1988 transferred 165 acres to EPA. Although residual contamination from past DOD and GSA activities persists at the facility, EPA has not stored, released, or disposed of any hazardous substances on the property.

EPA Region 2 is in the process of conducting (using DOD Defense Environmental Restoration Program funds) a listing site insepection (LSI) needed to rank the facility under the HRS II. If placed on the NPL, the facility will be remediated as required by EPA Region 2. If NPL placement does not occur, the facility will be remediated, as mandated by CERCLA, in accordance with all state and local clean-up criteria.

c. Gulf Breeze Laboratory, Florida

The Gulf Breeze facility submitted its preliminary assessment on April 17, 1988. Testing revealed that the contaminant concentrations are below the levels of concern. Regional review of the findings will determine what subsequent actions are required.

d. Region 10 Environmental Services Division Laboratory, Washington

The Region 10 laboratory is located on an abandoned Navy submarine net depot and open storage area. A PA has been conducted and an SI has been completed: The SI indicated that current trace levels of contamination offer no threat to public health or the environment, regardless of the pathway under consideration.

e. Region 10 Washington State University, Washington

During the 1970s, Washington State University provided a research plot for use by EPA's Office of Research and Development. EPA utilized the plot to study pesticide degradation. The research was terminated in 1980. Although this site is not identified in the federal facilities docket and no data suggests any significant

migration of hazardous substances offsite, the Agency is in the process of conducting a PA for the research plot. Regional review of this PA will determine the need for further action.

3.0 State-by-State Status of EPA Facilities Subject to Section 120 of CERCLA

EPA has identified 14 of its facilities that it believes are subject to the requirements of CERCLA section 120. These facilities along with an indication of the type of problem, and progress of activities required by CERCLA are presented by state in Exhibit D-1.

EXHIBIT D-1
STATUS OF EPA FACILITIES ON THE FEDERAL AGENCY HAZARDOUS WASTE COMPLIANCE DOCKET

State	EPA Facility	Known or Suspected Problems	Project Status
AR	Combusion Research Facility	No contamination	• PA submitted 04/89
CO	National Enforcement Investigation Center	No contamination	• PA submitted 04/88
FL	Gulf Breeze Laboratory	Suspected contamination	• PA submitted 04/88; Regional review of PA will determine need for SI
IL	Region 5 Environmental Services Division Laboratory	No contamination	• PA submitted 04/88
MD	Region 3 Environmental Services Division Laboratory	No contamination	• PA submitted 04/88
MO	EPA Mobile Incineration at Denny Farms	No contamination from mobile incinerator	
MO	Region 7 Environmental Services Division Laboratory	No contamination	• PA submitted 04/88
NJ	Region 2 Environmental Services Division Laboratory	Contamination present	• PA/SI completed by DOD for the Raritan Depot. No contamination caused by EPA • EPA Region 2 will conduct a Listing Site Investigation prior to ranking Edison according to HRS II.
OH	AWBERC Facility	No contamination	• PA submitted 04/88
OH	Center Hill	No contamination	• PA submitted 04/88
OH	Testing and Evaluation Facility	No contamination	• PA submitted 04/88
RI	Narragansett Environmental Research Laboratory	No contamination	• PA submitted 04/88
VA	Environmental Photographic Interpretation Center/Vint Hills Facility	Minor contamination due to EPA activities	• Suspected contamination due to past disposal activities of Army and EPA. • EPA will implement appropriate clean-up action upon DOD completion of the RI/FS. • PA submitted by EPA for EPIC. Army has submitted PA/SI for the entire Vint Hills facility.
WA	Region 10 Environmental Services Division Laboratory	Minor contamination due to EPA activities	• Suspected contamination from Navy activities before EPA ownership • PA submitted, SI completed; Region is evaluating SI results for subsequent investigations and scoring under HRS II

Source: This information was compiled for the Report by the Environmental Health and Safety Division of EPA.

APPENDIX

E

Report of the EPA Inspector General

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

THE INSPECTOR GENERAL

MEMORANDUM

SUBJECT: Audit Report No. EISFFO-11-0018-1100026
Review of Fiscal Year 1989 Superfund Report to Congress

FROM: John C. Martin
Inspector General (A-109)

TO: William K. Reilly
Administrator (A-100)

Summary of Results

We have completed our review of the Environmental Protection Agency's (EPA) report to Congress on Progress Toward Implementing Superfund: Fiscal Year 1989 (Annual Report). Most of the portions of the Annual Report which we reviewed were reasonable and accurate. However, we have concerns about the reasonableness and accuracy of sections of the Annual Report containing information on the pre-remedial, removal, and remedial programs, and on the Superfund Innovative Technology Evaluation (SITE) Program. Further, while the Report was submitted late to Congress, the Agency has made improvements in the process used to prepare the Report.

Scope and Objectives

The objectives of our review were to determine whether the Annual Report was reasonable and accurate, as required by Section 301(h)(2) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

We began our review of an early draft of the Annual Report on December 6, 1989, at EPA Headquarters. We completed our review in August 1990, by analyzing the final changes made to the Annual Report.

Our work focused on fiscal year (FY) 1989 activities. We performed detailed audit work to verify the accuracy of selected key information presented in the Executive Summary and the following Annual Report sections and related Appendixes:

- 1.1: "Enforcement Program Activities;"
- 4.1: "Use and Development of Permanent Technologies;"
- 4.1.5: "90-Day Study Activities;"
- 4.3: "Report on Facilities Subject to Review Under CERCLA section 121(c);"
- 5.5.3: "Fiscal 1989 Superfund Contracting;" and

- Appendix D: "EPA Annual Report to Congress: Progress Toward Implementing CERCLA at EPA Facilities."

We also reviewed the actions taken by the Office of Emergency and Remedial Response to improve the quality of the data in the CERCLA Information System (CERCLIS). Where appropriate, we compared information in this Annual Report pertaining to FY87 and FY88 back to those prior reports.

Throughout the course of our review, we brought a number of concerns to the Report Coordinator's attention. He satisfactorily addressed all of these concerns, except the ones discussed in this report.

Except as noted below, our work was performed in accordance with the Government Auditing Standards (1988 revision) issued by the Comptroller General of the United States. Our audit was limited to verifying the reasonableness and accuracy of selected information in the Annual Report. We did not perform extensive tests to determine if internal controls are adequate.

We Found That

Key information contained in the Annual Report on the following topics was generally reasonable and accurate:

- enforcement program activities;
- the use and development of permanent technologies, including the SITE Program (except as noted below);
- activities undertaken in response to the Administrator's study, A Management Review of the Superfund Program, also called "The 90-Day Study;"
- facilities subject to review under CERCLA Section 121(c);
- Superfund contracting, especially the contract laboratory program and the Alternative Remedial Contracting Strategy;
- EPA's implementation of CERCLA at its own facilities; and
- statistics and accomplishments pertaining to FY87 and FY88.

However, we have concerns about the reasonableness and accuracy of selected CERCLIS information, some information on the SITE Program, and the Annual Report preparation process.

CERCLIS Data Quality Work Group and Monthly Data Quality Audits

Although we did not review the data in CERCLIS this year, we nevertheless remain concerned about its accuracy. This data forms the basis for much of the Annual Report sections on pre-remedial, removal, and remedial accomplishments.

In our reviews of the FY87 and FY88 Annual Reports, we identified problems with the accuracy of CERCLIS data on the pre-remedial, removal, and remedial programs. Significant portions of the accomplishments claimed in those reports were not supported by valid source documents in the regions, and some accomplishments were not recorded in the correct fiscal year. In a few cases, accomplishments were double counted in different years, or did not meet the Agency's definition of an accomplishment at all. In contrast, we found enforcement data in CERCLIS to be much more accurate.

Throughout the course of these two reviews, we brought our concerns to the attention of the Office of Emergency and Remedial Response (OERR) management. After the FY88 audit, OERR officials advised us that they were taking two corrective actions: establishing a CERCLIS Data Quality Work Group to review input controls; and performing monthly data quality audits. These actions did not occur, however, in time to impact the FY89 data.

We commend OERR for taking some actions to improve the quality and reliability of the CERCLIS data. However, based on our current audit work, we do not believe that the actions actually taken fully addressed our concerns. Specifically, the work group has not yet visited the regions to evaluate the input controls first hand, even on a sample basis. We were, however, advised that there are plans to visit three regions to, among other things, test data entry procedures. Also, the data quality audits are, for the most part, checks for logic (i.e., programming correctness) and data completeness. We do not consider these to be sufficient checks for data accuracy, because the data input to CERCLIS has not actually been verified to the source documents. It is the accuracy of the data input to CERCLIS that is of concern to us, even more than the completeness and processing of it.

OERR officials acknowledged that the work group has not done any source document data accuracy audits. They stated that the work group has focused its efforts on: (1) report select logic consistency; (2) audits of specific data groups; (3) development of specialized data quality audit reports to be used by regional staff to check on the accuracy and completeness of their data; and (4) a comprehensive audit report to measure the accuracy of CERCLIS information. These officials stated that in FY90 the regions have corrected almost 60 percent of the errors identified in this audit report at the start of the year. They attributed many of the remaining errors to problems in the downloading of financial data from the new Integrated Financial Management System.

We reviewed examples of these computer-generated audit reports. These reports help to ensure that CERCLIS entries meet the official Agency definitions of accomplishments and are complete. However, we are still concerned about the validity of the support for data entries in CERCLIS, especially since a more detailed review of the input controls themselves has not been performed.

OERR officials further stated that virtually all Superfund program management activities are based on CERCLIS data, including allocation of resources and management accomplishment reporting. These officials added that CERCLIS produces a set of monthly management reports which are used to monitor the status of virtually all aspects of the program in minute detail. In our opinion, these statements demonstrate the importance of accuracy in the CERCLIS data, because even things like the number of full time personnel each region has are based on CERCLIS information.

The OERR officials also advised us that responsibility for the accuracy of the CERCLIS data lies with the regional offices. They added that "while it is possible, and even likely, that there are some inaccuracies in the data, the constant usage of CERCLIS data for program and project management purposes minimizes the possibility of gross errors in the statistics presented in the FY89 Superfund Annual Report to Congress."

In its "Report on CERCLIS Reporting" (audit report no. E1SFF9-15-0023-0100187, dated March 12, 1990), the OIG discussed more concerns about the reliability of CERCLIS. The OIG stated that there was an absence of good controls over documentation, software changes, and testing. Documentation at the programming level was found to be poor; control over report programs was inadequate; and formal testing and acceptance procedures for new report programming or changes to old reports did not exist. The auditors concluded that material errors have arisen within CERCLIS reports, and any information being reported by the system must be considered suspect and employed cautiously.

Annual Report Section 4.1: "Use and Development of Permanent Technologies"

Annual Report section 4.1.1, "The Superfund Innovative Technology Evaluation (SITE) Program," presents Ogden Environmental Services (Ogden) as being one of seven technology developers who completed a field demonstration during FY89. However, a recent OIG audit ("The SITE Demonstration Program: Much Promise But Delayed Results," Audit Report No. E1SKF9-11-0031-0100228, dated March 28, 1990) found that Ogden had withdrawn from the SITE Program without ever doing a full-scale field demonstration.

In March 1989, Ogden performed a pilot test of its technology at an off-site location. This was not a full-scale field test at a hazardous waste site, as is normally conducted in the SITE Demonstration Program. During January 1990, we learned that Ogden was withdrawing from the SITE Program and would not demonstrate its technology. This was confirmed in the January 12, 1990, SITE Program Quarterly Status Report that shows the accomplishments and status of each SITE project. This status report never mentioned that the Ogden pilot-scale test was considered a full-scale demonstration of the technology. Further, an Ogden official advised us that they were unable to proceed with the full-scale demonstration.

We believe that the Office of Research and Development is now considering Ogden's March 1989, pilot test a full-scale demonstration. However, we believe that this is incorrect, and as a result the Annual Report is not accurate in stating that Ogden's pilot test is equivalent to a full-scale field demonstration.

Agency officials stated that the SITE Program's report to Congress for FY89 properly includes Ogden's demonstration as one of the seven field demonstrations completed that year. They maintained that the Demonstration Program occurs in many stages that are not always readily quantifiable. They added that to be consistent with the SITE Program's report to Congress, it is appropriate to retain Ogden as one of the completed demonstrations in this Annual Report.

Annual Report Preparation Process

As we found in our reviews of the last two Annual Reports, the process used to prepare this year's was not fully effective. Although this Annual Report was due to Congress January 1, 1990, it was not submitted to OMB until March 1990. One reason for this was because of the lateness in issuing prior years' reports. In fact, while the Report Coordinator was preparing the FY89 Report, he was still devoting much of his time to the FY88 Report (the FY88 Report did not go to Congress until April 1990, 15 months after it was due). Similar delays in preparing the FY87 Report slowed the FY88 process.

However, this year's process was much more efficient and effective than in the past. For example, the delivery of the draft to OMB occurred six months earlier than last year. According to the Report Coordinator, centering this year's Report around a definite theme (the Superfund pipeline, i.e., the cleanup process from site identification to actual remediation), having increased resources to work on it, and simplifying its format all contributed to a more timely and readable report. We commend the Agency on the actions taken to improve this process.

APPENDIX

F

Office of Solid Waste and Emergency Response Reply to the Report of the Inspector General

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OCT 10 1990

OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE

MEMORANDUM

SUBJECT: Draft Audit Report No. E1SFF0-11-0018 -- Draft Review of Fiscal Year 1989 Superfund Report to Congress

FROM: Don R. Clay
Assistant Administrator for Solid Waste and Emergency Response

TO: John C. Martin
Inspector General

I reviewed your draft audit report on the Fiscal Year 1989 Superfund Report to Congress. I agree that the Office of Emergency and Remedial Response (OERR) has made improvements in the process used to prepare the Report. I appreciate your commending the Agency for a much more efficient and effective Report that is more timely and readable.

I also appreciate your recognition that OERR has taken actions to improve the quality and reliability of the Comprehensive Environmental Response, Compensation, and Liability Act Information System (CERCLIS). I agree that the CERCLIS Data Quality Work Group has not done any source document data accuracy audits. The Work Group has focused its efforts on: (1) report select logic consistency; (2) audits of specific data groups; (3) development of specialized data quality audit reports to be used by Regional staff to check on the accuracy of their data; and (4) a comprehensive audit report (AUDT-26) to measure the accuracy of CERCLIS information. So far in FY90, the Regions have corrected almost 60 percent of the errors identified on AUDT-26 at the start of the year. Many of the remaining errors are due to problems in the download of financial data from the new Integrated Financial Management System.

Responsibility for the accuracy of the data lies with the Regional Offices. While no specific source document audits have been performed, virtually all Superfund program management activities are based on CERCLIS data. Superfund also produces a set of monthly management reports from CERCLIS that monitors the status of virtually all aspects of the program in minute detail. In addition, the accomplishment of certain key events are routinely and aggressively reviewed for quality assurance and control on a quarterly basis. Copies of all RODs are maintained in headquarters. Regular calls between headquarters, regional coordinators, and regions continually validate key events, such as removal starts, negotiation status, and remedial design and remedial action starts. Documentation of many of these events is available through reports, as well as reviews of the financial management system. The INSITE reporting package on the Headquarters LAN not only allows managers to view the reports, but also to call up all of the site and event specific backup data for each of the data points on the report. While it is possible, and even likely, that there are some inaccuracies in the data, the

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constant usage of CERCLIS data for program and project management purposes minimizes the possibility of gross errors in the statistics presented in the FY89 Superfund Report to Congress. I believe, therefore, that the CERCLIS data presented in the FY89 Report is the best data available.

In regard to your comments on the Superfund Innovative Technology Evaluation (SITE) Program, we understand the concerns you express regarding the status of the Ogden Environmental Services Demonstration. The Office of Environmental Engineering and Technology Demonstration, which is responsible for the SITE program, maintains that the SITE program Report to Congress, which is the source for the FY89 Report, properly includes the demonstration by Ogden as one of the seven field demonstrations completed in FY89. The demonstration program occurs in many stages that are not always readily quantifiable, and to maintain consistency with the SITE Report, we have retained Ogden Environmental as one of the completed demonstrations in the FY89 Report.

I request that you finalize your draft audit report, and we will publish it, as required by statute, as an appendix to the Annual Report.

APPENDIX

G

List of Sources

The following is a list of reference sources that were used in the preparation of this Report. Sources for data used in graphics within the text are cited on the graphics and also listed below. Other references were used for background information and also for fiscal year accomplishment data.

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