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DEFENSE ENVIRONMENTAL RESTORATION PROGRAM



ANNUAL REPORT TO CONGRESS

FOR

FISCAL YEAR 1988

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REPORT DOCUMENTATION PAGE

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1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE March, 1989	3. REPORT TYPE AND DATES COVERED Final	
4. TITLE AND SUBTITLE Defense Environmental Restoration Program Annual Report to Congress for Fiscal Year 1988		5. FUNDING NUMBERS	
6. AUTHOR(S) Office of the Deputy Assistant Secretary of Defense (Environment)		8. PERFORMING ORGANIZATION REPORT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Deputy Assistant Secretary of Defense (Environment) 206 N. Washington Street, Suite 100 Alexandria, VA 22314		10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Deputy Assistant Secretary of Defense (Environment) 206 N. Washington Street, Suite 100 Alexandria, VA 22314		11. SUPPLEMENTARY NOTES	
12a. DISTRIBUTION/AVAILABILITY STATEMENT A - Approved for public release distribution unlimited		12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) This is the third annual report to the Congress on the Defense Environmental Restoration Program (DERP) in response to the specific information requested by Section 211 of the Superfund Amendment and Reauthorization Act (SARA) of 1986. The report explains and gives the current status of: (a) the Installation Restoration Program, (b) Formerly Used Properties, (c) Other Hazardous Waste Operations, (d) Research, Development and Demonstration, and (e) Building Demolition and Debris Removal. Progress at NPL sites is included along with an explanation of the process. The second part of the report provides specific information requested in SARA concerning progress at specific sites.			
14. SUBJECT TERMS - Environmental Restoration Progress + Pollution Prevention + Defense Priority Model + Program Costs		15. NUMBER OF PAGES 123	
17. SECURITY CLASSIFICATION OF REPORT Unclassified Unlimited		18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	
19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified		20. LIMITATION OF ABSTRACT UL	

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(ENVIRONMENT)
WASHINGTON, DC 20301-8000



FORWARD

This is the third Annual Report to the Congress on the Department of Defense Environmental Restoration Program. This report describes progress made in cleaning up hazardous waste sites and conducting other related activities during Fiscal Year 1988.

The report provides information requested by the Superfund Amendments and Reauthorization Act of 1986, PL 99-499 (SARA) in Section 120, Federal Facilities, and in Section 211, Department of Defense Environmental Restoration Program (codified as Title 10, United States Code (USC), Sections 2701-2707, and 10 USC 2810).

This document is divided into two major parts. Part I summarizes program status and highlights significant accomplishments; Part II provides specific information required by SARA.

Additional information regarding the program can be obtained from the Office of the Deputy Assistant Secretary of Defense (Environment), The Pentagon, Washington, DC. 20301-8000. Site specific information on environmental restoration activities can be obtained directly from installation commanders.

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EXECUTIVE SUMMARY

The Department of Defense (DoD) made significant progress during Fiscal Year 1988 in cleaning up hazardous waste sites and correcting other environmental problems under its Environmental Restoration Program. The \$404 million appropriated by Congress was used for Installation Restoration Program (IRP) activities at military installations and formerly used DoD properties and for hazardous waste minimization initiatives.

As of September 30, 1988, 8,139 sites at 897 installations had been included in the IRP. Preliminary Assessments/Site Inspections (PA/SI) had been completed at 7,711 sites; Remedial Investigations/Feasibility Studies (RI/FS) had been completed at 1,485 sites; and Remedial Designs/Remedial Actions (RD/RA) had been completed at 216 sites. Highlights of Fiscal Year 1988 include:

- Completion of RD/RA projects at 90 sites, (including remedial actions, interim actions, removals, and long term monitoring). Types of actions undertaken include cleanups of lagoons and disposal pits, treatment of contaminated soil, installation of soil and ground water treatment systems, and provision of alternate water supplies. Completion of RI/FS work at 389 sites, which will lead to follow on remedial activities.
- Development, with the Environmental Protection Agency (EPA), of model language for agreements at installations listed on the National Priorities List (NPL). Interagency Agreements are required under the Superfund Amendments and Reauthorization Act of 1986 (SARA), Section 120, however we expect our agreements to be more comprehensive than required by law. Agreement negotiations were initiated with EPA and States at 23 installations, with signature of four agreements expected in early 1989, and six others nearing completion.
- Addition of 158 installations and 2,974 sites to the program. These additions are primarily smaller installations such as National Guard and Reserve properties. Sites were added to the program due to: reclassification of contaminated areas into individual sites; including new sites at installations already in the program; and discovery of sites at newly included installations. Many of the sites are not expected to require an RI/FS.
- Continued emphasis on work at the 29 installations that are final listed on the NPL, and the 19 additional proposed for listing. Interim RD/RA or removal actions have been taken at 36 of these installations to date. Technical Review Committees, typically comprised of DoD, EPA and State representatives with input from local citizens have been established at most NPL installations.
- Cooperative efforts with EPA and the Department of Energy for development and demonstration of innovative clean up technologies.

DoD expects to continue its strong progress in the IRP in Fiscal Year 1989, with emphasis on increasing the pace of clean up activities and entering into agreements with EPA and State agencies to facilitate cleanups at NPL sites.

In hazardous waste minimization, DoD continued its national leadership role. Key FY 1988 initiatives were:

- Development of a hazardous materials management policy directive which will enhance overall quality of the acquisition process and reduce use of hazardous materials.
- Submitting a report to Congress on DoD Hazardous Waste Minimization, outlining progress being made by the DoD Components.

PART I

PROGRAM STATUS AND ACCOMPLISHMENTS

INTRODUCTION

The Defense Environmental Restoration Program was established in 1984 to expand existing efforts to clean up contamination from hazardous waste sites.

The Superfund Amendments and Reauthorization Act of 1986 (SARA) provided continuing authority for the Secretary of Defense to carry out this program in consultation with the Environmental Protection Agency (EPA). Executive Order 12580 on Superfund Implementation, signed by the President on January 23, 1987, delegated authority to the Secretary of Defense for carrying out the Department's Environmental Restoration Program within the overall framework of the SARA and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). Funding for the Defense Environmental Restoration Program is provided by the Defense Appropriations Act.

The Defense Environmental Restoration Program consists of three major elements:

- Installation Restoration Program (IRP)—to identify, investigate, and clean up contamination from hazardous substances and wastes on installations and at formerly used properties.
- Other Hazardous Waste Operations (OHW)—to fund studies and the purchase of equipment to minimize the generation of hazardous wastes. This element also includes research, development and demonstration of technology related to hazardous waste.
- Building Demolition and Debris Removal (BDDR)—to demolish and remove unsafe buildings, structures and debris at installations and at formerly used properties.

The DERP is managed centrally by the Office of the Secretary of Defense and is carried out by the DoD Components, (i.e. the Military Services and the Defense Logistics Agency). The Deputy Assistant Secretary of Defense (Environment) provides policy direction and oversight for the program. Each Component retains the lead for activities at its installations.

INSTALLATION RESTORATION PROGRAM PROGRESS

The Installation Restoration Program is carried out consistent with procedures of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR 300). The basic steps are as follows:

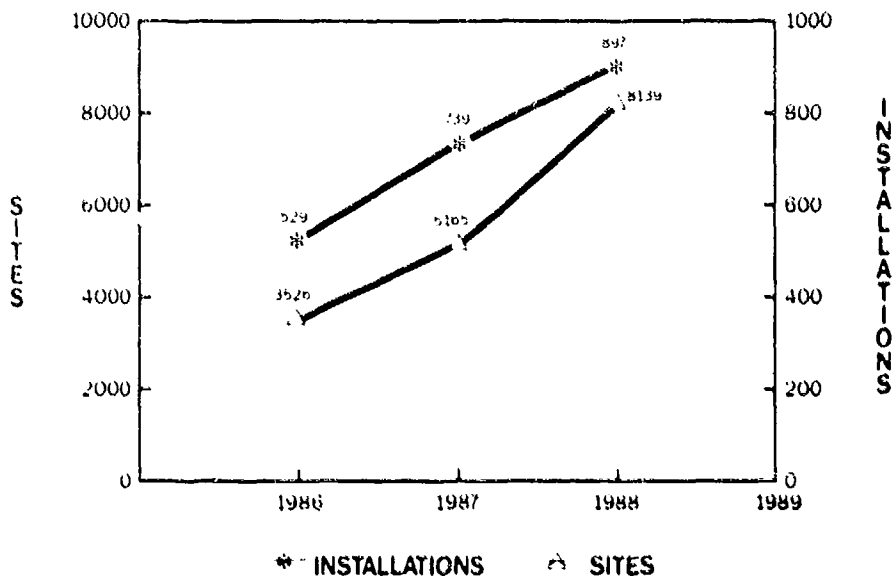
- Preliminary Assessment/Site Inspection (PA/SI)—an installation-wide study to determine whether there are sites on the installation that may pose hazards to the public health or environment.
- Remedial Investigation/Feasibility Study (RI/FS)—a comprehensive investigation of sites identified in the PA/SI to determine the nature and extent of contamination and the appropriate remedial action(s).
- Remedial Design/Remedial Action (RD/RA)—design and implementation of the selected remedial actions to address problems at the site.

A more complete description of the NCP process is provided in Appendix C.

The number of installations included in the IRP has been increasing steadily since the program's inception. Emphasis was initially placed on large, industrial facilities with the highest probability for contamination, consistent with the Department's worst first policy. Efforts have expanded yearly to include smaller installations with lower hazard potential. Also, installation re-assessments initiated to satisfy SARA requirements have, and will continue to identify additional sites not previously included in the program. Figure I-1 shows this increase in installations included in the IRP and the corresponding increase in the number of potentially contaminated sites identified. By the end of Fiscal Year (FY) 1986, 3,526 sites at 529 installations had been identified. This rose to 5,165 sites at 739 installations in FY 1987, and now stands at 8,139 sites at 897 installations. The installations which were added in FY 1988 were small, non-industrial properties. Sites were added to the program due to: reclassification of contaminated areas into individual sites; inclusion of new sites at installations already in the program, and discovery of sites at newly included installations. This program growth trend is expected to level off in the next few years. It should be noted that many potential sites are not expected to warrant RI/FS work.

Figure I - 1

INSTALLATIONS/SITES INCLUDED IN IRP



Program status at the end of FY 1988, reported by number of sites in each step of the NCP process is shown in Table I-1. These statistics indicate the large effort expended to date on PA/SI and RI/FS activities, with growing numbers of RD/RAs completed and in progress. As studies approach completion, future RD/RA requirements have, and will continue to be identified. A discussion of the status of each DoD Component's program appears later in this report. It should be noted that site status as reported in Table I-1 is based on funding and project initiation dates. Actual project execution may vary.

TABLE I-1
INSTALLATION RESTORATION PROGRAM STATUS
 Summary by DoD Component
 (September 30, 1988)

DoD Component	Total Number of		Number of Sites ¹							
	Instal- lations	Sites	PA/SI		RI/FS			RD/RA		
			C	U	C	U	F	C ²	U	F
Army	401	3208	3054	7	300	205	68	132 ³	281	57
Navy	224	1481	1344	113	233	963	36	10	94	463
Air Force	249	3380	3251	100	943	1604	56	73	883	472
Defense Log. Agency	23	70	62	1	9	16	2	1	8	12
GRAND TOTAL	897	8139	7711	221	1485	2788	162	216	1266	1004

C = Cumulative total sites completed

U = Number of sites underway

F = Number of sites scheduled for future study/action

¹ Site status is based on funding and initiation dates. Actual project execution may vary.

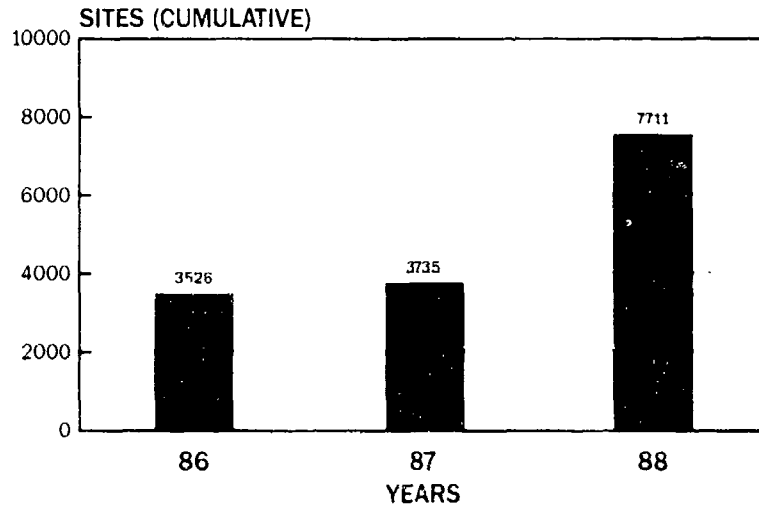
² RD/RAs completed to date consist primarily of removals and interim actions which are part of a larger, multi-year response action. They range in complexity from small surface cleanups to major soil and ground water treatment systems.

³ Numerous interim actions at Rocky Mountain Arsenal, CO are counted as one RD/RA.

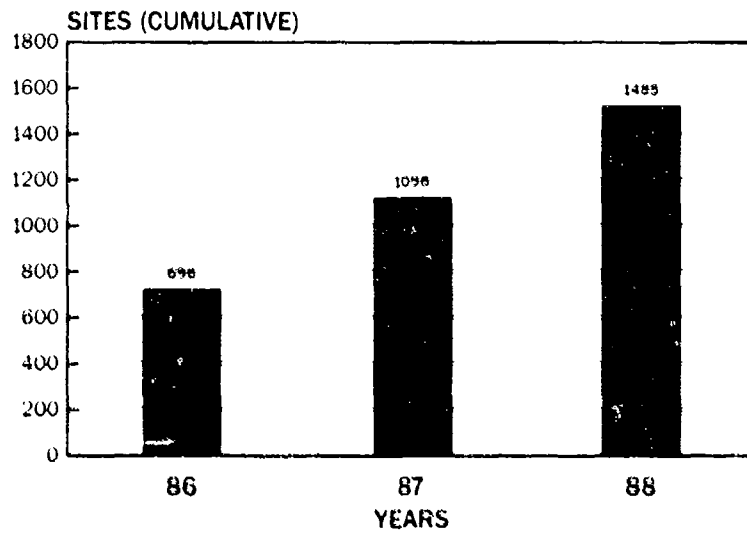
⁴ Table I-2 summarizes remedial activities conducted during FY 1988.

Figure I-2

PA/SI COMPLETIONS



RI/FS COMPLETIONS



RD/RA COMPLETIONS

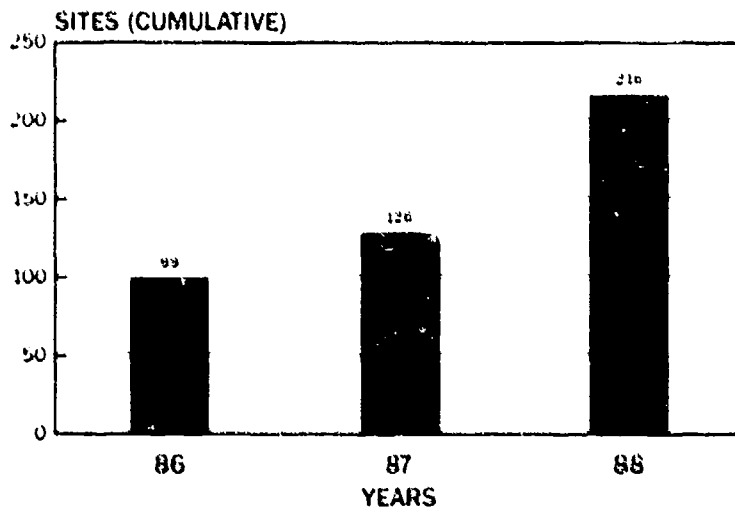


Figure I-2 depicts progress made in each step of the program over the past few years. By the end of FY 1988, PA/SI work had been completed at 7,711 sites. This represents a more than doubling of completions in PA/SI work since FY 1986. Fiscal Year 1988 efforts focused on conducting PA/SIs at smaller installations such as National Guard and Reserve installations. This includes many of the facilities that appeared on the Federal Agency Hazardous Waste Compliance Docket, published in February 1988. The SARA requires that EPA establish the Docket and update it every six months. All facilities listed on the Docket must have a preliminary assessment. By the end of FY 1988, DoD had completed PAs at all original Docket installations.

Sites with RI/FSs and RD/RAs underway or completed are rapidly increasing. Total RI/FS completions rose from 696 sites in FY 1986; to 1,096 in FY 1987, and are now at 1,485. This represents a 25 to 35 percent increase each year.

Cleanup activities also increased. By the end of FY 1986, cleanup projects had been undertaken at 99 sites. Since that time 117 sites have been cleaned up for a total of 216. The 216 RD/RA completions include activities which vary in cost and complexity—from small surface removals to major soil and ground water treatment systems. Most of the DoD RD/RA actions to date would be formally classified as removal or interim actions, and are part of a larger, multi-year response action.

TABLE I-2

SUMMARY OF FY 1988 RD/RA ACTIVITIES

Type of Actions	No. of Installations
Alternate Water Supply/Treatment	3
Incineration	1
Site Treatment/Remediation	5
Decontamination	1
Waste Removal	16
Ground Water Treatment	2
TOTAL	28

Notes:

- Remedial activities were undertaken at 90 sites on 25 installations.
- At some installations more than one type of action was taken, therefore increasing the total to 28 installations.

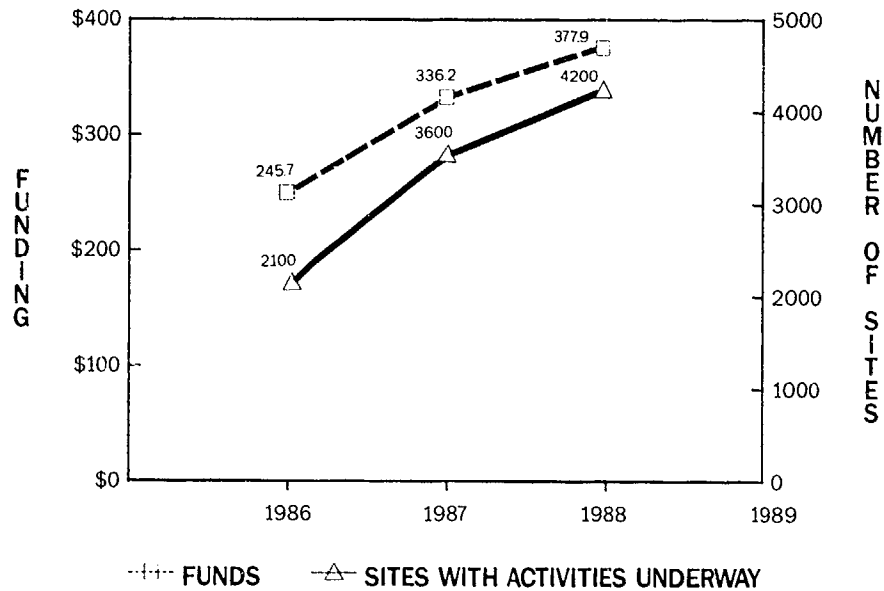
Remedial activities conducted during FY 1988 are summarized in Table I-2. Remedial activities were undertaken at 90 sites at 25 installations. At some installations more than one type of action was taken. Most projects involve excavation of buried waste, tanks, and/or contaminated soil. High priority alternate water supplies were provided at Tinker Air Force Base (AFB), OK; McClellan AFB, CA, and Twin Cities Army Ammunition Plant (AAP), MN, where drinking water was affected by contamination. A new ground water treatment system was installed at Twin Cities AAP and an existing system was expanded. At McClellan AFB, increased capacity was added to an operating ground water treatment system.

There are 1,266 cleanups and associated activities (such as providing safe drinking water to residents near installations whose wells are affected by contamination) underway. DoD expects its remedial activities to steadily increase over the next few years, and peak in the mid-1990s. This trend is beginning, as DoD allocated 52% of its FY 1988 IRP site budget to RD/RA, up from 29% in FY 1986.

Increases in funding each year have allowed DoD to increase the number of locations where work is underway. Figure I-3 shows a doubling between FY 1986 and FY 1988 in the number of sites where work is underway.

Figure I-3

IRP FUNDING AND ACTIVITY LEVELS



(FUNDING IN MILLIONS)

The overall progress in achieving IRP goals is the result of efforts by the environmental professionals within the DoD Components, from headquarters level through their respective staffs and commands and ultimately to those at the installation level. An analysis of progress made by each DoD Component during FY 1988 follows.

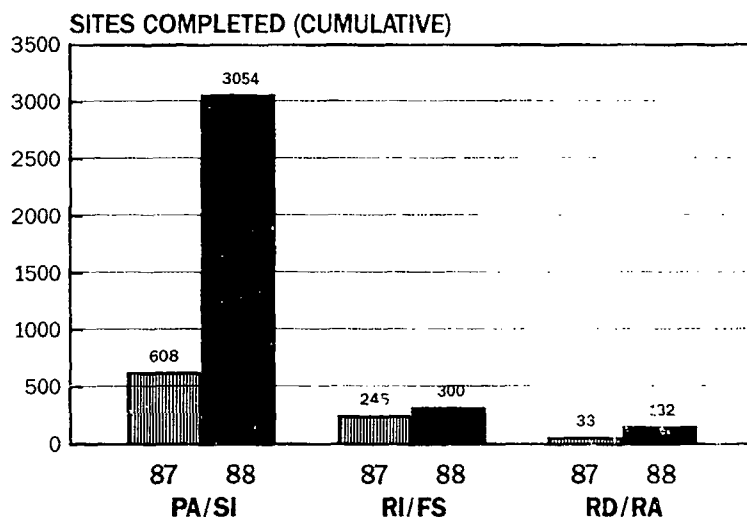
U.S. Army IRP Progress

The Army's program grew significantly in FY 1988. Seventy-three additional installations were included in the program, many of which appeared on the Federal Agency Hazardous Waste Compliance Docket. The number of potential sites nearly tripled; from 1,229 in FY 1987 to 3,208 in FY 1988. This large increase is attributed to a reclassification of contaminated areas into individual sites, and the addition of new sites not previously included in the program.

A five-fold increase in PA/SI completions in FY88 brought the Army's total to 3,054 sites (Figure I-4). Ninety-five percent of the Army's potential sites have now been assessed. RI/FS work underway and completed rose to 505 sites (Table I-1). This includes work at all listed and proposed National Priorities List (NPL) sites. RD/RA completions, now at 132, increased dramatically. In FY 1988 remedial project completions occurred at Alabama Army Ammunition Plant (AAP), AL; Cornhusker AAP, NE; Rocky Mountain Arsenal, CO; Twin Cities AAP, MN; and West Virginia Ordnance Works, WV. Descriptions of key projects follow. (Note: Appendix A provides additional details for installations which are final listed or proposed for the NPL.)

Figure I-4

ARMY IRP PROGRESS



- **Incineration of Explosive Contaminated Soil at Cornhusker Army Ammunition Plant, NE.** (NPL Listed). Soil at 60 sites was excavated and incinerated to destroy all explosive compounds. A total of 40,000 tons was incinerated at a cost of \$8 million. The treated soil was landfilled on site in accordance with procedures agreed to by the Army and the State of Nebraska. The incinerator was moved to Louisiana AAP, LA, where similar operations began in November 1988.
- **Area A Cleanup at Alabama AAP, AL.** (NPL Listed) Soil contaminated with nitroaromatic compounds and lead was excavated and placed into a temporary storage facility. Old explosive storage igloos and buildings were decontaminated.
- **Remediation of Explosives Contamination at West Virginia Ordnance Works, WV.** (NPL Listed) This site is a former ammunition plant which was sold to the State of West Virginia. In FY 1988, the Army initiated remedial action, including excavating and flashing seven miles of sewer lines, destroying surface TNT, and capping burning grounds and manufacturing areas.
- **Ground Water Recovery System at Twin Cities Army Ammunition Plant, MN.** (Part of New Brighton/ Arden Hills NPL site) A treatment system to prevent contaminant migration in the upper aquifer was completed and became operational. Increased capacity was added to the ground water recovery system at TCAAPs southwest boundary to prevent any additional contamination from leaving the installation. A temporary treatment system for the City of New Brighton was installed. Construction of a permanent system will begin in FY89.
- **Basin F Cleanup at Rocky Mountain Arsenal, CO.** (NPL Listed). Clean up of this major waste storage lagoon involved removing liquids, and 600,000 cubic yards of contaminated soils and sludges. A double-lined, 16 acre wastepile was constructed to contain the solid materials. The Basin F site has been capped, and revegetated. The project was one of the largest clean ups of its kind, and cost \$40 million.

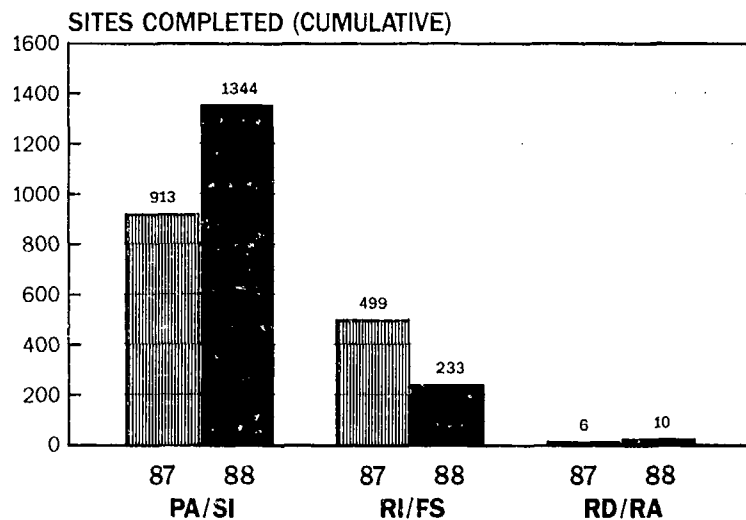
U.S. Navy IRP Progress

The Navy also showed a large increase in the number of installations included in the IRP in FY 1988: from 129 to 224. Most of those added were facilities listed on the Federal Agency Hazardous Waste Compliance Docket published in February 1988. Preliminary Assessments were conducted in FY 1988 at these locations in order to meet SARA-mandated deadlines. The number of potential sites at Navy installations rose to 1,481 from 975 in FY 1987. This increase can be attributed to: newly identified sites at installations already in the program; additional sites recommended for inclusion by regulatory agencies; and sites at installations assessed during FY 1988.

The cumulative number of sites where PA/SIs have been completed now stands at 1,344 sites (Figure I-5). The apparent decrease in RI/FS site completions from FY 1987 to FY 1988 is due to a review of remedial investigation work conducted prior to SARA, and a reclassification of some of this work to the site inspection category. In addition to the 10 RD/RA projects completed and the 94 that are underway, the Navy completed a study of all future remediation needs and their attendant resource requirements. The study employed EPA's Cost of Remedial Action (CORA) model, thus capitalizing on an existing, validated procedure, eliminating model development costs, and assuring output compatibility with similar Superfund site projections.

Figure I-5

NAVY IRP PROGRESS



NOTE: Decrease in RI/FS completions due to reclassification as site inspections.

Representative examples of Navy projects include:

- **Remedial Action at MCAS Tustin, CA.** A \$1 million french drain system was designed and constructed to contain and collect leachate containing hydrocarbons and perchloroethylene from a fire training area. The leachate is disposed of off base. This was the first use of Defense Environmental Restoration Program funds for a military construction project.
- **PCB Cleanup at PWC Guam.** A former transformer storage area was partially cleaned up as part of a DoD/EPA cooperative effort. Twenty tons of PCB contaminated soil was chemically treated using innovative KPEG technology at one seventh the cost of incineration. Fiscal Year 1989 efforts will involve treatment of the remaining soil. This technology has the potential to provide major cost savings at a number of DoD sites.
- **Removal Action at MCMWTC, Bridgeport, CA.** About 20,000 cubic yards of soil contaminated with petroleum products was excavated from a disposal site and taken to an acceptable facility off base. All actions were coordinated with the State. The cost was \$260,000.
- **NAS Lemoore, CA.** Contaminated soil and sludges were removed from an old industrial waste disposal pond and taken off base to a hazardous waste landfill.
- **Health and Safety Training of Navy Response Personnel.** Health and safety training required by SARA was provided to Navy personnel involved in the IRP. This training includes the use of personal protective equipment and operation of contaminant monitoring systems.

U.S. Air Force IRP Progress

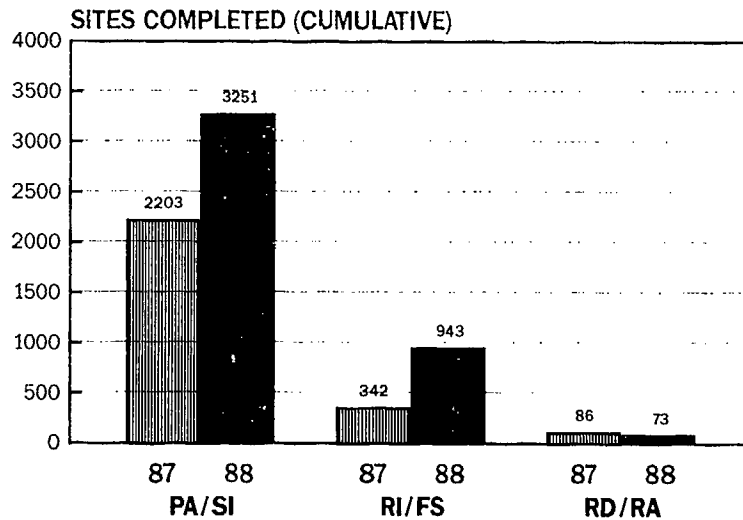
The number of installations included in the Air Force IRP remained constant between FY 1987 and 1988. Nearly 3,400 potential sites have been identified. During FY 1988 the largest increase in activity was in the RI/FS step; work was completed at 601 sites (Figure I-6). These investigations are underway or completed at every major installation and most industrial plants. RD/RA project completions increased to 73 sites. In FY 1987, a larger number of RD/RA completions (86) were reported, based on the assumption that a funded project would be completed in that fiscal year. Actually, many of the 86 should have been categorized as RD/RA underway instead of completed. Therefore, the actual FY 1987 figure would have been lower than reported.

In FY 1988 the Air Force invested over \$34 million in RD/RA activities. Key examples of these projects are:

- **Ground Water Reclamation at Air Force Plant 44, Tucson.** A system is being operated to treat ground water contaminated by solvents and heavy metals from industrial activities. The \$20 million remediation action, which was coordinated with the EPA and the Arizona Department of Health Services, will treat 26 billion gallons of water over 10 years. In addition, the Air Force committed \$2.5 million to address off-plant contamination. This investment demonstrates the Air Force's leadership role in correcting contamination at this large and complex site.
- **Ground Water Treatment at Hill AFB, UT.** (NPL Listed) Contaminated ground water is being treated near two landfill sites at Hill AFB. These landfills were used for disposal of wastes from municipal and industrial activities; contaminants are primarily volatile organic compounds.
- **Ground Water Treatment at McClellan AFB, CA.** (NPL Listed) A \$1 million project was initiated to expand an existing system for treating ground water contaminated by volatile organic compounds.

Figure I-6

AIR FORCE IRP PROGRESS



NOTE: The FY87 RD/RA figure was based on the assumption that a funded project would be completed in that FY. This assumption proved to be invalid therefore, the FY87 figure is inflated.

- **Waste Fuel Recovery System at Langley AFB, VA.** Installation of a waste fuel recovery system at a former underground fuel storage area has begun. The system will collect JP-4 fuel which leaked from the tanks and is floating above the water table, and in the soil. This project is important because of the base's proximity to the Chesapeake Bay.
- **Ground Water Treatment at the Former Olmstead AFB, PA.** A new water supply system was constructed for residents near this former installation. The \$6 million project is the result of a cooperative effort between the Air Force, EPA and State.

Defense Logistics Agency IRP Progress

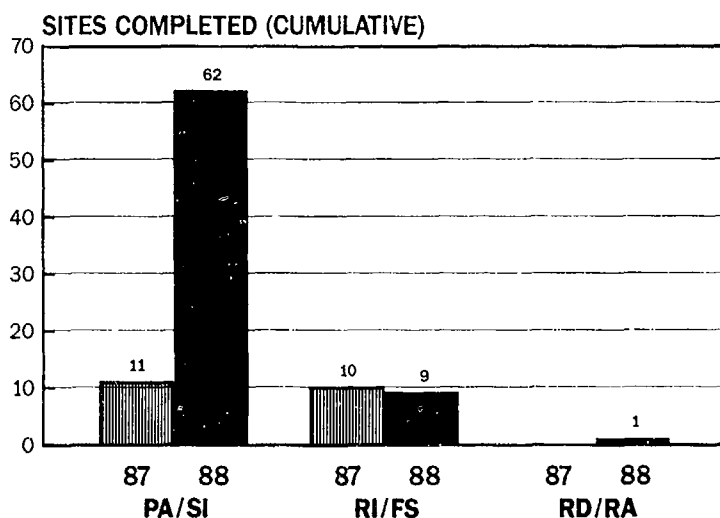
Activity continued in all three steps of the IRP during FY 1988. Progress is shown in Figure I-7. Ninety percent of PA/SIs are completed, and RI/FS work is underway or completed at 25 sites. Removal actions were undertaken at the Defense Depot Ogden, UT, and at a non-installation site at Meddybemps, ME.

Highlights of FY 1988 DLA activities include:

- **Removal of Chemical Surety Items at Defense Depot Ogden, UT.** (NPL Listed) Buried surety items, including mustard and phosgene, were removed from the installation in May 1988, and transported to Tooele Army Depot, UT for disposal. The entire operation was coordinated with EPA and state regulatory agencies.
- **Removal Action at Meddybemps, ME.** In consultation with EPA Region I, the DLA removed about 2,700 government owned cylinders containing compressed gas from a non-DoD site at Meddybemps. The Army and Air Force provided technical support, as some of the cylinders were deteriorated and required special handling.

Figure I - 7

DLA IRP PROGRESS



NOTE: The FY87 RI/FS figure was based on the assumption that a funded project would be completed in that FY. This assumption proved to be invalid therefore, the FY87 figure is inflated.

DoD Installations on the National Priorities List

The number of DoD installations that are final listed on the NPL stands at 29, with one additional installation, Twin Cities Army Ammunition Plant, MN listed as part of a larger non-Federal NPL site—New Brighton/Arden Hills, MN. Nineteen other installations (23 sites) are proposed for listing. Although not required by SARA provisions, DoD gives priority attention to the proposed sites similar to that given to final listed sites. The status of both groups of installations is presented in tabular form as Tables A-1a and A-1b. These tables and detailed narratives describing each NPL installation are in Appendix A.

At all NPL installations, SARA-mandated deadlines have been met. Investigatory work has been initiated; much of this is formal remedial investigations in accordance with SARA. Interim remedial activities or removal actions have been taken at 23 of the 29 listed installations, including waste removal, soil and ground water treatment, and provision of alternate water supplies to installation residents and the surrounding community.

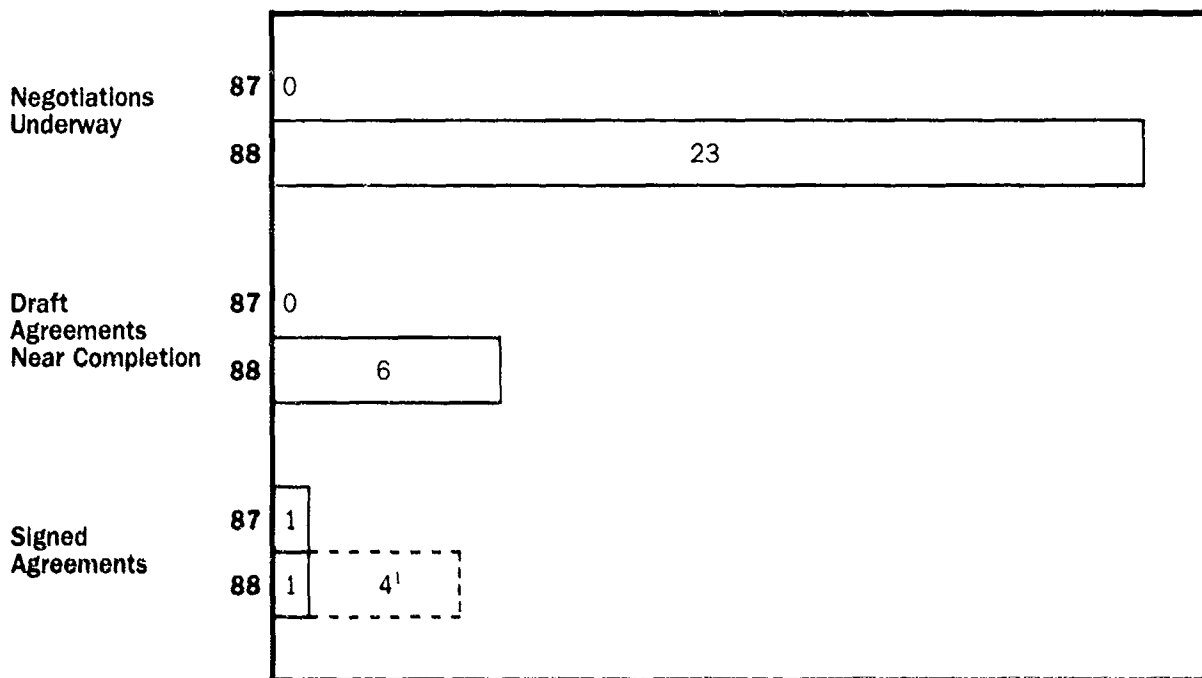
Federal Facility Agreements Under SARA Section 120 (Interagency Agreements (IAG))

In FY 1987 the first Federal Facility Agreement for cleaning up Twin Cities Army Ammunition Plant, MN (TCAAP) was signed. Since then, DoD and EPA have developed model language for use in the negotiation process, trained staff, set up a dialog with States, and started negotiations at installations with sites listed on the NPL. DoD's goal is to sign IAGs at all installations that are final listed or proposed for listing. Progress in achieving that goal is shown in Figure I-8.

The negotiation process involves the applicable DoD Component and both the EPA regional office and State pollution control agency. The identification and resolution of issues typically takes several months. Once the parties conclude the negotiations, the agreement is signed, and public comments are solicited. Appropriate changes are made before the agreement goes into effect. Additional information on IAGs is provided in Part II of this report.

As Figure I-8 indicates, negotiations have been initiated at 23 additional NPL-listed facilities. Substantial progress has been achieved in drafting agreements with the signing of four new agreements expected in early 1989. Six other agreements are nearing completion.

Figure I - 8
PROGRESS IN NEGOTIATING
INTERAGENCY AGREEMENTS



NOTES

¹In addition to the TCAAP agreement signed in 1987, four additional installations are expected to have signed agreements in early FY 1989—Sacramento AAP, Tinker AFB, Louisiana AAP and Letterkenny AD.

IRP Priorities

In order to effectively manage the IRP, DoD must set priorities to assure that sites are addressed on a worst first basis, nationwide. DoD currently uses a three tiered system which is based on risk. In this system, sites are assigned priorities according to the following levels:

- Priority A—Sites that have been proposed or final listed on EPA's National Priorities List, and other sites which pose an imminent or substantial danger to the public or the environment.
- Priority B—Sites not posing as high a potential risk as Priority A; and sites not listed or proposed for listing on the NPL, but undergoing investigative or remedial activity.
- Priority C—All sites not classified as Priority A or B and non-site specific activities that directly support the IRP.

This basic system has proven effective and also provides flexibility to the DoD Components to address their most urgent problems. Anticipating increased competition for limited resources as the DERP matures and sites move into the more costly cleanup step, DoD developed a model which assesses the relative risk presented by sites. This model will assist in setting priorities for cleanups using data gathered during the investigative steps of the IRP. During FY 1988, DoD worked with the EPA and State organizations to refine the model. It will be piloted in FY 1989, and implemented in the FY 1990 program.

FORMERLY USED PROPERTIES

The U.S. Army Corps of Engineers (COE) is the DoD Executive Agent for the implementation of Environmental Restoration Program operations at formerly used properties. As Executive Agent, the COE is responsible for hazardous waste cleanup activities, building demolition and debris removal, and unexploded ordnance removals on lands formerly owned or used by any of the DoD Components. The investigation and cleanup procedures at formerly used sites are similar to those at currently owned installations. Determinations must be made as to the origin of the contamination, land transfer, and current ownership before a site is considered eligible for restoration by the DoD.

As shown in Table I-3, there are 7,118 formerly used properties with potential for inclusion in the program that have been identified through inventory efforts. Inventory Investigations at 2,815 of those properties have been initiated, 1,966 are underway, and 849 have been completed. Of these, 168 properties have been funded by DoD for building demolition and debris removal or cleanup of hazardous or toxic contaminants. Investigative or cleanup work has either been completed or is ongoing at these locations.

TABLE I-3
STATUS OF FORMERLY USED PROPERTIES
September 30, 1988

Properties Identified (cumulative total)	7,118
Inventory Investigations (cumulative total)	2,815
Underway	1,966
Completed	849
Projects Completed or Ongoing (total)	168
BD/DR	94
IRP: Haz/Tox and UXO* Removals	74

* Unexploded Ordnance Removals at three locations—Tierrasanta, CA; Burma Rd., Kodiak, AK; Tidewater Community College, VA.

This work includes 94 building demolition/debris removals for unsafe buildings or structures on formerly owned or used properties, and 74 projects to clean up hazardous or toxic contamination such as formerly used underground storage tanks for fuels or solvents, or contamination from leaking polychlorinated biphenyls (PCB) transformers. Included in the 74 are three projects for detection and removal of unexploded ordnance from former target ranges or impact areas.

In FY 1988, \$29.5 million was spent on activities at former sites. Examples of work undertaken include:

- **Surface Clearance at Former Camp Elliott, CA.** A community called Tierrasanta was built on property that was part of the former Camp Elliott, CA. Thousands of pieces of potentially dangerous ordnance-related items remain on the site. Various actions are being undertaken by the COE, including clearance of some areas, restricting access, and reacquisition.
- **Tidewater Community College, VA.** In the fall of 1988, a surface and sub-surface ordnance clearance was conducted to remove all explosive hazards. An RI/FS is being conducted to characterize soil and ground water contamination. Remedial work, including soil treatment is planned.

OTHER HAZARDOUS WASTE (OHW) PROGRAM PROGRESS

The OHW Program, a second element of the DERP, examines current operations to find cost-effective approaches to DoD's waste management activities and to prevent pollution at the point of generation. Funds are provided for promoting DoD's total quality management of hazardous waste initiative. This effort includes research, development and demonstration of pollution prevention and hazardous waste management technology, including unexploded ordnance (UXO) detection and range clearance; investigation of alternate products, specifications, acquisition and operating practices; procurement of hazardous waste reduction equipment; and information exchange; and other environmental restoration and pollution prevention activities. In March 1988, DoD published a report to Congress on the status of hazardous waste minimization activities. The report describes each DoD Component's actions, progress, and goals, and provides examples of their accomplishments.

In Fiscal Year 1988, \$26.1 million in DERP funds were provided for these projects. Some notable examples of program accomplishments are as follows:

- **DLA Review and Revision of Product Specifications and Standards**

This ongoing effort involves a review of the specifications for items procured for the Department by the DLA. Recommendations are made for product substitution, elimination and/or recycling of hazardous substance specifications. Three examples of DLA efforts follow.

Dry Cleaning Solvent—The Federal specification for dry cleaning solvent was revised in September 1988 for the first time in 25 years. This action successfully demonstrates the incorporation of the "design-to-recycle" concept into a specification. The revised specification allows the procurement of both virgin and recycled dry cleaning solvent on an equitable basis. Application of the "design-to-recycle" concept reduces both the requirement for new solvent and minimizes the amount which must be disposed of annually. This may result in annual savings and cost avoidance of hundreds of thousands of dollars for the DoD. Efforts are continuing to incorporate "design-to-recycle" and other source reduction concepts into specifications for military antifreeze, carbon removing compounds, and degreasing and depreserving solvents.

Cadmium—An interservice cooperative effort was initiated in Fiscal Year 1988 to identify cost effective substitutes for cadmium coatings, including less toxic materials such as zinc.

Fuel System Icing Inhibitor (FSII)—An FSII injection system is being cooperatively developed by the DoD, Department of Energy, and the National Institute of Petroleum Energy Research to eliminate the need for FSII in bulk storage operations and still provide combat ready fuels to the DOD components.

- **Plastic Media Blasting (PMB)**

The technique of removing paint with a stream of particles forced from a hose by air pressure allows for improved efficiency, a better work environment, and minimizes hazardous waste generation. The Air Force, which first developed and implemented PMB at Hill Air Force Base (AFB), UT, plans to expand and mechanize the operations. At Hill AFB more than 150 fighter aircraft have already been dry stripped. The manhours required to strip with PMB, in comparison to the traditional method of paint removal with chemicals, have been reduced by 30 percent. Additionally, the elimination of hazardous materials and waste generated from the chemical stripping has resulted in substantial savings in hazardous materials/wastes processing.

The Naval Aviation Depot, Norfolk, VA, has adapted PMB techniques, and for several months has been using an improved process to remove paint from aircraft components. Beginning with small components and heading towards stripping air frames, their goal is to replace 90 percent of the chemical processes with PMB in the next two to three years. Kelly AFB, TX is building a paint removal room to accommodate dry stripping and Randolph AFB, TX plans to implement this technology.

- **Paint Stripping on Ships**

Paint and scale must be periodically removed from ship hulls prior to recoating with anticorrosion and antifouling paints. Traditionally, abrasive blasting has been used to prepare hulls for recoating. Disposal of spent abrasive is costly, particularly in states where it is classified as a hazardous waste. The Navy is investigating methods of removing paint without using abrasives. The Cavitating Jet Paint Removal and Containment System removes coatings from the underwater surface of the ship using high pressure water, and collects the water and paint chips that have been removed. The result is a significant reduction in the volume of hazardous waste.

- **Electrostatic Painting**

The Naval Aviation Depot, Alameda, CA, has acquired a more efficient system for painting aircraft as a result of adopting an electrostatic process. Turnaround time has improved 200 percent and a P-3 Aircraft is now painted in 6-7 shifts rather than 16-20 shifts. The process uses electricity to cause the paint to adhere to the aircraft surface and prevent overspray. Less paint is used and it dries faster with less airborne residue. Not only is the process cost effective, but it has also solved air pollution problems and helps meet California clean air standards.

- **Torpedo Solvent Recovery**

The Navy spends over \$850,000 per year to dispose of more than 440,000 gallons of spent torpedo solvent and related wastes. This waste is generated by cleaning torpedos after test firings. Studies are underway to recover the solvent by distillation. Estimated savings from distillation range from \$2.65 to \$8.90 per gallon, for a total savings of up to \$570,000.

- **Shipyard Operations**

Research is being conducted on waste reduction from shipyard operations, the largest Navy waste generating activity. Efforts center on application of less environmentally persistent degreasers and systems for paint and scale removal. The Naval Shipyard Pearl Harbor, HI reported savings of \$7,500 in treatment costs per ship using a biodegradable cleaner instead of a hazardous material for bilge cleaning.

- **Product Substitution**

At Fort Lewis, WA, solvents classified as hazardous materials are being replaced by non-hazardous materials in several operations. These products can be disposed of in the sanitary sewer instead of requiring special handling.

- **Waste Segregation and Recycling**

Fort Polk, LA, has reduced hazardous waste volume by segregating waste oil from waste solvent. The mixture is considered a hazardous waste because of the volatility of the solvent. Better management through segregation, and hazardous waste awareness training at the Company Commander level, produced results. The waste solvent load has also been reduced by recycling at many locations on post.

- **Comprehensive Waste Management**

Holston Army Ammunition Plant, TN, has put an overall hazardous waste minimization management program into place which has already produced a more than 50 percent reduction in their hazardous wastes. This was achieved through reuse of paint thinners, delisting effluent from the waste treatment plant, pesticide tracking and process changes to reduce solvent use.

- **Solvent Reuse**

Fort Benning, GA has concentrated their initial hazardous waste minimization efforts on solvent use in maintenance shops. Used solvents are filtered so that they can be reused, thereby avoiding disposal costs.

- **Product Elimination**

Fort Bliss, TX has established a consolidated hazardous waste minimization program with a goal of eliminating use of hazardous materials through a review of industrial processes. They have reduced their waste disposal costs by one third. Battery acid wastes constituted 86 percent of all hazardous wastes generated by the installation. With the completion of a battery acid neutralization facility this year and the elimination of scale remover at the radiator repair shop, the volume of wastes is expected to drop by 95 percent by FY 1992.

- **Data Base Management**

DoD began the process of automating its waste minimization project data base using a one page format containing information such as a project description, categories of waste addressed, and cost totals. Additions to the data base, such as cost savings information, are planned.

RESEARCH, DEVELOPMENT AND DEMONSTRATION

Available technologies for site clean up are limited and often require substantial capital outlays, operations and maintenance costs or both. In addition, these technologies provide little assurance that DoD has reduced its liabilities in the long term. As part of the DERP, DoD is working to identify and develop practical, new cleanup technologies and hazardous waste site investigation techniques which will be effective and cost efficient.

In FY 1988, DoD committed approximately \$27.6 million to Research, Development and Demonstration (RD&D) for clean up technology and hazardous waste minimization. About 16 million of this was from the Environmental Restoration account. The balance was from service R&D accounts.

DoD Component efforts are coordinated by an Installation Restoration Technology Coordinating Committee (IRTCC). Comprised of representatives of each Component, its purpose is to encourage and improve communication among the Components to ensure that limited RD&D dollars are spent most effectively. The organization recently published an IRP/Hazmin Notebook of technologies for use by managers, production, and environmental personnel. The notebook was distributed to approximately 150 offices in DoD, and also to other Federal agencies such as EPA. The notebook will be updated periodically.

A DOD/EPA/DOE working group was established in 1985 to address the issues of the high cost of hazardous waste cleanups; the need for innovative technology development to achieve the necessary clean up goals in a more cost-effective manner; and to provide a coordinated approach to these efforts among the agencies. A report, known as the Blue Book, describing this group's work during FYS 1988, 1989, and 1990 will be published in March 1989. The report includes over 138 projects which have application to more than one agency.

Examples of the Department's RD&D projects are as follows:

- **Radio Frequency Soil Decontamination**

Removal and destruction of solvent and fuel products in soil is a difficult and costly task. The Air Force is working to determine the full scale efficiency of radio frequency energy to heat contaminated soil in situ and thermally distill the volatilized organic pollutants which result. A pilot test of radio frequency technology at Volk Field, WI has proven to be very effective in removing organic contaminants from the soil. A full scale study will optimize the radio frequency system to improve vapor recovery, reduce heating time and energy costs. Current cost estimates of this technology are less than one-half the cost of other methods such as incineration. This effort is being closely coordinated with the EPA as well as Army and Navy researchers.

- **Destruction of Dioxin**

A 2 year research effort on restoring a site contaminated with Herbicide Orange has been completed at the Naval Construction Battalion Center (NCBC), Gulfport, MS. More than 26,000 tons of contaminated soil have been incinerated since full-scale efforts began in November 1987. It was the first EPA-approved test of a transportable, rotary kiln incinerator to rid soil of dioxin, an impurity found in Herbicide Orange.

- **Air Stripping to Remove Volatile Organic Compounds**

The Air Force is improving air stripping technology for cleanup of ground water contaminated with volatile organic compounds (VOCs). These improvements may save 50 percent in operating costs over conventional air stripping.

- **Low Cost Long Term Ground Water Monitoring**

The Air Force is developing inexpensive sensor systems and supporting instrumentation for ground water monitoring in cooperation with the EPA and two universities. This effort will also demonstrate the feasibility of using remote fiber spectroscopy and fiber optic chemical sensors.

Currently, assessing ground water contamination requires installing monitoring wells, taking samples, and accomplishing chemical analyses which requires complex and expensive laboratory equipment. This study uses fiber optics to detect changes in the chemicals being monitored. This technology offers the benefits of automated continuous monitoring and a historical record of analysis. Also, this monitoring technology offers significant cost savings because of smaller, more easily installed monitoring points.

- **Geophysical Diffraction Tomography**

The Army has successfully demonstrated the use of this technology for subsurface investigations of waste sites. Use of this technology could result in more accurate, safer and less expensive site characterizations than well drilling and sampling.

- **Catalytic Destruction of Chlorinated Organics**

The Air Force is studying the technique of controlling exhausted chlorinated organics (e.g., TCE) from air stripping operations using catalytic oxidation. Removal of chlorinated organics from ground-water using air strippers is an efficient and cost effective cleanup technique; however, the discharged organics in the exhausted air are problematic. Currently, activated carbon absorption or incineration are used to remove the contaminants, but they have limitations. Activated carbon absorption produces secondary waste while incineration requires a substantial energy requirement and operating cost.

Preliminary results from a joint Air Force/EPA effort identified a catalytic system capable of destroying TCE vapors at a much lower temperature than incineration currently requires, thus reducing cost.

BUILDING DEMOLITION AND DEBRIS REMOVAL (BD/DR)

The third element of the DERP, BD/DR was not allocated funds in FY 1988 due to the other higher priority cleanup activities.

PROGRAM FUNDING

In FY 1984 the Congress consolidated and expanded DoD programs for cleanup of hazardous waste into a separate appropriation entitled the Defense Environmental Restoration Account (DERA) under the Defense Appropriations Act. This allowed the DoD to accelerate work and also to add research and other components to the Environmental Restoration Program.

Funds appropriated by the Congress to the Defense Environmental Restoration Account are summarized in Table I-4. More than 80% of these funds have been allocated to the IRP since FY 1984. In FY 1988, 94 percent was expended in the IRP. This heavy emphasis is expected to continue in FY 1989 because of the growth in these high priority requirements.

TABLE I-4
DERA FUNDING
(\$ MILLIONS)

	IRP	OHW	BD/DR	HWD	TOTAL
FY 1984	85.9	5.1	36.1	22.9	150
FY 1985	180.8	39.4	54.5	39.3	314
FY 1986	245.7	27.3	27.0	60.6	360.6
FY 1987	336.2	24.7	16.3	— ¹	377.2 ²
FY 1988	377.9	26.1	—	— ¹	404.0 ³
FY 1989	466.6	33.6	—	— ¹	500.2 ⁴
TOTAL	1,693.1	156.2	133.9	122.8	2,106.0

¹Costs for hazardous waste disposal included in military services O&M budgets.

²Includes \$1.3M carryover from FY 1986.

³Includes \$1.1M carryover from FY 1987.

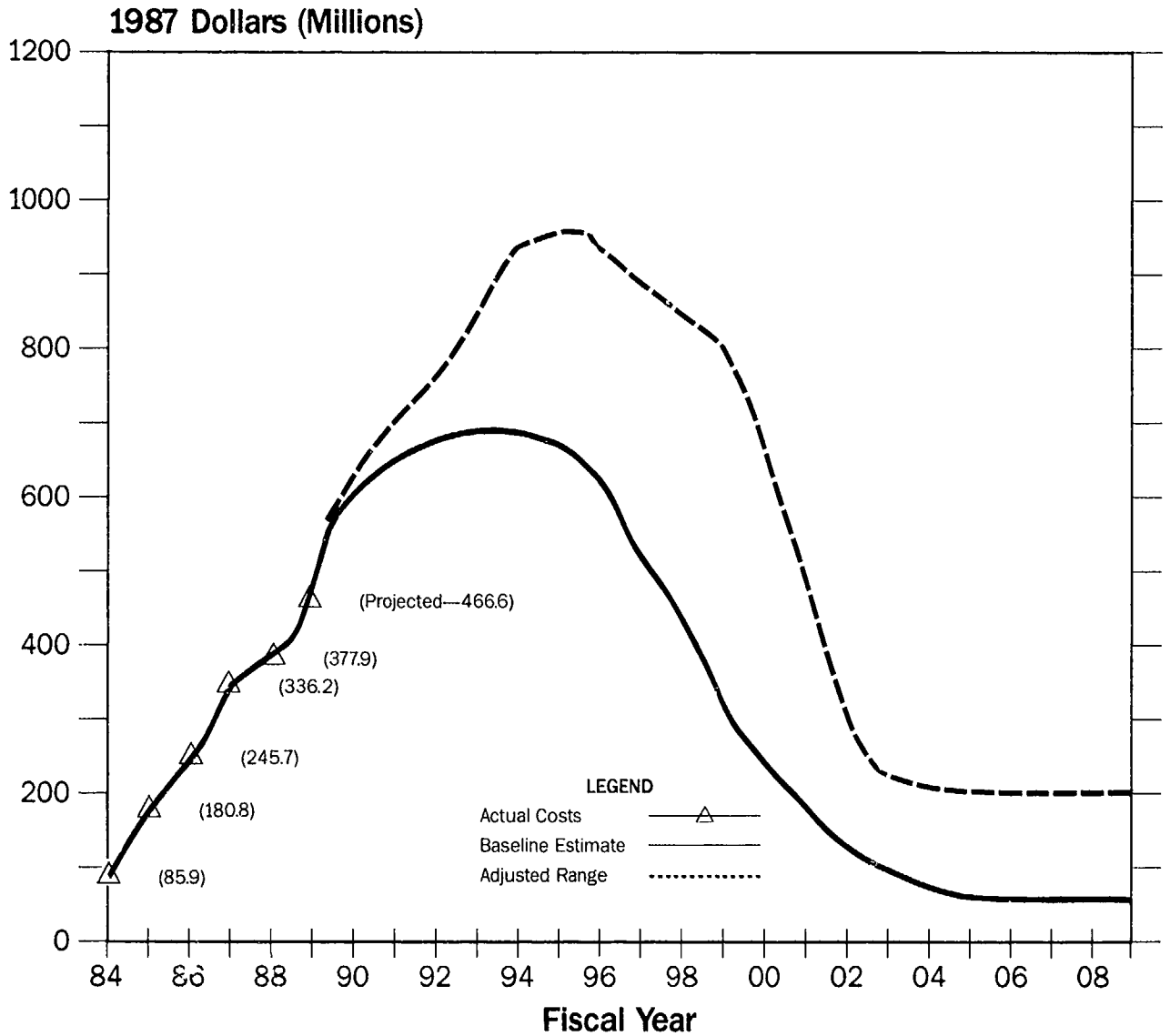
⁴Includes \$0.2M carryover from FY 1988.

Projections for future IRP funding needs are shown in Figure I-9. The bulk of this funding is for the more costly RD/RA cleanup step of the program. The Department has estimated the total cost of DoD IRP activities at installations and formerly used properties at \$9 to \$14 billion (FY 1987 dollars). The uncertainty of the total funding requirement is because: there are still many remedial investigations to complete, which will indicate the number of sites actually requiring cleanup; cleanup standards are uncertain; and agreements for remedial action at NPL installations have not been reached with EPA and state agencies.

DoD intends to revise this total program cost estimate periodically as more information as the program matures and more information becomes available.

Figure I-9

INSTALLATION RESTORATION PROGRAM COSTS



NOTE: These figures do not include costs of Other Hazardous Waste, or Building Demolition/Debris Removal activities or Rocky Mountain Arsenal, CO cleanup.

PART II

INFORMATION REQUESTED BY THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT

Part II of the Annual Report provides information requested in Section 120(e)(5) of the Superfund Amendments and Reauthorization Act of 1986 (SARA), which applies to all Federal Facilities, and Section 211 of SARA (codified at 10 USC 2706), which pertains to the Defense Environmental Restoration Program.

FEDERAL FACILITIES REPORTING REQUIREMENTS

Section 120(e)(5) of the SARA legislation specifies that each Federal department or agency shall annually report on the following items:

- (1) "A report on the progress in reaching interagency agreements under this section."
- (2) "The specific cost estimates and budgetary proposals involved in each interagency agreement."
- (3) "A brief summary of the public comments regarding each proposed interagency agreement."
- (4) "A description of the instances in which no agreement was reached."
- (5) "A report on progress in conducting investigations and studies under Paragraph (1)" (Paragraph (1) discusses the timing of RI/FS work at National Priorities List (NPL) sites)
- (6) "A report on progress in conducting remedial actions."
- (7) "A report on progress in conducting remedial action at facilities which are not listed on the National Priorities List."

"With respect to instances in which no agreement was reached within the required time period, the department, agency, or instrumentality filing the report under this paragraph shall include in such report an explanation of the reasons why no agreement was reached. The annual report required by this paragraph shall also 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 action, enforcement status (where appropriate), and an explanation of any postponements or failure to complete response action. Such reports shall also be submitted to the affected States."

At Appendix A is a description of each installation which has a site final listed or proposed for listing on the NPL. Each description includes a summary of background information on the installation, and the types of environmental hazards present; the status of Installation Restoration Program (IRP) response actions at that installation; and schedules for initiating and completing those response actions. The information in Appendix A answers requirements of the preceding paragraph. Tables A-1a and A-1b in Appendix A catalog DoD facilities that are final listed and proposed for listing on the NPL.

1. Progress in Reaching Interagency Agreements

During Fiscal Year 1988, efforts to establish Federal Facility Agreements under SARA, Section 120 increased. These Interagency Agreements (IAGs) were given a high priority because they establish comprehensive installation-specific arrangements for proceeding with DoD's waste cleanup activities under applicable Federal and State laws. They also fully integrate the responsibilities of the Environmental Protection Agency (EPA) and state regulatory agencies. It is our goal to have agreements in place for all installations that have sites final listed on the NPL, or are proposed for listing. Considerable supporting efforts by the Office of the Deputy Assistant Secretary of Defense (Environment) and DoD Component headquarters offices occurred in parallel with the installation-specific negotiations this year. This was done to place the agreements' process on a firm foundation that would enable the DoD Components to enter into consistent, workable agreements nationwide. Extensive field negotiations also took place.

The most significant accomplishment of the agreement support effort was the development with the EPA of model language that will serve as the nucleus for site specific IAGs. The model language resolved the most contentious national policy issues between DoD and EPA when it was agreed to in June 1988 after six months of negotiation. It lays out the core of a cleanup management framework which allows for incorporation of State concerns. The Office of the Deputy Assistant Secretary of Defense (Environment) issued guidance to the Components in September 1988 regarding the State role in DOD cleanup activities through IAGs. DoD also opened up a dialog on this topic with a State working group which will lead to additional guidance. Working group efforts will continue in FY 1989. The DoD Components held workshops for their field personnel on the IAG model language and other aspects of working out Federal Facility Agreements, and issued additional guidance to direct field activities' efforts.

The first Interagency Agreement was signed in FY 1987 for Twin Cities Army Ammunition Plant, MN (TCAAP). By the end of FY 1988, negotiations were underway at 23 other installations. At many locations, staff were organizing to commence discussions early in 1989. Because the agreements now being developed are more comprehensive than required under SARA (e.g. they may cover RI/FS activities for NPL and non-NPL sites on an installation), their negotiation has proven resource intensive for all parties. The FY 1988 efforts will lead to signed three-party agreements in the first half of FY 1989 at four installations: Tinker AFB, OK; Sacramento Army Depot, CA; Louisiana Army Ammunition Plant, LA; and Letterkenny Army Depot, PA. We expect many more IAGs to be entered into before the year's end as the negotiation process becomes more familiar to the participants.

2. Interagency Agreement Cost Estimates and Budgetary Proposals

Defense Environmental Restoration Program funding is discussed in Part I of this report. The estimate for total program funding is based on existing budget documentation including program cost data from the individual DoD Component Installation Restoration Programs, and from existing Superfund cost data. The FY 1987 Annual Report provided a detailed accounting of costs, totaling \$29,490,000, expended or programmed for cleanup efforts at TCAAP. As no additional IAGs had been signed as of the end of FY 1988, cost estimates and budgetary proposals for the remaining NPL installations have not yet been determined.

Details of expenditures at the DoD NPL installations are shown in Tables A-1a and A-1b of Appendix A. This includes funds for interim remedial actions, removal actions, and Remedial Investigations/Feasibility Studies.

3. Public Comments Regarding Proposed Interagency Agreements

As agreements are finalized, public comments regarding each agreement will be reported to the Congress. The principal comments received from the public regarding the agreement for TCAAP were reported in last year's Annual Report. Comments on negotiated agreements will be summarized in the next Annual Report. DoD will continually factor public concerns and comments into its plans.

4. Instances Where No Agreement Reached

There are no instances, as yet, where DoD has failed to reach an agreement under negotiation.

5. Remedial Investigation/Feasibility Study (RI/FS) Progress

The SARA Section 120(e)(1) specifies that RI/FS work must be initiated at sites within six months of listing on the NPL. Remedial Investigation/Feasibility Study work has been started at all DoD installations final listed on the NPL. Also, RI/FS work has been initiated at 17 of the 19 DoD installations proposed for listing on the NPL. Anticipated RI/FS completion dates are shown in Tables A-1a and A-1b of Appendix A.

6. Remedial Design/Remedial Action (RD/RA) Progress

Final RD/RA activities based on RI/FS recommendations, and under the terms of an IAG, have not yet been initiated at any DoD NPL installation, because none of the RI/FS's are complete. Tables A-1a and A-1b indicate, where available, estimated RI/FS completion dates. SARA Section 120(e)(2) requires that within 15 months of completion of an RI/FS at an NPL facility, onsite remedial action must be initiated. The DoD anticipates these dates will be met.

Response actions other than final RD/RA activities have been undertaken at 36 DoD installations with sites on or proposed for listing on the NPL. This work involves several types of removal and/or interim remedial actions. A summary of these actions is shown in Table II-1 below:

TABLE II-1

SUMMARY OF NPL INSTALLATION ACTIVITIES

Type of Action	No. of Installations
Alternate Water Supply/Treatment	9
Incineration	1
Site Treatment/Remediation	19
Decontamination	2
Waste Removal	28
Ground Water Treatment	4
Long-Term Monitoring	6
TOTAL	69

Note: Some installations have more than one type of action underway.

Additional information on RD/RA initiatives at DoD NPL installations is provided in the narratives at Appendix A.

7. Remedial Actions at Non-NPL Facilities

Remedial actions have been initiated at 1,482 DoD sites (including sites at NPL installations). These include removal actions, interim remedial actions and long-term monitoring. Of these, 216 had been completed by the end of FY 1988.

Details are presented as part of the DERP reporting requirements that follow.

DEFENSE ENVIRONMENTAL RESTORATION PROGRAM REPORTING REQUIREMENTS

Section 211 of SARA (10 USC 2706) specifies that the Annual Report to Congress . . . "shall include the following:

- "(1) A statement for each installation under the jurisdiction of the Secretary of the number of individual facilities at which a hazardous substance has been identified."
- "(2) The status of response actions contemplated or undertaken at each such facility."
- "(3) The specific cost estimates and budgetary proposals involving response actions contemplated or undertaken at each such facility."
- "(4) A report on progress on conducting response actions at facilities other than facilities on the National Priorities List."

Appendix B summarizes the information requested in items 1, 2, and 4 above. It denotes the number of sites undergoing each step of the IRP at any one installation. The response to item "3" above is found in Part I of this report, Program Funding.

Table B-1 provides an overall summary of the status of IRP work at installations on a state-by-state basis. It summarizes Table B-2, which is a detailed listing of IRP status for each installation in the program. Figure B-1 provides similar information superimposed on a map of the United States. For each IRP phase listed in Tables B-1 and B-2, there are three status categories: "C," "U" or "F." Category "C" represents the total number of sites for which that particular study or action has been completed. The "U" category denotes the number of sites having that particular study or action underway; and the "F" category shows the number of sites scheduled to have that study/action performed in the future. There is no "F" category for the PA/SI phase because virtually all PA/SI work has been started, and most studies are complete.

1. Facilities Having Identified Hazardous Substances

The universe of sites at DoD installations in the IRP is summarized in Table I-1, Part I and further detailed in Appendix B. Referring to these tables, a PA/SI is a Preliminary Assessment/Site Inspection of an installation to determine whether it potentially has a contamination problem, and at which locations. The Remedial Investigation/Feasibility Study (RI/FS) involves quantitative sampling and analysis to identify those sites that are contaminated, the types of contaminants present and their levels, and whether or not the contamination is causing or contributing to any ground or surface water pollution. Remedial Design/Remedial Action (RD/RA) work is performed at those facilities where an RI/FS has identified a contamination problem that needs remediation.

Confirmation of which of the 8,139 potential sites are actually contaminated and are presenting a health or environmental risk requires a time-consuming Remedial Investigation. Because these RIs are still underway at many sites, the absolute number of sites having hazardous substances cannot yet be reported. A minimum can be calculated by assuming that all sites with RD/RA scheduled, underway or completed have been confirmed as having identified hazardous waste that may present a risk. Therefore, the present estimate of confirmed hazardous waste sites in DoD is 2,486.

2. Status of Current or Contemplated/Undertaken Response Actions

The number of response actions undertaken at any one installation is indicated by the sum of the numbers in the "C" and "U" categories of each response action type listed in the tables in Appendix B. Similarly, the "F" category under each type of response action indicates the number of contemplated (future) response actions for each installation. Table B-3 summarizes for each DoD service component the response action status as of September 30, 1988.

The table indicates that 216 cleanups—i.e., removals, interim responses and remedial actions—have been completed. This includes 132 Army, ten Navy, 73 Air Force, and one DIA sites. In addition there are 1,266 site actions underway with 1,004 scheduled for future work.

3. Response Action Cost Estimates and Budgetary Proposals

In FY 1988, the Congress appropriated \$404 million for the Defense Environmental Restoration Program of which \$377.9 million were spent on the IRP. These funds were used primarily to expand and accelerate studies and remedial actions at more than 4,200 individual sites. Part I of this report, Program Funding, provides additional information.

4. Response Action Progress at Non-NPL Facilities

The DoD has continued to make progress during FY 1988 in investigating all sites or facilities on DoD installations potentially contaminated with hazardous substances, and cleaning up those that pose a threat to human health and the environment, regardless of whether they are on the NPL. A total of 8,139 sites on 897 military installations are now included in the IRP. In FY 1988, 2,974 sites and 158 installations were added to the IRP. These additions represent, primarily, smaller installations such as National Guard and Reserve facilities.

Appendix A provides data regarding IRP response actions at DoD facilities on the NPL; the listing provided in Appendix B includes both NPL and non-NPL facilities.

APPENDIX A

DoD INSTALLATIONS ON THE NPL OR PROPOSED FOR LISTING ON THE NPL

Includes:

- Tables A-1a and A-1b DoD Installations Listed or Proposed for the NPL
- Installation Descriptions of Listed and Proposed NPL Facilities

**TABLE A-1a
DoD INSTALLATIONS ON THE NATIONAL PRIORITIES LIST (NPL)**

INSTALLATION	STATE	DESCRIPTION	MRS SCORE	REMOVAL ACTION/INTERUM REMEDIAL ACTION			RUF5		IAG		RD/RA	
				ACTIVITY	DATE (LATEST)	\$(K) THRU FY88	COMPLETED ACTIVITY	COMPL DCE	\$(K) THRU FY88	STATUS	DATE	ACTIVITY
Alabama AAP	AL	IS - MUN/HMT	36.83	WAR/DEC	31.88	\$7.642	PHASE II, SOW/MP/TRC/CRP	89	IN	10/88	RD START	89
Comhusker AAP	NE	ISSD - MUN	51.13	AWS/LTM	54.39	\$14.500	PHASE II	85	STATE	66	AWS/INC/WT/ITM	90
Fort Dix	NJ	LD - VOCHMT/POL	37.40	WAR	3	\$4.4	PHASE II	87	IN	88	RD START	90
Fort Lewis	WA	LD/SD - VOCHMT	42.78	STR	68	-	PHASE II, SOW/MP/TRC/CRP	790	STATE	86	RD START	90
Joliet AAP (mtg area)	IL	ISSD - MUN/HMT/VO	32.08	WAR/STR	85	\$1.496	PHASE II, SOW/MP/TRC/CRP	990	IN	89(e)	RD START	90
Lake City AAP	MO	ISSD - MUN/HMT/VO	33.68	WAR/STR	88	\$11.800	PHASE II, SOW/MP/TRC/CRP	689	IN	888	RD START	89
Letterkenny AD (SE IND)	PA	IS - VOCHMT	34.21	AWS/WAR/STR	87	\$6.307	PHASE II, SOW/MP/TRC/CRP	689	FIN	2/89	RD START	89
Lone Star AAP	TX	ISSD - MUN/HMT	31.85	-	-	-	PHASE II, SOW/MP/TRC	1285	IN	8/88	RD START	89
Milan AAP	TN	ISSD - MUN/HMT	58.15	WAR/STR	84	\$1.050	PHASE II, SOW/MP/TRC/CRP	390	IN	8/88	RD START	91
Rocky Mtn. Arsenal	CO	ISSP - MUN/HMT/VO	58.15	WAR/STR/DEC/WT/ITM	78.88	\$77.256	PHASE II, SOW/MP/TRC/CRP	993	CONSECR	1/88	RD START	93
Sacramento AD	CA	ISSS - VOCHMT	44.46	WAR/STR	87	\$1.830	PHASE II, SOW/MP/TRC/CRP	291	IN	-	RD START	92
Shreve AD	CA	IS - VOCHMT	42.24	AWS/STR/LTM	88	\$1.863	PHASE II, SOW/MP/TRC/CRP	991	FIN	9/89	RD START	92
Umatilla ADA	OR	ISSD - MUN/VO	31.36	-	-	-	PHASE II, SOW/MP/TRC/CRP	391	-	-	RD START	91
NAEC Lakehurst	NJ	SS/LD - VOCHMT/POL	50.53	WAR	88	\$70	SOW/MP/TRC/CRP	990	IN	10/88	RD START	92
NAS Brunswick	ME	SS/AD - VOCHMT	43.38	-	-	-	SOW/MP/TRC	690	IN	10/88	RD START	91
NAS Moffett Field	CA	ISS/AD - VOCHMT/POL	32.90	WAR/STR	88	-	SOW/MP/TRC/CRP	690	IN	10/88	RD START	91
NSB Bangor	WA	ISS/AD - MUN	30.42	WAR/STR	88	-	SOW/MP/TRC/CRP	590	IN	10/88	RD START	91
Castle AFB	CA	LDSS - VOCHMT	37.93	AWS	86-87	\$958	PHASE II/TRC/CRP	190	IN	2/88	RD START	91
Griffis AFB	NY	LDSS - VOCHMT/POL	34.20	WAR	85-87	\$3.824	PHASE II	190	IN	89(e)	RD START	91
Hill AFB	UT	LD - VOCHMT	49.90	WAR/STR/GMT	85-87	\$7.582	PHASE II/TRC/CRP	1290	IN	89(e)	RD START	91
Mather AFB	CA	LDSS - VOC	28.90	AWS	85-87	\$786	PHASE II/TRC/CRP	1289	IN	4/88	RD START	90
McChord AFB	WA	LD - VOCHMT	43.24	AWS/AWAR	85-86	\$3.801	PHASE II/TRC/CRP	390	IN	7/87	RD START	91
McClellan AFB	CA	IS/LD/SD/OTH - VOCHMT/OTH	57.93	WAR/STR/GMT	85-87	\$26.546	PHASE II/TRC/CRP	390	IN	9/88	RD START	91
Mann. St. Paul IAP	MIN	LDSS - VOCHMT/POL	35.00	-	-	-	PHASE II/CRP	490	IN	10/88	RD START	91
Norton AFB	CA	LDSS - VOCHMT/POL	39.65	WAR	85-87	\$582	TRC/CRP	290	IN	4/87	RD START	91
Roberts AFB	GA	LDSS - VOCHMT/POL/OTH	51.66	AWS/AWAR	85-87	\$3.361	PHASE II, TRC/CRP	190	IN	8/88	RD START	91
Travis AFB	OK	LD - VOCHMT/POL	42.24	WAR/STR	85-87	\$8.288	TRC/CRP	390	IN	88	RD START	91
DDOU Ogden	UT	LD - VOCHMT/OTH	45.10	WAR	88	\$186	SOW/MP/TRC/CRP	390	IN	1/89	RD START	90
DGSC Richmond	VA	LDFT - VOCHMT	33.85	-	-	-	SOW/MP/TRC/CRP	1089	IN	1/89	RD START	90
Turn Cites AAP	MN	ISSD - VOCHMT	58.41	WAR/STR/LTM	88	\$17.300	PHASE II, SOW/MP/TRC/CRP/RI	989	FIN	12/87	RD START	89

**TABLE A-1b
DoD INSTALLATIONS PROPOSED FOR THE NATIONAL PRIORITIES LIST (NPL)**

INSTALLATION	STATE	DESCRIPTION	NRS SCORE	PROP. NPL DATE	REMOVAL ACTION/INTERIM REMEDIAL ACTION ²			R/F/S ³			IAG ⁴		RD/RAS ⁵	
					ACTIVITY	DATE	\$(K)	ACTIVITY	COMPL DATE	\$(K) THRU FY88	STATUS	DATE	ACTIVITY	DATE
Aberdeen Prvg. Grnd (Edgewood)	MD	ISLD - VOC/HMT/MUN	53.57	7/87	-	-	-	PHASE II. SOW/WP/CRP	89	\$11.345	RCRA	10/86	RD	
Aberdeen Prvg. Grnd (Aberdeen)	MD	ISLD - VOC/HMT	31.45	7/87	-	-	-	PHASE II. SOW/WP/CRP	89	-	RCRA	-	-	
Anniston AD	AL	ISDS - VOC/HMT	51.91	7/87	WAR/STR/LT/M/GWT	83/88	\$6.744	PHASE II. SOW/WP	1/89	\$3.197	IN	89	RD	89
Joliet AAP (LAP Area)	IL	ISDS - MUN/HMT/VOC	35.23	7/87	WAR/STR	85	\$1.496	PHASE II. SOW/WP/TRC/CRP	9/90	\$4.046	IN	89(e)	RD	90
Letterkenny AD (PDO Area)	PA	DS - VOC/HMT	34.21	7/87	AWS WAR/STR	87	\$6.307	PHASE II. SOW/WP/TRC/CRP	6/89	\$4.820	FIN	2/89	RD	89
Louisiana AAP	LA	ISDS - MUN/HMT	30.26	7/87	WAR/INC	88	\$29.500	PHASE II. SOW/WP/TRC/CRP	5/89	\$1.797	IN	89(e)	RD	90
Riverbank AAP	CA	ISDS/LD - VOC/HMT	63.94	5/88	WAR/AWS/LTM	87	\$251	PHASE II. SOW/WP/TRC/CRP	10/89	\$3525	IN	89(e)	RD	89
Savanna ADA	IL	ISDS - MUN	42.20	7/87	-	-	-	Phase II	1/90	\$1.178	-	-	RD	90
Tooele AD	UT	ISDS - VOC/HMT	38.32	7/87	WAR/STR	88	\$2.800	PHASE II. SOW/WP/TRC/CRP	4/89	\$29.918	IN	87	RD	89
MCAS El Toro	CA	LDSS - VOC	40.83	5/88	-	-	-	SOW/TRC	7/92	\$1.040	-	-	RD	92
MCAS Yuma	AZ	LDSS - VOC	29.88	5/88	-	-	-	SOW/WP/TRC	9/90	\$50	-	-	RD	91
MCB Camp Lejeune	NC	LDSS/FT - VOC/POL/OTH	36.84	5/88	-	-	-	SOW/TRC	6/90	\$1.748	-	-	RD	91
NADC Warminster	PA	LD/FT/IS - VOC/HMT/POL	57.93	7/87	-	-	-	SOW/TRC/WP	7/92	\$120	IN	-	RD	92
NAS Whidbey Isl. (Ault Field)	WA	ISSS - POL/VOC/HMT	48.48	7/87	-	-	-	SOW/WP/TRC/CRP	10/91	\$575	-	-	RD	91
NAS Whidbey Isl. (Seaplane Base)	WA	LDSS/FT - POL/VOC/HMT	39.64	7/87	-	-	-	SOW/WP/TRC/CRP	10/91	\$575	-	-	RD	91
NSGA Sebana Seca	PR	LDSS - POL/OTH/VOC	34.28	5/88	STR	88	\$7	SOW/WP/TRC	2/90	\$98	-	-	RD	90
NUMES Keyport	WA	LD/IS - HMT	33.60	7/87	STR	-	\$6	SOW/TRC	3/91	\$2,401	-	-	RD	91
NWS Concord	CA	LD/OT - OTH	29.92	5/88	WAR	83	\$425	SOW/WP/TRC/CRP/IF/S	12/92	\$6,536	-	-	RD	88
NWS Earle Coits Neck	NJ	LD/IS - HMT	37.21	7/87	-	-	-	SOW/WP	9/90	\$140	-	-	RD	90
AFP No. 4 Ft. Worth	TX	LD/SD - VOC/HMT/POL	39.92	7/87	WAR	86	\$2,500	PHASE II. TRC/CRP	11/90	\$7,315	IN	9/88	RD	91
Dover AFB	DE	LFSS - VOC/HMT	35.89	7/87	WAR	85-86	\$760	PHASE II. TRC/CRP	1/90	\$3,524	IN	10/88	RD	90
Fairchild AFB	WA	LD/SD/FT - VOC/POL	31.98	5/88	-	-	-	PHASE II	2/90	\$1,671	IN	7/88	RD	90
Wright-Patterson AFB	OH	LD - VOC/OTH	57.85	5/88	AWS	87	\$6,860	TRC/CRP/WP	1/90	\$5,323	IN	10/86	RD	90

LEGEND

1. DESCRIPTION		3. RI/FS
IS	Industrial Operations Sources	PHASE II = Confirmation Studies, Pre-SARA
LD	Land Disposal/Landfill	RI/FS = Remedial Investigation/Feasibility Study
SD	Surface Impoundment/Lagoon	SOW = Scope of Work
SS	Spill Site	WP = Work Plan
FT	Fire Training Area	TRC = Technical Review Committee
DS	Drum Storage	CRP = Community Relations Plan
OT	Other	HRA = Health Risk Assessment
MUN	Munitions Related Wastes	ROD = Record of Decision
HMT	Heavy Metals	
POL	Petroleum/Oil/Lubricants (and other hydrocarbon fuels)	4. IAG
VOC	Volatile Organic Compounds	(e) = Estimated
OTH	Other	IAG = Interagency Agreement
HRS	Hazard Ranking System	IN = Initiated (Mtg or Draft)
PA/SI	Preliminary Assessment/Site Inspection	FIN = Finalized (Signed)
		STATE = Agreement with State
		CONSDECR = Consent Decree
2. REMOVAL ACTION/INTERIM REMEDIAL ACTION		5. RD/RA
AWS	Alternate Water Supply/Treatment	
INC	Incineration	
STR	Site Treatment/Remediation	RD/RA = Remedial Design/Remedial Action
DEC	Decontamination	AWS = Alternate Water Supply
WAR	Waste Removal	INC = Incineration
GWT	Groundwater Treatment	STR = Site Treatment/Remediation
OTH	Other	WAR = Waste Removal
LTM	Long Term Monitoring	DEC = Decontamination
		GWT = Groundwater Treatment
		LTM = Long Term Monitoring
		OTH = Other

ABERDEEN PROVING GROUND, MD—INSTALLATION DESCRIPTION

Background Information

Aberdeen Proving Ground occupies 72,518 acres, 21 miles northeast of Baltimore, in Harford and Baltimore Counties, Maryland. Its mission is the testing and development of munitions, weapons, vehicles, and materials, and the operation of training schools. Mission-support operations have generated varying quantities of hazardous wastes including arsenic, volatile organics, phosphates, napalm, UXO, nitrates, and chemical agents. Water range areas that are contaminated with large quantities of UXO are accessible to local boating during non-testing periods, and could present a potential safety problem. Off-base contaminant migration could affect 4 proposed state critical areas and a national wildlife refuge.

STATUS UPDATE

PA/SI

An Installation Assessment was completed in September, 1976. Eight areas of contamination were identified. Three were recommended for preliminary survey and two for further monitoring. Large areas contaminated or potentially contaminated with UXO, chemical munitions, and manufacturing wastes were identified; and contamination of surface and ground waters was detected. Four wells were removed from service due to volatile organic compound contamination. Potential contaminant migration via surface waters was indicated at five sites. Sites at this installation were proposed for inclusion on the NPL in July, 1987; HRS: Edgewood Area—5357; Michaelsville—31.45.

RI/FS

An RI/FS is underway and expected to be completed in 1989. Low levels of hydrocarbons have been found in the ground water at three areas. White phosphorus has been detected in the sediment and surface waters at one area. It has been determined that O Field is contaminated with large quantities of chemical and explosive materials, and that it is a source of contaminant migration. Arsenic, trichloroaniline, and DDT have been detected in surface waters. Ground water has been contaminated by VOCs. No significant off-base migration has been reported. Resampling has confirmed original survey findings. Ground water investigation of O-Field is scheduled for completion in 1989.

RD/RA

Cleanup of the Edgewood area is being addressed under RCRA.

ALABAMA ARMY AMMUNITION PLANT, AL— INSTALLATION DESCRIPTION

Background Information

Alabama Army Ammunition Plant occupies 5,067 acres, 4 miles north of Childersburg, Alabama. The mission of this installation during WWII was the production of high explosives, nitrocellulose, and propellants. After the war, it remained on standby status until the early 1970s, when it was excessed. Mission-support operations generated varying quantities of potentially hazardous wastes including acids, nitrocellulose, nitroaromatic compounds, tetryl, anilines, paint and paint thinners, heavy metals, rubble, insecticides, polynuclear aromatic compounds, coal-pile runoff and asbestos.

STATUS UPDATE

PA/SI

The Army completed an Installation Assessment and an Exploratory Survey in July, 1983. These studies identified 21 sites as potential contaminant migration sources, 7 of which were targeted for an RI/FS. The studies identified a potential for vertical contaminant migration within the aquifer and surface water contamination. A Confirmation Study delineated parameters and migration patterns of one of the ground water aquifers. This study also identified nitroaromatic compounds in on-site soils and in an aquifer beneath and down gradient of the manufacturing areas. This installation was listed as a site on the NPL in July, 1987; HRS: 36.83.

RI/FS

RI/FS work at Alabama AAP is scheduled for completion in 1989. Investigations to date have found that the ground water is contaminated with nitroaromatic compounds in concentrations above applicable standards. On-site surface water is contaminated with nitroaromatic compounds and lead. Migration of contaminants at levels exceeding criteria is not expected.

RD/RA

Cleanup of Area A was completed in 1988, including soil excavation and decontamination of storage igloos and buildings. Decontamination of other areas is underway. The Army's goal is to clean up the facility to certify its release for general use. Other RD/RA work may be undertaken pending the RI/FS results.

ANNISTON ARMY DEPOT, AL—INSTALLATION DESCRIPTION

Background Information

Anniston Army Depot occupies 15,246 acres, approximately 10 miles west of the city of Anniston, Alabama. It is the largest tank rebuild facility in the free world. Efforts in support of this mission include the repair, maintenance, modification and rebuilding of combat vehicles and artillery equipment. Industrial and other mission-support operations generated varying quantities of potentially hazardous wastes including oils and greases, cyanide, metal plating sludge (heavy metals), paints and paint residues, acids, solvents, degreasers, phenols, boiler blowdown (fly ash), TNT and other ammunition waste, and unexploded ordnance.

STATUS UPDATE

PA/SI

The Army completed all PA/SI work at Anniston in July, 1983. This study identified 15 past disposal or spill sites potentially contaminated with hazardous wastes. In addition, the PA/SI found that hazardous wastes from some sites had contaminated the surface water and were probably contaminating the ground water as well. Sites at this installation were proposed for placement on the National Priorities List in July, 1987; HRS: 51.91.

RI/FS

RI/FS work confirmed that the local ground water is contaminated, principally with VOCs, phenols, and metals. Low levels of contaminants have migrated beyond the Depot boundary. Completed RI/FS document to be transmitted to regulatory agencies in 1989. Interagency Agreement currently being negotiated.

RD/RA

In 1983, contaminated materials at Site Z-1 were removed and excavated to a RCRA permitted facility. An air stripper for removing volatiles from ground water was installed and operational in 1987. Three additional ground water treatment systems are currently being installed.

NAVAL SUBMARINE BASE BANGOR, WA—INSTALLATION DESCRIPTION

Background Information

Naval Submarine Base Bangor occupies 6,692 acres, on the Kitsap Peninsula, 13 miles north of Bremerton, Washington. It currently serves as a support base for Trident submarines. Mission-support operations have produced hazardous wastes such as PCBs, waste oil and grease, spent solvents, waste battery acid, ordnance, pesticides, paints and painting residues, photographic chemicals, metal plating wastewater and sludge, and dyes.

STATUS UPDATE

PA/SI

An Installation Assessment was completed in June, 1983. Forty-two sites were identified as potentially contaminated and 10 were targeted for RI/FS work. Three ground water aquifers were characterized and their potential contaminant pathways determined. TNT, RDX, OTTO fuel, and ammonium pincrate contamination of the shallow aquifer, soil, and surface water was confirmed. In addition, an evaluation was made of the potential for contamination of nearby shoreline sediment from on-base surface water drainage. Site A was placed on the National Priorities List in 1987; HRS: 30.42.

RI/FS

RI field work for Site A was initiated in May, 1988 and an RI/FS will be completed in 1990. A draft RI/FS report for 10 sites will be completed in February, 1989.

RD/RA

Remedial Design/Remedial Action activities are expected to be initiated in 1991.

NAVAL AIR STATION BRUNSWICK, ME—INSTALLATION DESCRIPTION

Background Information

Naval Air Station Brunswick occupies 7,259 acres (including the main station and four non-contiguous properties) adjacent to the city of Brunswick, Maine, 27 miles northeast of Portland. Its principal mission is as a NATO facility. Mission-support industrial, ordnance, and other operations generated varying quantities of hazardous wastes including waste oils, contaminated fuels, solvents (including trichloroethane and trichloroethylene), acids, paint residues, photographic chemicals, pesticides, herbicides, and asbestos. Ground water, which serves as drinking water for 18,000 people, surface water, and nearby wetlands may be threatened by potential contaminant migration.

STATUS UPDATE

PA/SI

The Navy completed all PA/SI work in 1983. This study identified ten past disposal or spill sites potentially containing hazardous contaminants. Of these, seven were designated as having a high potential for environmental contamination, thus warranting further investigation. Sites on this installation were placed on the National Priorities List in July, 1987; HRS: 43.38.

RI/FS

An RI/FS was begun in April, 1986 to confirm contaminants present at the site, evaluate the potential for migration, and determine the migration paths. All RI/FS work is scheduled to be completed in 1990.

RD/RA

Remedial Design/Remedial Action activities are expected to be initiated in 1991.

CASTLE AIR FORCE BASE, CA—INSTALLATION DESCRIPTION

Background Information

Castle Air Force Base occupies 3,257 acres adjacent to the city of Atwater, California. The installation began as an Army base in 1941, and served as an aircrew training facility. Strategic Air Command (SAC) assumed responsibility for the base in 1946. Since 1957, the base has serviced the KC-135 strato-tanker and provided training programs for tanker crews. Mission-support operations have generated varying quantities of hazardous wastes including trichloroethylene, trichloroethane, cyanide, cadmium, fuels, waste oils, and pesticides. A water quality analysis of drinking water in wells drawing from a shallow ground water aquifer beneath and adjacent to the base indicated the presence of trichloroethylene in levels exceeding state and federal drinking water standards.

STATUS UPDATE

PA/SI

PA/SI work was completed in October, 1983. Twenty-six sites of potential contaminant migration were identified. Five sites were targeted for RI/FS investigations. Sites at this installation were placed on the National Priorities List in July, 1987; HRS: 37.93.

RI/FS

An RI/FS has been initiated and will be completed in 1990. Results to date indicate the shallow ground water aquifer beneath and adjacent to the base is contaminated with nitrates, trichloroethylene, and trace amounts of pesticides.

RD/RA

In 1986, the TCE-contaminated on-base drinking water supply was replaced with a new, potable water well drawing from deeper, uncontaminated aquifers. In 1987, a filter system was installed on off-base wells to remove TCE contamination. Bottled water was supplied to off-base users prior to filter installation. Further RD/RA work is expected to begin in 1991.

NAVAL WEAPONS STATION CONCORD, CA— INSTALLATION DESCRIPTION

Background Information

Naval Weapons Station Concord occupies 12,922 acres, 30 miles northeast of San Francisco, California. The activity is divided into two areas with two separate missions. The Tidal Area mission is transshipment, receipt, inspection, and classification of munitions; the Inland Area serves as a munitions storage and weapons maintenance, inspection, and testing facility. Operations have generated varying quantities of hazardous wastes including waste solvents, acids, paint, creosote, arsenic, lead, waste oils, ordnance compounds, fuels and asbestos. Past disposal practices and scattered unexploded ordnance could potentially cause soil, surface water and ground water contamination, posing a threat to human health from direct contact, ingestion of contaminated fish, shellfish or water. Several endangered species reside in tidal or inland areas.

STATUS UPDATE

PA/SI

An Installation Assessment was completed in 1984, which identified 32 sites of potential contamination. Thirteen sites were recommended for an RI/FS. Two sites at this activity were proposed for listing on the National Priorities List in 1988; HRS: 29.92.

RI/FS

An RI for 7 sites under litigation was completed in 1986, and the final FS was completed in 1988. An RI/FS for 4 sites in the Tidal Area was begun in 1987. An RI/FS for 11 sites in the Inland Area was begun in 1988. Both are expected to be completed in 1992. The 7 litigation sites were found to be contaminated with heavy metals and a potential exists for migration of contaminants into the bay area. Bioassays indicated movement of metals into plants, soil-dwelling organisms, and marine sediment inhabitants. Additional testing will be conducted at the litigation sites.

RD/RA

Contaminated debris has been removed from the Kiln Site (Site 3), and the Coke Pile Site (Site 6).

CORNHUSKER ARMY AMMUNITION PLANT, NE— INSTALLATION DESCRIPTION

Background Information

Cornhusker Army Ammunition Plant occupies 11,936 acres, 3 miles west of Grand Island, in Hall County, Nebraska. The plant was constructed in 1942 for the production of conventional munitions used in World War II. The plant was rehabilitated in 1950 to produce artillery shells and rockets for the Korean Conflict. Operations resumed during the Vietnam Conflict. The plant is currently in standby status. Previous activities at Cornhusker Army Ammunition Plant included loading, assembly, and packing of bombs, boosters and mines. Mission-support activities have generated hazardous wastes including TNT, DNT, RDX, and TNB.

STATUS UPDATE

PA/SI

An Installation Assessment was completed in March, 1980. This study identified 56 sources of contamination, ground water contamination by explosive compounds, and noted a potential for off-base contamination and migration. Sites at this installation were placed on the National Priorities List in July, 1987; HRS: 51.13.

RI/FS

A preliminary survey was completed in 1982, followed by a confirmation survey in 1985. A contaminant plume was detected 3 miles off-post and over 500 private wells in nearby Grand Island were affected.

RD/RA

In 1986, the municipal water system was extended to 800 residences in Grand Island. A dewatering system was completed in 1986 to control the high water table. In 1988, soil at 58 cesspools and leaching pits was excavated and incinerated to destroy all explosive compounds. The soil was landfilled on-site in accordance with procedures agreed to by the Army and the State. In addition, excavation and open burning/flashing of contaminated construction materials was completed in 1988.

DOVER AIR FORCE BASE, DE—INSTALLATION DESCRIPTION

Background Information

Dover Air Force Base occupies 3,740 acres, 3.5 miles southeast of Dover, in Kent County, Delaware. Its current mission is to provide immediate airlift of troops, cargo, and equipment. Mission-support operations have generated varying quantities of solvents, paints, waste fuel and oils, VOCs, hydraulic fluid, paint and corrosion removers, muriatic and nitric acids, caustic soda, cyanide, phenols, cadmium, copper, chromium, nickel, lead, and zinc.

STATUS UPDATE

PA/SI

An Initial Assessment was completed in October, 1983. Eleven areas were identified as potential sources of contamination, and seven of these were targeted for RI/FS work. The upper aquifer was found to be contaminated with low levels of volatile organics and heavy metals. However, the deep aquifer, which provides the base drinking water supply, was found not to be contaminated. Sites at this installation were proposed for inclusion on the NPL in July, 1987; HRS: 35.89.

RI/FS

A presurvey was completed in 1986. Twelve sites were investigated. It was confirmed that the concentration of VOCs and metals in soils, sediments, surface waters, and ground water exceed public health criteria or Delaware drinking water standard maximums at several sites. Contaminant sources and the extent of contaminant migration are currently being investigated under an RI/FS that is expected to be completed in 1990.

RD/RA

The industrial waste basin, the major source of on-base ground water contamination, was closed and capped in FY 1986.

NAVAL WEAPONS STATION EARLE COLTS NECK, NJ— INSTALLATION DESCRIPTION

Background Information

Naval Weapons Station Earle Colts Neck occupies 706 acres in the Chapel Hill, New Jersey area, and 10,428 acres inland, 47 miles southeast of New York City. Current missions include the receipt, renovation, maintenance, storage, and issuance of ammunition, explosives, and expendable ordnance material, and provision of logistics and administrative support to home ported ships. Base operations generated varying quantities of hazardous wastes including waste oils and lubricants, degreasers, solvents, paint residues, corrosives, acids, metals, ammunition, unexploded ordnance, and fungicides and pesticides. This base is in the recharge area for the regional ground water system. Extensive public and private use of both surface and ground water makes runoff from any on-base contamination a substantial threat to public health and the environment.

STATUS UPDATE

PA/SI

The Navy completed a PA in March 1983. This study identified 29 potentially contaminated sites. An SI for 11 sites was completed in 1986. An SI for 16 of the remaining 18 sites is expected to begin in 1989. This activity was proposed for the National Priorities List in July, 1987, HRS: 37.21.

RI/FS

An RI work plan for 11 sites is currently being prepared. The RI/FS is expected to be completed in 1990.

RD/RA

Remedial Design/Remedial Action activities are expected to be initiated in 1990.

MARINE CORPS AIR STATION EL TORO, CA— INSTALLATION DESCRIPTION

Background Information

Marine Corps Air Station El Toro occupies approximately 4,700 acres, 9 miles southwest of Newport, California. This activity serves as the Marine Corps' major West Coast jet fighter facility. The operations conducted at this activity have resulted in the generation of varying quantities of hazardous wastes including waste fuels, oils, degreasers, solvents, paints, paint residues, photographic chemicals, corrosives, refrigerants, pesticides, herbicides, and PCBs. Ground water in the vicinity of El Toro is contaminated with volatile organic chemicals. Ground water is used both for agricultural and domestic purposes, and surface water flows to the Upper Newport Bay Ecological Reserve. Contamination levels off-base are significantly higher than levels found on-base. A perimeter investigation is underway to help establish El Toro's influence on the off-base contamination.

STATUS UPDATE

PA/SI

An Initial Assessment Study was completed in 1986. This study identified 17 potentially contaminated sites, 16 of which were targeted for additional investigation. An SI is currently underway and scheduled for completion in 1989. Sites at this installation were proposed for listing on the National Priorities List in 1988; HRS: 40.83.

RI/FS

An RI/FS is planned after completion of the SI. The Navy intends to negotiate a Federal Facilities Agreement with the EPA and the State of California prior to initiation of the RI/FS. A Technical Review Committee has been established.

RD/RA

Remedial Design/Remedial Action activities are expected to be initiated in 1992.

FAIRCHILD AIR FORCE BASE, WA—INSTALLATION DESCRIPTION

Background Information

Fairchild Air Force Base is located approximately 12 miles west of Spokane, Washington. Its primary mission is support of Strategic Air Command operations. Mission-support operations have generated varying quantities of hazardous wastes including solvents, fuels, oils, electroplating chemicals, cleaning solutions, corrosives, photographic chemicals, paints, thinners, pesticide residues, PCBs and low-level radioactive wastes.

STATUS UPDATE

PA/SI

An Installation Assessment was completed in 1985. Twenty-one waste disposal sites were identified at Fairchild AFB, and 1 site was identified at the USAF/FAA operations at Mica Peak. Twelve sites were recommended for further investigations. Land-use restrictions are in effect. Sites at this base were proposed for listing on the National Priorities List in 1988; HRS: 31.98.

RI/FS

An RI/FS for ten sites was initiated in 1988 and is expected to be completed in 1990.

RD/RA

Remedial Design/Remedial Action activities are expected to begin for 2 sites in 1990.

FORT DIX, NJ—INSTALLATION DESCRIPTION

Background Information

Fort Dix occupies 31,110 acres, 16 miles southeast of Trenton, in Burlington County, New Jersey. Its mission is to conduct basic combat and advanced individual training, provide combat support, and support the Reserve and National Guard units. Hazardous wastes generated by these operations include methylene chloride, trichloroethylene, chloroform, trichloroethane, toluene, VOCs, petroleum hydrocarbons, heavy metals, photographic chemicals, UXO, battery acid, antifreeze, pesticides, herbicides, Freon, and PCBs.

STATUS UPDATE

PA/SI

The Army completed an Installation Assessment in March, 1977. A Reassessment was completed in 1987. Over 40 potentially contaminated sites were identified, 22 of which were investigated in detail. On-site radioactive contamination of soils was detected at an inactive BOMARC missile site. The Air Force is responsible for investigating and monitoring this site under a leasing agreement with the Army. Soil and ground water contamination was identified at 4 sites; heavy metal contamination was detected at 4 sites; evidence of petroleum hydrocarbon contamination was uncovered at 4 sites; chloroform contamination was found at 2 sites; trichloroethylene and trichloroethane were located at 1 site each; and potential contamination from underground fuel tanks was present at 2 sites. The landfill at this installation was placed on the NPL in July, 1987; HRS: 3740.

RI/FS

An initial Remedial Investigation (RI) at the NPL Landfill was completed in September, 1986 and a Feasibility Study was finished in January, 1987. Findings indicated that a contaminant plume was emanating from the landfill. VOCs were detected in wells south and southwest of the landfill. Source control alternatives were identified for the landfill. An Interagency Agreement is currently being negotiated between the base and the EPA. Another RI encompassing 14 sites including the NPL Landfill was initiated in February, 1987. A draft RI report is scheduled for completion in May, 1989.

RD/RA

Remedial actions to address the landfill are expected to begin in 1990.

FORT LEWIS, WA—INSTALLATION DESCRIPTION

Background Information

Fort Lewis occupies 86,541 acres, 20 miles northeast of Tacoma, in Pierce County, Washington. Its mission is to serve as the U.S. Army Forces Command Center for troop induction and training, and to supervise execution of the High Technology Test Bed Program. Mission-support operations have generated varying quantities of spent solvents, plating wastes, pesticides, PCBs, coal liquification wastes, polycyclic aromatic hydrocarbons, waste oils and fuels, battery electrolyte, trichloroethylene (TCE), asbestos, sodium hydroxide paint stripper, chromic and phosphoric acids, paints, paint strippers and thinners, neutralized caustic paint-stripping and battery electrolyte wastes.

STATUS UPDATE

PA/SI

The Army conducted assessment work during 1983 and 1984. These studies identified 26 sites potentially contaminated with hazardous wastes, of which 15 were recommended for an RI/FS. No evidence of off-base contaminant migration via surface or ground water was found. However, there was evidence of ground water degradation from liquified coal production spillage. The lagoon sediment and underlying ground water were found to be contaminated with TCE, and hazardous chemicals were detected at Landfill 5. Landfill 5 was final listed on the NPL in July, 1987; HRS: 42.78.

RI/FS

An initial investigation was completed in May, 1986. An RI/FS at the Logistics Center is to be completed in 1990, and an RI/FS on Landfill 5 has been started. These investigations have detected di- and trichloroethylene in ground water beneath the Logistics Center, and found that contamination is flowing from the Center towards the American Lake Gardens housing area. The contamination zone has been identified as being approximately 10,000 feet long, 2,500 feet wide, and extending 80 feet below the land surface. Three potential sources of TCE contamination have been identified.

RD/RA

Installation of a liner and leachate collection system at Landfill 5 is planned following completion of a Feasibility Study.

AIR FORCE PLANT #4, FT. WORTH, TX—INSTALLATION DESCRIPTION

Background Information

Air Force Plant #4 occupies 602 acres, in Fort Worth, Tarrant, Co., TX. It is a government owned-contractor operated plant run by General Dynamics that manufactures aircraft and associated equipment. Industrial operations have resulted in the generation of wastes including solvents, paint residues, spent process chemicals, PCBs, waste oils and fuels. Approximately 13,000 people in the city of White Settlement rely on the aquifer underlying the base for drinking water.

STATUS UPDATE

PA/SI

PA/SI work was completed in August, 1984. Twenty sites were studied and 10 were identified as potentially contaminated. Ground and surface water contamination involving di-, tri-, and tetrachloroethylene; ethylbenzene; toluene; methylene chloride; heavy metals; cyanide; and petroleum products was found. Sites at this plant were proposed for placement on the National Priorities List in July, 1987; HRS: 39.92.

RI/FS

A Confirmation/Quantification Study examined 21 sites. No further action was recommended for 8 sites. Twelve sites were recommended for Feasibility Studies and 1 site will undergo additional sampling. Contamination of soils, surface waters and ground water with heavy metals and organic compounds was confirmed. An RI/FS will be completed in 1990.

RD/RA

In 1986, contaminated soil was excavated at four sites. Other RD/RA work will begin in 1991. Wells for the city of White Settlement are sampled on a quarterly basis by EPA. Future monitoring is planned.

GRIFFISS AIR FORCE BASE, NY—INSTALLATION DESCRIPTION

Background Information

Griffiss Air Force Base occupies 5,836 acres, 2 miles northeast of Rome, in Oneida County, New York. The installation was activated in 1942 and serves to maintain and implement effective air refueling operations, and provide long-range bombardment capability on a global scale. Mission-support operations have generated varying quantities of hazardous wastes including methanol, acetone, trichloroethane, trichloroethylene, dye penetrants, soaps, greases, degreasers, isopropyl alcohol, solvents, cleaners, methyl ethyl ketone, toluene, and lead. On-base wells may be contaminated from landfill leachate.

STATUS UPDATE

PA/SI

The Air Force completed all PA/SI work in 1981. The study identified 19 sites containing hazardous materials from past disposal activities. Four sites were recommended for an RI/FS. The study detected surface contamination at the Tank Farm and potential ground water contamination by dry wells and a lindane spill. Sites at this installation were placed on the National Priorities List in July, 1987; HRS: 34.20.

RI/FS

Initial studies were completed in 1985. Ten sites were identified. The studies detected contaminated ground water in a limited area near Landfill 1; PCB contaminated soils at Building 112; fuel product contamination of soils and ground water at the Tank Farm; heavy metal contamination of soils in the Battery Disposal Pits and VOC contamination in the groundwater at Landfill 7. An RI/FS is scheduled for completion in 1990. The Air Force is currently negotiating an Interagency Agreement with the EPA, and the State of New York.

RD/RA

Several underground storage tanks were removed from the Tank Farm and contaminated soils were removed from the Battery Acid Disposal Pits in 1987. Additional RD/RA activities are expected to begin in 1991.

HILL AIR FORCE BASE, UT—INSTALLATION DESCRIPTION

Background Information

Hill Air Force Base occupies 5,915 acres, 5 miles south of Ogden, in Davis and Weber County, Utah. Its current mission as Ogden Logistics Center, ensures that Air Force weapon systems are kept at maximum operational capability and that the Air Force constantly assumes a combat-ready posture. Operations have generated a variety of wastes including sulfuric and chromic acids, methyl ethyl ketone, trichloroethylene, industrial sludge, solvent cleaning bottoms, solvents, and liquid petroleum wastes.

STATUS UPDATE

PA/SI

PA/SI work was completed in 1982. Thirteen sites were identified as contaminant sources and 7 of these were recommended for an RI/FS. Sites at this installation were placed on the National Priorities List in July, 1987; HRS: 49.90.

RI/FS

Initial investigations were completed in 1984 and 1988. Sampling confirmed soil and ground water contamination by metals, VOCs and fuel products. A contaminant plume was identified at Landfills 3 and 4. An underground oil slick was identified below Berman Pond. It was determined that golf course irrigation may be driving contaminant migration. The RI/FS is expected to be completed in 1990. An Interagency Agreement between the Air Force, the EPA, and the State of Utah is currently being negotiated.

RD/RA

Hill AFB installed a slurry wall and capped the landfills, chemical disposal pits and Berman Pond to reduce leachate generation. Additional RD/RA activities are expected to begin in 1991.

JOLIET ARMY AMMUNITION PLANT, IL—INSTALLATION DESCRIPTION

Background Information

Joliet Army Ammunition Plant occupies 23,543 acres, 17 miles south of Joliet, in Will County, Illinois. The plant is a government owned-contractor operated facility designed for the manufacture of explosives and ammunition. Since 1977, it has been in standby status. Mission-support operations generated varying quantities of hazardous waste including TNT, DNT, RDX, nitric and sulfuric acids, oleum, sellite, toluene, sodium, sulfite, tetryl, and lead azide. Several areas could potentially contaminate ground and surface water on- and off-base. Humans (using water for recreational purposes), vegetation, and wildlife could be impacted by contaminated surface water.

STATUS UPDATE

PA/SI

An Installation Assessment was completed in September, 1978. Five areas were identified as major sources of contamination. A potential for off-base contaminant migration of nitrocompounds and other industrial wastes was identified. The study found that aquifer was potentially contaminated, aquatic life was eliminated in creeks that received wastewater discharge in the past, and inorganic contamination was found in soils near the ashpiles. The manufacturing area was final listed on the NPL in July, 1987. HRS: 32.08. The LAP (load, assembly, pack) area was proposed for inclusion on the NPL in July, 1987; HRS: 35.23.

RI/FS

Field investigation and technical reports were completed in 1983. A confirmation survey assessment was completed in November, 1987. Contamination was detected in ground and surface water, sediments, and soils. Off-post migration of contaminants via surface water was found to be likely. An RI report for the manufacturing area is expected to be completed in June 1989. An RI/FS for the remaining sites is expected to be completed in 1990. An Interagency Agreement between the Army, EPA, and the State of Illinois is being negotiated and is expected to be signed by June, 1989.

RD/RA

In 1985, sludge and the liner was removed from the red water lagoon and the area was capped with clay. The ash piles were recapped in 1985. Additional RD/RA activities are expected to be initiated in 1990.

NAVAL UNDERSEA WARFARE ENGINEERING STATION KEYPORT, WA— INSTALLATION DESCRIPTION

Background Information

Naval Undersea Warfare Engineering Station Keyport occupies 4,959 acres, 15 miles west of Seattle, Washington, on the Kitsap Peninsula. Originally, it was used as a torpedo range. Its mission was expanded during World War II to include the proving, overhaul, and issue of torpedoes. Mission-support operations generated varying quantities of hazardous wastes including painting residues, thinners, and strippers; solvents, cleaners, and degreasers; deflocculant, contaminated fuel solids and rinsewaters; sewage and metal plating wastewater and sludge; neutralized concentrated plating baths; waste oils and fuels; acids, caustics lag, and pesticide rinseate; dyes; ordnance and explosives wastes; and batteries. Potential pollution receptors in and around the base include backup water wells, fish, shellfish and wildlife habitats along the shoreline.

STATUS UPDATE

PA/SI

An Initial Assessment Study was completed in 1984. Twenty-three sites were identified as potential contaminant migration sources; six were recommended for an RI/FS and one was recommended for mitigation action. The study concluded that past disposal practices may have contaminated portions of a shallow aquifer and adjacent marsh. Potential off-site contamination of bay and marsh sediment may impact oysters, fish, and shellfish. Sites on this installation were repropoed for listing on the National Priorities List in July, 1987; HRS: 33.60.

RI/FS

An RI/FS is on-going and is expected to be completed in 1991.

RD/RA

Remedial Design/Remedial Action activities are expected to begin in 1991.

LAKE CITY ARMY AMMUNITION PLANT, MO— INSTALLATION DESCRIPTION

Background Information

Lake City Army Ammunition Plant occupies 3,909 acres, 10 miles east of Independence, in Jackson County, Missouri. The plant is a government owned-contractor operated facility, run by Olin Corporation. Its primary mission is the manufacture and loading of small arms ammunition and the production of lead styphnate. Mission-support operations have generated hazardous wastes such as TNT, oils, spent halogenated and nonhalogenated solvents, tetracene, asbestos, tranzite, VOCs, trichloroethylene, sodium orthosilicate, heavy metals (barium, cadmium, chromium, lead, mercury, silver, beryllium), sulfuric acid, styphnic acid, and initiator materials. It is estimated that ground water contamination could affect approximately 2,800 people who rely upon on-base wells as a source of drinking water.

STATUS UPDATE

PA/SI

The Army completed an Installation Assessment in May, 1980, and a Reassessment in 1986. Seventy-three past and present disposal areas were identified, all of which were recommended for an RI/FS. The sand pits were found to contain various heavy metals. Solvents were detected in the ground water beneath the closed landfill and solvent pits. TCE was detected in a well downgradient from the chemical laboratory lagoon; and an explosive compound was detected in a ground water sample from the IWTP Area. In addition, the geology of the site indicates the potential for contaminant migration. Sites at this installation were placed on the National Priorities List in July, 1987; HRS: 33.68.

RI/FS

Soil gas studies and geophysical surveys were conducted in 1987; monitoring well installation was completed in 1988. Soil gas samples did not reveal any contamination. Ground water monitoring results will be included in the Draft RI Report which is scheduled for completion in April, 1989. An Interagency Agreement between the EPA, the Army, and the State of Missouri is currently being negotiated.

RD/RA

In 1988, several explosive waste lagoons were closed by removing contaminated sludges and soils, filling with clean soils/clays, grading and reseeding. Four explosive waste lagoons, the six IWTP lagoons and the oily trenches at the solid waste landfills are currently undergoing closure.

NAVAL AIR ENGINEERING CENTER LAKEHURST, NJ— INSTALLATION DESCRIPTION

Background Information

Naval Air Engineering Center Lakehurst occupies 7,382 acres in New Jersey; 65 miles south of New York City and 50 miles east of Philadelphia. The primary mission of NAEC Lakehurst is the testing and development of weapons systems and their components. Operations related to mission-support activities generated varying quantities of hazardous wastes including fuels, waste oils, degreasers, solvents, paints and paint residues, photographic chemicals, acids, refrigerants, boiler blowdown from coal and oil power plants, PCBs, pesticides and herbicides, and unexploded ordnance. The installation lies within an extensive environmentally sensitive pineland preservation which supports recreational, wildlife and agricultural uses. A shallow aquifer adjacent to the base is utilized by surrounding communities for drinking water.

STATUS UPDATE

PA/SI

The PA/SI, completed in May, 1983, identified 44 potentially contaminated sites. Forty-three of these sites will undergo further investigation during an RI/FS. Sites at this installation were placed on the National Priorities List in July, 1987; HRS: 50.53

RI/FS

An RI/FS is currently on-going. Completed field work has confirmed contamination at several sites. Analysis of potable well water showed no evidence of contamination. A draft report is scheduled to be completed by August, 1989. In addition, initial screening of the FS for 15 priority sites is on-going. Aquifer characterization testing is scheduled for late summer 1989.

RD/RA

Remedial Design/Remedial Action activities are expected to be initiated in 1992.

MARINE CORPS BASE CAMP LEJEUNE, NC— INSTALLATION DESCRIPTION

Background Information

Marine Corps Base Camp Lejeune occupies 88,432 acres, south of Jacksonville, North Carolina. The base's mission is to provide housing, training facilities, logistical support and administrative support for Fleet Marine Force Units and other assigned units. The operations conducted on-base have resulted in the generation of varying quantities of hazardous wastes including waste oils, fuels, solvents, battery acid, lithium batteries, paints, thinners, pesticides, herbicides, and PCBs. A potential for soil, surface water and ground water contamination exists. Surface waters drain from the base to the Atlantic Ocean via the New River. Both water bodies support recreational and commercial fishing. Several endangered species, including the American Alligator and the Red-Cockaded Woodpecker, inhabit protected areas on the base. Ground water is the sole source of potable water for the base and surrounding communities.

STATUS UPDATE

PA/SI

The Navy completed an Installation Assessment in 1983. Fifty-four past spill and disposal sites were identified as potentially contaminated and possible migration sources. Twenty-three of the sites were targeted for an RI/FS. One site on this installation was proposed for the National Priorities List in 1988; HRS: 36.84

RI/FS

An RI/FS began in 1984 and is expected to be completed in 1990. An accelerated investigation for the Hadnot Point Industrial Area has been conducted. The studies identified fuel and chlorinated solvents in the ground water at the industrial area. However, the contamination source has not been identified. Several on-base wells have been closed. A Technical Review Committee has been established.

RD/RA

Remedial Design/Remedial Action activities are expected to be initiated in 1991.

LETTERKENNY ARMY DEPOT, PA—INSTALLATION DESCRIPTION

Background Information

Letterkenny Army Depot occupies 19,511 acres, 2 miles north of Chambersburg, Pennsylvania. Its mission is the maintenance and testing of tracked vehicles and missiles; the issuance of chemicals and petroleum; and the storage, demilitarization and modification of ammunition. Operations have generated varying quantities of potentially hazardous wastes including heavy metals, pesticides, explosives, petroleum/oil/lubricant (POL) wastes, phenolics, phosphorus, trichloroethylene, painting residues and thinners, solvents, cleaning agents, and metal plating wastewater and sludge.

STATUS UPDATE

PA/SI

An Installation Assessment was completed in December, 1983. Fourteen potentially contaminated sites were identified; all were targeted for an RI/FS. Significant contamination of ground water by aromatic hydrocarbons and volatile chlorinated hydrocarbons was identified. Elevated levels of contaminants have migrated off-base. Nitrate concentrations were detected in the ground water at levels above the national standard. The Property Disposal Office (PDO) area was repropose for inclusion on the National Priorities List in July, 1987, and the Southeast Industrial Area was placed on the National Priorities List in July, 1987; HRS: 34.21.

RI/FS

An RI/FS is currently underway and expected to be completed in 1989. Contamination has been confirmed at 11 sites. Ground and surface waters have been contaminated with chlorinated hydrocarbons, chlorinated organic solvents, toluene, chloroform, heavy metals, and freon. Soils have been found to be contaminated by xylene, heavy metals, chloroform, aromatic and chlorinated hydrocarbons, and chlorinated organic solvents. Contaminant migration beyond the Depot boundary has been identified. A study is currently underway to define contaminant flow. An Interagency Agreement between the Army, the EPA, and the State of Pennsylvania is expected to be signed in early 1989. Under the agreement a ground water quality assessment effort at the IWTP lagoon is underway in order to meet RCRA requirements.

RD/RA

An alternate water system was provided in September, 1987. An in-situ volatilization system is currently being installed. Additional RD/RA activities for the PDO and Southeast Industrial Area are expected to begin in 1989.

LONE STAR ARMY AMMUNITION PLANT, TX— INSTALLATION DESCRIPTION

Background Information

Lone Star Army Ammunition Plant occupies 15,546 acres, 12 miles west of Texarkana, in Bowie County, Texas. The base is a government owned-contractor operated plant run by Day and Zimmerman, Inc., for the production, loading, and demilitarization of explosives and munitions. Mission-support operations have generated the following hazardous wastes: TNT, DNT, RDX, tetrazine, lead styphnate, lead azide, tetryl, octal, hexavalent chromium, copper, cadmium, lead, mercury, arsenic, nitrobenzenes, sulfates, and chlorides. Potential ground water contaminant migration off-base could affect approximately 1200 people that use private wells located within three miles of the base as a source of drinking water.

STATUS UPDATE

PA/SI

The Army completed an Installation Assessment in July, 1978. Twenty-eight areas of potential contamination were identified of which 24 were targeted for an RI/FS. Manufacturing, disposal, demolition, and lagoon areas were found to be contaminated with nitrobenzenes and heavy metals, and it was determined that the potential exists for contaminant migration beyond the base boundaries via surface and subsurface waters. Unexploded ordnance was found in the testing and demolition areas. One site, the Old Demolition Area, was proposed for the National Priorities List in 1984 and final listed in July, 1987. HRS: 31.85.

RI/FS

Preliminary investigations were conducted in 1982 and 1983. Fourteen areas of potential contamination were investigated. Heavy metal contamination was discovered in the ground water at 8 areas, in the surface water at 2 areas, in the sediments at 1 area, and in the surface soils at 4 areas. In addition, small concentrations of sulfates, chlorides, DNT, and dieldrin were detected in the ground water at 1 area; contaminant migration via ground water was detected at 2 areas; and 5 areas were identified as having the potential for contaminant migration via ground water and/or surface water. An RI/FS was initiated in 1987. The EPA and State agencies will review the RI findings in 1989. A three-party Interagency Agreement is currently being negotiated for response actions.

RD/RA

The Chromic Acid and O-Line ponds have been closed and are currently being monitored. Future RD/RA work will address the Old Demolition Area.

LOUISIANA ARMY AMMUNITION PLANT, LA— INSTALLATION DESCRIPTION

Background Information

Louisiana Army Ammunition Plant occupies 14,974 acres, 22 miles east of Shreveport, Louisiana. The base is a government owned-contractor operated plant run by Thiokol Corporation to manufacture metal shell parts, and to load, assemble, and pack ammunition items. Mission-support operations generated varying quantities of hazardous wastes including oils, grease, degreasers, phosphates, solvents, metal plating sludges, acids, fly ash from boiler blowdown, and TNT and RDX explosives.

STATUS UPDATE

PA/SI

The Army completed PA/SI work at Louisiana AAP in 1978. This investigation identified contamination by explosives, metal plating, and lubrication wastes in both the industrial and waste disposal areas with the potential for contaminant migration. Sites at this installation were proposed for placement on the National Priorities List in July, 1987; HRS: 30.26.

RI/FS

The first stage of RI/FS work was completed in 1983 and a follow-on study was completed in 1987. The investigation indicated that on-post wells were contaminated with di- and trinitrotoluene, phenols, cadmium and tetryl. South plant boundary wells were contaminated; but no off-post migration had occurred. The Feasibility Study is to be initiated in 1989. A Decision Memorandum for the interim response at Area P has been approved by the Army, concurred in by the State of Louisiana, and is under review by EPA Region VI. An Interagency Agreement with the State of Louisiana and EPA is expected to be signed in early 1989.

RD/RA

A closure plan for the leaching pits was submitted to the State of Louisiana in 1988. Incineration of explosive contaminated soil began in 1988 and is expected to be completed by 1990.

MATHER AIR FORCE BASE, CA—INSTALLATION DESCRIPTION

Background Information

Mather Air Force Base occupies 5,934 acres, 12 miles east of Sacramento, California. Its primary mission is Air Force navigator training. Since 1958 it has also provided support for Strategic Air Command bombers. Mission-support operations have generated hazardous wastes such as solvents, cleaners, plating wastes, and residues. Water quality analyses of drinking water in wells on and nearby the base have indicated the presence of trichloroethylene in the ground water system beneath and adjacent to the base.

STATUS UPDATE

PA/SI

The Air Force completed PA/SI work in January, 1982. Twenty-three past disposal or spill sites were identified, 20 of which were suspected of having a potential to be contaminant migration sources and were targeted for an RI/FS. Because of the suspected significant levels of TCE contamination, the Aircraft Control and Warning (AC&W) area of the base was placed on the National Priorities List in July, 1987; HRS: 2890.

RI/FS

RI/FS work commenced in August, 1983. TCE ground water contamination on-base was confirmed and low concentrations of chloro- and dichloro-benzenes were detected. The ground water investigation is continuing with additional monitoring wells and further ground water sampling to define the contaminant plume. The RI/FS is scheduled to be completed in 1989.

RD/RA

Several homes off the installation were connected to alternate water supply sources in FY 1986 and FY 1987. Further RD/RA activities are expected to be implemented in 1990.

McCHORD AIR FORCE BASE, WA—INSTALLATION DESCRIPTION

Background Information

McChord Air Force Base occupies 7,199 acres, 1 mile south of Tacoma in Pierce County, Washington. Formerly a bomber base, its current mission is to provide airlift of troops, cargo, equipment, passengers, and mail. Mission-support operations generated varying quantities of hazardous wastes including methylene chloride, chloroform, benzene, VOCs, arsenic, chromium, mercury, solvents, detergents, paints, hydraulic fluid, corrosion-removing compounds, di- and trichloroethylene, perchloroethylene, sodium cyanide, acids, trichloroethene, thinners, strippers, toluene, naphtha, pesticides, developer, fixer, arsenic, cadmium, copper, lead, and methyl chloride. Over 10,000 people located within 3 miles of the base depend on the aquifer partially underlying the base for drinking water.

STATUS UPDATE

PA/SI

PA/SI work was completed in August, 1982. Sixty-two disposal sites were identified; 34 of these sites were targeted for an RI/FS. Di- and trichloroethylene were detected in the surface and ground water, and it was determined that there was a potential for on- and off-base contaminant migration. Sites at this installation were placed on the National Priorities List in July, 1987. HRS: 43.24.

RI/FS

Initial investigations completed to date indicated low level contamination of surface and ground waters. Contaminant migration north and west of the base was confirmed. The contaminant plume was determined to be 250 feet wide and present in the water column 40 to 70 feet below the ground surface. Quantities of di- and trichloroethylene were discovered at American Lake Gardens Housing Tract in excess of health department action levels. In addition, public water supply wells adjacent to the base were closed due to low level concentrations of organic solvents and other priority pollutants. An RI/FS is scheduled to be completed in 1990.

RD/RA

A new potable water system for the American Lake Gardens Housing Tract was completed in 1986. Additional RD/RA activities are expected to be implemented in 1991.

McCLELLAN AIR FORCE BASE, CA—INSTALLATION DESCRIPTION

Background Information

McClellan Air Force Base occupies 3,690 acres, 8 miles northeast of Sacramento, California. Its current mission is to operate as an Air Force Logistics Center. Base personnel manage assigned aircraft, missile, and space programs, electronics systems, and communications-electronics programs. Mission-support operations have produced hazardous wastes including organic solvents, metal plating wastes, caustic cleaners/degreasers, painting residues, waste lubricants, photochemicals, phenols, chloroform, spent acids and bases, and PCB contaminated oils. A 1979 Air Force study detected ground water contamination. Two on- and three off-base wells were closed. Approximately 23,000 people in the area depend on the ground water for domestic and agricultural use.

STATUS UPDATE

PA/SI

A Preliminary Assessment was completed in 1981. Forty-six potential contaminant migration sites were identified, 36 of which were grouped as one site. DCE, TCE, and other solvents were discovered on-base and in public and private wells off-base. Sites at this installation were placed on the National Priorities List in July, 1987. HRS: 5793.

RI/FS

RI work is on-going. Sixty-eight areas have been investigated. Further action will be taken at 27 of these areas. Eighty-eight additional areas have been identified for RI/FS work. Ground water contamination, primarily of the shallow aquifer, has been detected. Deeper aquifer contamination was below the limit of detection with the exception of pesticides and herbicides. Ground water contamination off-base has been confirmed. The RI/FS is expected to be completed in 1990.

RD/RA

One area was capped in 1987 and a pump-and-treatment system was installed to treat contaminated ground water from two areas. PCB contaminated soils were removed, and the Air Force is providing alternate water sources to residents with water supply contamination above California action levels. Further RD/RA activities are expected to be implemented in 1991.

MILAN ARMY AMMUNITION PLANT, TN—INSTALLATION DESCRIPTION

Background Information

Milan Army Ammunition Plant occupies 22,544 acres, 5 miles east of Milan, in Gibson and Carroll Counties, Tennessee. Its mission is storage, loading, assembly, packing, shipment, and demilitarization of explosive ordnance. Mission-support operations have generated potentially hazardous wastes in various quantities including nitrates, TNT, RDX, paint, thinners, lead, mercury, acids, toluene, organic solvents, carbon tetrachloride, and cadmium. Over 13,000 people in this area depend on ground water as a source of drinking water. Ten base water supply wells are located less than 3 miles from an area of known ground water contamination.

STATUS UPDATE

PA/SI

All PA/SI work was completed in 1978. Six past industrial and disposal areas contaminated with explosive wastes were identified. All six were targeted for RI/FS work. It was determined that surface drainage ditches and streams were contaminated with RDX, TNT, zinc, chromium, iron, sulfates, phosphates, tetryl, and nitrobenzenes (with potential for off-base migration). The O-line ponds at this installation were placed on the NPL in July, 1987; HRS: 58.15.

RI/FS

Initial investigations have been completed. Ground water contaminant plumes migrating toward the base boundary have been identified. Widespread low level contamination of ground and surface water and stream sediments has been verified. It has been determined that ground water concentrations of metals slightly exceed EPA water standards. Regular sampling and analysis of existing wells is on-going. A formal RI/FS delisting of the O-line ponds was initiated in 1988 and is expected to be completed in 1990.

RD/RA

O-line settling ponds were capped and seeded with grass in December, 1984. Soil contaminated with explosive compounds was excavated. Post-closure monitoring and maintenance of the cap and structures (fences) is on-going. Further RD/RA activities are expected to begin in 1991.

MINN ST. PAUL IAP, MN—INSTALLATION DESCRIPTION

Background Information

Minn St. Paul IAP Air Force Reserve Base occupies 301 acres at the civilian Minneapolis-St. Paul IAP. It was established in 1943 as an Air Force Flight Training Base. Since 1970, it has been under the command of the 934th Tactical Airlift Group. Operations have generated wastes including oil/petroleum/lubricants, spent solvents and cleaners, battery acid, strippers, methyl ethyl ketone, cellulose nitrate, painting wastes (containing metals), PCBs, pesticides, chromium-containing paint filters, and chlorinated hydrocarbons. Approximately 64,700 people in the Twin Cities metropolitan area use public and private wells located within 3 miles of the base.

STATUS UPDATE

PA/SI

An Initial Assessment was completed in March, 1983. Nine past disposal and spill sites were identified, six of which were considered to be potential contaminant migration sources and targeted for an RI/FS. One site was targeted for removal action. One site at this installation was placed on the National Priorities List in July, 1987; HRS: 35.00.

RI/FS

Initial studies were completed in 1986. These studies found that leachate from the small arms landfill is a potential source of off-base contaminant migration. Evidence indicated that the ground water is contaminated with mercury, DCE, oil and grease, and trichloroethane. A free floating hydrocarbon plume in the water table aquifer, migrating to the southwest and possibly to the northwest, was found in 1987. Soils were found to be contaminated with benzene, ethyl benzene, toluene, xylene, oil and grease, chloroform, and heavy metals. The RI/FS is expected to be completed in 1990.

RD/RA

Remedial Design/Remedial Action activities are expected to begin in 1991.

NAVAL AIR STATION MOFFETT FIELD, CA— INSTALLATION DESCRIPTION

Background Information

Naval Air Station Moffett Field occupies 3,919 acres adjacent to Sunnyvale, California, 35 miles south of San Francisco. It supports antisubmarine warfare training and patrol squadrons; houses one major air training squadron and seven Orion patrol squadrons; and is the Headquarters for the Commander Patrol Wings of the Pacific Fleet. Operations have generated a variety of hazardous wastes including waste oil and fuels, painting residues, solvents, caustic solutions, cleaning components, boiler blow-down, PCB contaminated transformer oil and filters, battery electrolytes, coolant, pesticides, freon, asbestos, dyes, metal plating wastes, photographic chemicals, and ordnance. Approximately 272,000 people depend on wells located within three miles of the base as a source of drinking water. The estuarine wetlands of San Francisco Bay are located adjacent to the base.

STATUS UPDATE

PA/SI

An Installation Assessment was completed in April, 1984. Nine sites were identified as potential contaminant migration sources. Eight of these were targeted for an RI/FS. The potential effect of contaminant migration on the regional aquifer system was documented, as was the chlorinated hydrocarbon contamination of a shallow on-site aquifer. Sites at this installation were placed on the National Priorities List in July, 1987; HRS: 32.90.

RI/FS

An RI/FS is on-going and expected to be completed in 1990.

RD/RA

Remedial Design/Remedial Action activities are expected to be initiated in 1991.

NORTON AIR FORCE BASE, CA—INSTALLATION DESCRIPTION

Background Information

Norton Air Force Base occupies approximately 2,376 acres adjacent to the city of San Bernardino, California; 58 miles east of Los Angeles. Since 1962, the base has served as a Military Airlift Command base. In addition, Norton AFB formerly had the responsibility for providing maintenance and logistics for all liquid fueled ICBMs. Industrial and other operations generated varying quantities of fuels, waste oils, solvents, paint strippers and residues, refrigerants, acidic plating solutions, metal plating residue, and sludge dredged from industrial waste lagoons.

STATUS UPDATE

PA/SI

The Air Force completed initial assessment work in October, 1982. The study identified 20 sites of potential contaminant migration. Eighteen were targeted for an RI/FS. Sites at this installation were placed on the National Priorities List in July, 1987; HRS: 39.65.

RI/FS

Initial investigations found that soils at several sites were contaminated with fuel related VOCs and volatile chlorinated hydrocarbons. Ground water was found to be contaminated with VOCs, fuel derivatives and metals. Seven sites were recommended for further study during the RI/FS which is expected to be completed in 1990.

RD/RA

A removal action was taken in late 1986 to clean up the on-base Industrial Wastewater Treatment Plant sludge drying beds. Monitoring of a TCE-contaminated well is on-going and a system has been installed to maintain contaminants below California State action levels. Further RD/RA activities are expected to begin in 1991.

DEFENSE DEPOT OGDEN, UT—INSTALLATION DESCRIPTION

Background Information

Defense Depot Ogden occupies 1,326 acres near Ogden, Utah. Its mission, as a distribution depot, is the receipt, storage, maintenance, inventory, and issuance of electronic, industrial and construction equipment, textiles, package petroleum and industrial/commercial chemicals. Wastes generated by these operations include paints and paint residues, solvents, thinners, acids, bases, waste oil and fuel, boiler blowdown, insecticides, pesticides, chemical warfare agents (mustard and phosgene gas, methyl bromide), metal plating wastewater and sludge, and PCB contaminated oils.

STATUS UPDATE

PA/SI

An Installation Assessment was completed in March, 1980. Three areas were identified as potential contaminant migration sources and targeted for RI/FS work. Sampling confirmed concentrations of arsenic, chromium, chloride, benzenes, lead, trans 1,2-dichloroethene, chlordane, heptachlor enoxide, mercury, and 1,1,1-TCA in the ground water above maximum contaminant levels. Sites at this installation were placed on the National Priorities List in July, 1987; HRS: 45.10.

RI/FS

The RI/FS is currently on-going and is expected to be completed in 1990. Ground water monitoring wells were installed and soil borings have been taken. Two artesian aquifers were identified. It was determined that an upward water flow gradient may retard contaminant migration.

RD/RA

Vials of mustard agents and irritant grenades were removed from disposal pits in June, 1988. Additional Remedial Design/Remedial Action activities are expected to be initiated in 1990.

DEFENSE GENERAL SUPPLY CENTER RICHMOND, VA— INSTALLATION DESCRIPTION

Background Information

The Defense General Supply Center (DGSC) Richmond occupies 640 acres, 11 miles south of the city of Richmond, Virginia. Its mission, as part of Defense Logistics Agency (DLA), is to coordinate, organize, direct, and accomplish the management of general supplies to the Armed Forces, and to provide general Federal civilian supply support. Industrial and other operations related to mission-support activities generated varying quantities of wastes including oils, gases, solvents, paints and paint residues, corrosives, oxidizers, photographic chemicals, pesticides, herbicides, refrigerants, and antifreeze.

STATUS UPDATE

PA/SI

PA/SI work was completed in 1983, and a Contamination Assessment was completed in 1985. The PA/SI identified five past spill and/or disposal sites as having a high potential for contaminant migration, thus warranting further investigation during an RI/FS. The water supply both on- and off-base has been found to be contaminated with phenols, chloroform, methylene chloride, dichlorobenzene, di- tri- and tetra-chloroethylene, and chromium. Sites on this installation were placed on the National Priorities List in July, 1987; HRS: 33.85.

RI/FS

Initial investigations have been completed. Over 50 toxic compounds have been detected in the soil and ground water. Virginia drinking water standards have been exceeded for phenols, lead, cadmium, chromium, and trichloroethylene. Soils have been contaminated with volatile and semi-volatile organic compounds, acidic compounds, base-neutral compounds, hydrocarbons, and phenols. Monitoring wells will be installed to define the sources and the extent of ground water and soil contamination, on- and off-site. The RI/FS is expected to be completed in 1989.

RD/RA

Bottled water has been provided to area residents until county water is made available. The fire training pit will be drained and filled with the surrounding dike soils. Other remedial actions are expected to begin in 1990.

RIVERBANK ARMY AMMUNITION PLANT, CA— INSTALLATION DESCRIPTION

Background Information

Riverbank Army Ammunition Plant occupies 172 acres, approximately 10 miles northeast of Modesto, California. The primary mission is manufacture of steel cartridge cases, grenades, and projectiles. On-base operations have generated hazardous wastes in varying quantities including industrial wastewater, sludge, cyanide, solvents and chromium bearing wastes. Past disposal methods have caused contamination of the uppermost ground water aquifer, which is used as a potable water supply off-base as well as for industrial and agricultural uses.

STATUS UPDATE

PA/SI

An Installation Assessment was completed in 1980 and Contamination Survey in 1985. Ground water monitoring revealed that the uppermost aquifer near the abandoned landfill has been contaminated with chromium and cyanides. Chromium has been found in levels exceeding drinking water standards. The abandoned landfill and the wastewater treatment plant are the suspected sources. Chromium and cyanide have migrated beyond the plant boundaries, and have contaminated nearby residential water wells. Sediments in the evaporation ponds have been sampled and found to contain elevated levels of zinc. Sites at this installation were proposed for listing on the National Priorities List in 1988; HRS: 63.94.

RI/FS

A Confirmation Study was completed in 1986. An RI/FS is scheduled for completion in 1989. The cyanide and chromium contaminant plumes have been defined horizontally and vertically. The contaminant plume has been determined to extend approximately 1/4 mile off-post. Quarterly ground water sampling on-post and off-post is on-going.

RD/RA

In 1987, three new deep wells were installed for residential water supplies drawing from uncontaminated aquifers. Installation of a ground water extraction and treatment system is scheduled for 1989.

ROBINS AIR FORCE BASE, GA—INSTALLATION DESCRIPTION

Background Information

Robins Air Force Base occupies 8,810 acres, 90 miles southeast of Atlanta in Houston County, Georgia. The installation was used for training purposes during World War II and currently serves as a worldwide parts and equipment logistics manager, repair center and storage area for assigned aircraft and parts. Mission-support activities generated varying quantities of potentially hazardous wastes including paint strippers and thinners, paints, solvents, phosphoric and chromic acids, oils, hydraulic fluid, acetone, methylene chloride, methyl ethyl ketone, trichloroethylene, trichloroethane, carbon remover, cyanide, perchloroethylene, and toluene. The water supply for the base and the city of Warner Robins could potentially be affected by any contamination in ground and surface water.

STATUS UPDATE

PA/SI

An Initial Assessment was completed in April, 1982. The study identified 13 sites as contamination sources and targeted nine of these for RI/FS work. Three sites were determined to have a high potential for contaminant migration. Ground water contamination was also detected. Sites at this installation were placed on the National Priorities List in July, 1987; HRS: 51.66.

RI/FS

Initial investigations were completed in 1985. Nine sites were investigated and then redefined as six zones. In zone 1, contamination of ground and surface water and sediments by organic solvents and cyanide, was confirmed. Ground and surface water contamination was detected in zone 2. High levels of petroleum products, TOX, and lead were found in the ground water in zone 3. Ground water contamination by TOX, phenols, and cyanides was detected in zone 4. Solvents were found in zone 5. No significant contamination was detected in zone 6. The RI/FS is expected to be completed 1990.

RD/RA

The DDT spill site located in zone 2 has been covered with asphalt. Several underground storage tanks were removed and water supply wells were replaced in 1987. Additional RD/RA activities are expected to begin in 1991.

ROCKY MOUNTAIN ARSENAL, CO—INSTALLATION DESCRIPTION

Background Information

Rocky Mountain Arsenal occupies 17,228 acres northeast of Denver, in Adams County, Colorado. The installation was originally used for the manufacture, assembly, demilitarization, and disposal of chemicals and incendiary munitions. Areas of the arsenal were leased to Shell Chemical Company for the manufacture of pesticides. The current mission includes the decontamination and cleanup of real estate, facilities, and equipment. Mission-support operations generated varying quantities of potentially hazardous wastes including pesticides; mustard gas and nerve agents; mercury, lead and arsenic; chlorides of aluminum, arsenic, sulfur, thionyl, and cyanogen; hydroxides and fluorides; disopropyl methylphosphonate (DIMP), dicyclopentadiene (DCPD), and dibromochloropropane (DBCP); sulfates; solvents; dimethyl disulfide; acids; methyl isobutyl ketone; dithiane oxathiane; and chlorophenyl methylsulfide, sulfoxide, and sulfone. Environmental impacts include ground water contamination; and off-base contaminant migration via surface runoff from intermittent storms. Airborne particulates and odors may pose a hazard to on-base workers.

STATUS UPDATE

PA/SI

The Army completed a Material Contamination Survey in August, 1973 and an Installation Assessment in March, 1977. These studies identified 19 areas potentially contaminated with heavy metals, chemical agents, incendiaries, and industrial wastes. Sites on the installation were placed on the NPL in July, 1987; HRS: 58.15.

RI/FS

Initial investigations were initiated in 1984 and will culminate in 1993 with a Record of Decision. These investigations have identified the South Plants, Basins A and F, and sewer lines as primary contamination sources. Chloride, DIMP, DCPD, and DBCP plumes have been determined to be migrating towards the northern and northwestern installation boundaries. Vertical migration of contaminated ground water has been identified at the South Plants and Basin A areas. A Consent Degree was established in 1988 between the State of Colorado, Environmental Protection Agency, the Army, and Shell Chemical Company.

Future RI/FS work is scheduled to determine the type and extent of contamination, and identify alternative remedial actions. These investigations will be completed by the Army in 1993. Rocky Mountain Arsenal has been under special program management by the Army since 1985.

RD/RA

Three ground water intercept/treatment systems have been constructed and are operational. A pilot system was completed in August, 1978, at the installation's northern boundary, an extension to the system was completed in November, 1981. A system was installed at the Irondale area in December, 1981 and at the Northwest Boundary in October, 1984. A contaminated sewer system was removed in 1982. Waste salts were removed in 1985. A deep well used for waste disposal was closed in 1986, and liquids and sludges were removed from Basin F in 1988.

Interim remedial action projects currently underway include the decontamination and disposal of hydrazine wastewaters and facilities; treatment and removal of building 1727 sump liquid. Future projects include the removal of a sewer system; control of Basin A dust; removal of sediment in the lower lakes; excavation and storage of contaminated railroad yard materials; establishment of water management activities at the South Plants area; disposal of waste salts; and the development of a comprehensive remedial action plan.

NAVAL SECURITY GROUP ACTIVITY SABANA SECA, PR— INSTALLATION DESCRIPTION

Background Information

Naval Security Group Activity Sabana Seca occupies 2,252 acres, approximately 11 miles west of San Juan, Puerto Rico. The activity's mission is to operate a High Frequency Direction Finding Facility, and to provide communications and related support, including communications relay, security and manpower assistance. Hazardous wastes generated in conducting the base operations include paints, paint thinners, used oil, solvents, herbicides, pesticides, and batteries. Past disposal methods have created the potential for soil and ground water contamination. Ground water is used as a base potable water supply. Spillage of herbicides and pesticides, and rinsing of application equipment, has contaminated the areas adjacent to the pesticide shop. Sightings of endangered wildlife have been reported in numerous locations.

STATUS UPDATE

PA/SI

The Navy completed an Installation Assessment in 1984. Seven potentially contaminated sites were identified, five were reported as not requiring further actions. The former pesticide shop and a leachate pond adjacent to the municipal landfill were recommended for an RI/FS. Sites at this activity were proposed for listing on the National Priorities List in 1988; HRS: 34.28.

RI/FS

An RI/FS was initiated in 1985 and is expected to be completed in 1990. Two rounds of sampling have been completed. Analyses indicate that soils are contaminated at the former pest control shop. No ground water contamination has been detected. The municipal landfill is an off-base operation; however, its inclusion in the scope of the RI/FS is a precautionary measure to protect the base water supply. Contamination appears to be migrating from the Municipal Landfill. A Technical Review Committee has been established.

RD/RA

Remedial Design/Remedial Action activities are expected to be initiated in 1990.

SACRAMENTO ARMY DEPOT, CA—INSTALLATION DESCRIPTION

Background Information

Sacramento Army Depot occupies 485 acres within the city of Sacramento, California. Its mission is the receipt, storage, issuance, maintenance and disposal of electronics materials and the manufacture of parts. These operations have generated hazardous wastes including waste oil and grease, solvents, metal plating sludge and wastewaters (containing caustics, cyanides, heavy metals, and acids).

STATUS UPDATE

PA/SI

PA/SI work was completed in December, 1979. This investigation identified a number of industrial areas, and spill and disposal sites that may be potential sources of contaminant migration. In addition, surface runoff was determined to be the likely source of contamination of Morrison Creek. Sites on this installation were placed on the National Priorities List in July, 1987; HRS: 44.46.

RI/FS

An RI/FS was initiated in 1984 and is expected to be completed in 1991. Ground water sampling has indicated contamination both on- and off-site, primarily with trichloroethylene and heavy metals. In addition, heavy metals have been found in the sediment of Morrison Creek.

RD/RA

RD/RA activities including construction of a ground water treatment system, and a ground water monitoring system are expected to begin in 1992. The installation is in the process of closing the old oxidation lagoons, oil burn pits and has developed plans to remove leaking storage tanks.

SAVANNA ARMY DEPOT, IL—INSTALLATION DESCRIPTION

Background Information

Savanna Army Depot occupies 13,172 acres, north of Savanna, in Jo Davis and Carroll Counties, Illinois. It is situated on the east bank of the Mississippi River. Its mission is the handling, processing, testing, and storage of munitions and explosives; manufacture and storage of chemicals; and quality assurance for ammunition, components, missiles, and rockets. Mission-support operations have generated hazardous wastes such as TNT, DNT, RDX, nitrobenzene, di- and trinitrobenzene, ammonium nitrate, lead azide, UXO, and mustard gas. Potential impacts include the possible contamination of three potable water sources that exist in the vicinity of the depot and the shallow aquifer located in the upper 5 meters of soil covering the site. Lagoons adjacent to the Mississippi River could contaminate this drinking water source, and surface contamination could affect the large wintering population of bald eagles.

STATUS UPDATE

PA/SI

PA/SI work was completed in May, 1979. Fifty-nine potentially contaminated sites were identified. Localized munitions-related contamination was detected in the TNT washout area leaching pond sediments and in ground water on-base. Sites at this installation were proposed for inclusion on the National Priorities List in July, 1987; HRS: 42.20.

RI/FS

Initial investigations were completed in January, 1982. Ground water and soil contamination was confirmed and verified. The extent of contamination and waste concentrations in the lagoon sediment were identified. The lagoon was found to have leached TNT and other chemicals to the ground water. Sampling of selected ground and surface water sites to determine the extent of contaminant migration was completed in December, 1988. Additional aquifer testing and monitoring will be conducted. The RI/FS is expected to be completed in 1990.

RD/RA

Incineration of TNT-contaminated soils and remedial action at the lagoons is scheduled for 1990.

SHARPE ARMY DEPOT, CA—INSTALLATION DESCRIPTION

Background Information

Sharpe Army Depot occupies 724 acres, 80 miles east of San Francisco, in San Joaquin County, California. Its primary mission is to serve as a center for storage, shipping, packaging and maintenance of general supplies. These operations produced varying quantities of hazardous wastes including chlorinated solvents, hydrocarbons, chromium compounds, industrial waste treatment plant sludge (containing phenols and chromium), and used paints.

STATUS UPDATE

PA/SI

An Installation Assessment was completed in January, 1980. The North and South Balloon Areas and the western boundary were identified as potentially contaminated areas and were targeted for RI/FS work. Volatile organic compounds were detected in the soil and ground water. Evidence of off-base contaminant migration was found. The aquifer was determined to be contaminated with TCE and arsenic. Sites at this installation were placed on the National Priorities List in July, 1987; HRS: 42.24.

RI/FS

The Army has completed numerous initial investigations at Sharpe Army Depot. An RI/FS for the North Balloon Removal Action was completed in April, 1988. An RI/FS for the remaining sites is expected to be completed in 1991. Eight distinct VOC ground water plumes have been found. Concentrations of arsenic and VOCs exceeding drinking water standards have been detected in the ground water at the base boundary. However, significant off-base contaminant migration has not been found. Seven areas of VOC contaminated soil have been identified. Signature of an Interagency Agreement between the Army, the EPA, and the State of California is expected in early 1989.

RD/RA

Bottled water has been supplied and a water supply well has been closed. Operation, maintenance, and monitoring of the ground water air-stripping treatment plant and ground water sampling for contamination is on-going. Additional RD/RA activities are expected to begin in 1992.

TINKER AIR FORCE BASE, OK—INSTALLATION DESCRIPTION

Background Information

Tinker Air Force Base occupies 4,277 acres, adjacent to Oklahoma City, Oklahoma. Its mission is to serve as a worldwide repair depot for aircraft, weapons, and engines. Mission-support operations have generated varying quantities of hazardous wastes including organic solvents, waste oils, paint strippers and sludges, plating solutions and wastes, heavy metals, alkaline cleaners, acids, freon, jet fuels, and radium paint. Contamination of the aquifer underlying the base could affect base and municipal water supply systems serving approximately 55,400 people. In addition, surface water contamination could affect threatened and endangered species that use the base as a stopover during migration.

STATUS UPDATE

PA/SI

PA/SI work was completed in April, 1982. Fourteen contaminated areas were identified. Two creeks on or near the base were found to be contaminated with high concentrations of oil, grease, nickel, and chromium. Sites at this installation were placed on the National Priorities List in July, 1987; HRS: 42.24.

RI/FS

Initial investigations commenced in September, 1983 and have been completed for several sites. One site was found to have contaminated the base water supply wells in relatively shallow zones of the aquifer. It was also determined that the landfill is releasing trichloroethylene and chloromethane into the environment. Limited on-base contaminant migration from the sites was recorded. No off-base contaminant migration has been found. The RI/FS is currently on-going and is expected to be completed in 1990. An interagency agreement is expected to be signed in early 1989.

RD/RA

Tinker AFB is in the process of removing contaminated sediments from a lagoon; draining the pond to lower the risk of contaminant migration; plugging the water supply wells that serve as contaminant conduits; and capping a landfill. Further RD/RA activities are expected to begin in 1991.

TOOELE ARMY DEPOT, UT—INSTALLATION DESCRIPTION

Background Information

Tooele Army Depot occupies 44,087 acres in Tooele County, Utah. Its mission is to provide for receipt, storage, issuance, maintenance and disposal of ammunition, combat vehicles, missiles, equipment, and chemical weapons. Operations in support of these missions generated varying quantities of hazardous wastes including solvents, metals, detergents, grease and oils, acids, alkali, white phosphorus, mustard gas, plating wastes, PCBs, paint primer, photographic chemicals, and explosives. Ground water may be threatened by possible contaminant migration from the waste sites. Plant and animal life in the area could also be affected.

STATUS UPDATE

PA/SI

A PA/SI was completed in January, 1989. Forty-four sites were identified. Nine sites were studied in detail which included field sampling. The field investigation found three sites to be potential contaminant sources. The PA/SI recommended these sites be included in an RI/FS. The investigation also detected explosives, petroleum products, and arsenic in the ground water. A potential exists for contaminant migration via ground water. Sites at this installation were proposed for inclusion on the National Priorities List in July, 1987; HRS: 38.32.

RI/FS

An Environmental Survey was completed in October, 1982. The Survey indicated that a contaminant plume containing trichloroethylene was migrating from the industrial wastewater lagoon to the northern base boundary and possibly off-base. A RI was initiated at 9 sites in September, 1987. RI well installation was completed in September, 1988. The RI/FS is scheduled to be completed in April, 1989.

RD/RA

Remedial Design/Remedial Action activities are expected to be initiated in 1989.

TWIN CITIES ARMY AMMUNITION PLANT (TCAAP), MN— INSTALLATION DESCRIPTION

Background Information

Twin Cities Army Ammunition Plant occupies 2,560 acres, approximately 13 miles north of Minneapolis-St. Paul, in New Brighton, Minnesota. Its mission is the manufacture of small arms and projectile casings. Mission-support operations have generated potentially hazardous wastes in varying quantities including solvents, acids, caustics, heavy metals, VOCs, fuels, cleaners, paint wastes, paint sludge, TNT, and 1,2-trichloroethylene. Round Lake and Rice Creek have been contaminated by wastes from sewer line effluent. The drinking water supply for some 64,700 area residents has been contaminated. It is suspected that contamination could affect the Minnesota Valley National Wildlife Refuge located 500 feet from the landfill. In addition, periodic metal contamination of the Minnesota River occurs when the landfill floods.

STATUS UPDATE

PA/SI

PA/SI work was completed in 1988. Fourteen potentially contaminated areas were identified. Investigations have determined that operations at Buildings 103 and 502 were a source of VOC-contaminated ground water that is migrating toward Rice Creek and off-base. VOCs and metals were detected in sewer sediments. Site A was found to be the origin of a plume of VOCs in the ground water north of TCAAP. Sites at this installation were included in the scoring package for the New Brighton/Arden Hills, MN National Priorities List site in 1983; HRS: 58.41.

RI/FS

RI/FS work is currently on-going at 14 sites. A regional ground water model is being developed as part of the RI/FS effort. The EPA and the State will conduct off-base RI studies. Completion of RI/FS projects and signing of a final Record of Decision is scheduled for 1989.

A Federal Facilities Agreement between EPA, the State of Minnesota and the Army was negotiated in 1987. A final Apportionment Agreement between the Army, Honeywell, and the Department of Justice for the remediation of ground water contamination plumes was signed in September, 1988.

RD/RA

Residents with VOC-contaminated wells were given bottled water until they were connected to the municipal water system. A ground water treatment system became operational in 1987 and was modified in 1988. A ground water collection system was constructed at Building 103 and a water quality monitoring program was implemented. A decontamination pilot system is operating to remove trichloroethylene from the soil. Full scale ISV systems, caps, and in situ air stripping are in operation at sites D and G to remove VOCs. In addition, the following have been completed: sewer line and sump restoration; PCB contaminated soils removed and stored; site A ground water extraction and treatment system; site F closure investigation in progress. Granular Activated Carbon (GAC) treatment units have been installed on two New Brighton municipal wells for VOC removal. A smaller GAC system has been installed on-site at the northern boundary. All extraction wells for the modified boundary extraction system were installed and are in operation, including a fourth water treatment tower. Additional RD/RA activities are expected to begin in 1989.

UMATILLA ARMY DEPOT, OR—INSTALLATION DESCRIPTION

Background Information

Umatilla Army Depot occupies 19,729 acres, 3.5 miles west of Hermiston, in Umatilla and Morrow County, Oregon. It has served as an ammunition storage facility. Mission-support activities have produced potentially hazardous wastes in varying quantities including TNT washout plant wastewater, metals, red fuming nitric acid, aniline, pesticides, RDX, nitrates, TNT, TNB, HGMX, and DNT.

STATUS UPDATE

PA/SI

The Army completed PA/SI work in March, 1980. Several major areas were identified as contaminant sources and were targeted for RI/FS work. Areas contaminated with explosive wastes and unexploded ordnance were discovered. Ground water under the lagoon was found to be contaminated with RDX, nitrates, TNT, TNB, HMX and DNT. The explosive washout lagoons were placed on the National Priorities List in July, 1987; HRS: 31.36.

RI/FS

The RI/FS is on-going and expected to be completed in 1991. The washout lagoon was identified as having contaminated the alluvial aquifer with TNT, RDX, HMX, TNB, DNT and nitrates. Monitoring of ground water elevations is being conducted monthly as required by the State and EPA.

RD/RA

Remedial Design/Remedial Action activities are expected to begin in 1991.

NAVAL AIR DEVELOPMENT CENTER WARMINSTER, PA— INSTALLATION DESCRIPTION

Background Information

Naval Air Development Center Warminster occupies 921 acres in Warminster Township, Pennsylvania. Its mission is the research, development, testing and evaluation of naval aircraft systems, as well as software development and antisubmarine warfare systems studies. Mission-support operations have generated hazardous wastes in varying quantities including metal plating and other industrial waste solids, sludges and liquids, domestic sewage and sludges, painting residues, PCB contaminated waste oils, fuel, solvents, asphalt, and coolant. Numerous private and public wells are located within three miles of the installation. These wells provide drinking water for over 100,000 people in the area. Local surface water is used for recreational and industrial purposes.

STATUS UPDATE

PA/SI

An Installation Assessment was completed in December, 1981. Eight sites were identified as potential contaminant migration sources and were recommended for an RI/FS. Chromium and lead were found in surface waters. A PA/SI was completed in June, 1985. Chromium and di- and trichloroethane were discovered in on-site wells at levels above EPA water quality standards. Ground water monitoring is ongoing. Sites at this installation have been proposed for placement on the National Priorities List in July, 1987; HRS: 57.93.

RI/FS

The Navy has initiated a work plan for an RI/FS at eight sites. A Technical Review Committee has been formed. RI field work is expected to begin in 1989. The RI/FS is expected to be completed in 1992. A Federal Facilities Agreement is currently being negotiated between the Navy and the State of Pennsylvania.

RD/RA

Remedial Design/Remedial Action activities are expected to be initiated in 1992.

NAVAL AIR STATION WHIDBEY ISLAND, WA— INSTALLATION DESCRIPTION

Background Information

Naval Air Station Whidbey Island occupies 7,000 acres northeast of Seattle, Washington. It was commissioned in 1942 to maintain and operate facilities and to provide services and material in support of operations of aviation activities and units of the operation forces of the Navy. Mission-support operations have generated waste oils and fuels, fuel sludges, solvents, painting residues, resins, lacquers, thinners, cleaning compounds, glues, alodyne liquid, zyglow, caustic solvents, Freon, acid, battery electrolyte, boiler blowdown, coal pile leachate, phosphates, asphalt, PCBs, printing solutions and ordnance. The ground water is used extensively for water supply throughout much of Whidbey Island. A possibility exists that contaminant migration could occur via ground and surface water.

STATUS UPDATE

PA/SI

An Installation Assessment was completed in September, 1984. Fifty-one past spill and/or disposal sites were identified. Forty-four of these were targeted for an RI/FS. It was determined that surface water runoff may have contaminated sediment and biota in nearshore areas around the island. A potential exists for contaminant migration via ground water at several sites. Mitigation actions were recommended at seven sites. Ault Field (HRS: 48.48) and Seaplane Base (HRS: 39.64) were repropoed for inclusion on the National Priorities List in July, 1987.

RI/FS

A Remedial Investigation/Feasibility Study for Ault Field and Seaplane Base was initiated in June, 1988 and is expected to be completed in 1991. A Technical Review Committee has been established.

RD/RA

Remedial Design/Remedial Action activities are expected to be initiated in 1991.

WRIGHT-PATTERSON AIR FORCE BASE, OH— INSTALLATION DESCRIPTION

Background Information

Wright-Patterson Air Force Base (WPAFB) occupies 8,312 acres in Dayton, Ohio. The primary mission of WPAFB is support of its major command headquarters, Air Force Logistics Command and tenant organizations. On-base operations have resulted in the generation of varying quantities of hazardous wastes including waste fuels, oils, lubricants, acids, plating wastewaters, solvents, herbicides, pesticides, batteries and radioactive wastes. Past disposal practices have resulted in contamination of ground water, which is used by the base and the city of Dayton as a potable water supply.

STATUS UPDATE

PA/SI

An Installation Assessment was completed in December, 1981, which identified 24 potentially contaminated sites. Thirteen sites were recommended for soil sampling and ground water monitoring. Sites at this installation were proposed for inclusion on the National Priorities List in 1988; HRS: 57.85.

RI/FS

An RI/FS is currently on-going and is expected to be completed in 1990. Forty-two sites have been identified and divided into 8 zones. Zone 1 includes Landfills 8 and 10, and is the highest concern for potential contamination due to its proximity to residential areas. Ground water near Landfill 8 is contaminated with cyanide, benzene, dichloroethane, and trichloroethylene. Ground water near Landfill 10 is contaminated with VOCs and inorganic compounds. Zone 3 landfills are generating leachate; however, contaminants are at significantly lower concentrations.

RD/RA

An on-base alternate water supply was provided in 1987. Drinking water from base wells is being treated for VOC contamination. Additional RD/RA activities are expected to be initiated in 1990.

MARINE CORPS AIR STATION YUMA, AZ— INSTALLATION DESCRIPTION

Background Information

Marine Corps Air Station Yuma occupies 3,000 acres southeast of Yuma, Arizona. Its mission is to support tactical aircrew combat training for the Pacific and Atlantic Fleet Marine Corps Forces squadrons. Operations have generated varying quantities of hazardous wastes including waste fuels, oils, degreasers, solvents, paints and paint residues, photographic chemicals, refrigerants, pesticides, herbicides, PCBs, and unexploded ordnance. Past disposal practices could potentially contaminate soils and ground water. Ground water is used as a potable water source for the activity, the city of Yuma, and for industrial and agricultural purposes.

STATUS UPDATE

PA/SI

An Initial Assessment Study was completed in 1985, and a draft SI in 1988. These reports identified 12 past spill and disposal sites as potentially contaminated and possible migration sources. The State of California requested additional SI data be obtained and two additional sites be evaluated. Continuing SI is scheduled for 1989, to include the two additional sites. Sites at this activity were proposed for inclusion on the National Priorities List in 1988; HRS: 29.88.

RI/FS

An RI/FS is scheduled to begin in September, 1989.

RD/RA

Remedial Design/Remedial Action activities are expected to be initiated in 1991.

APPENDIX B

INSTALLATION RESTORATION PROGRAM STATUS

Includes:

- Table B-1: Installation Restoration Program Status Summary
- Table B-1: U.S. Map of DoD IRP Sites by State
- Table B-2: State-by-State Installation Status
- Table B-3: Cumulative IR Response Actions Status

LEGEND: Letter codes used throughout this Appendix are defined as follows:

C = number of sites for which a particular study or action has been completed.

U = number of sites having a particular study or action underway.

F = number of sites scheduled to have a study or action performed in the future.

Table B-1
DEPARTMENT OF DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
Installation Restoration Program Status Summary
(As of 30 September, 1988)

State	Number of		Number of								
	Instal- lations	Sites	PA/SI		RI/FS			RD/RA			
			C	U	C	U	F	C	U	F	
ALASKA	65	507	478	1	184	226	5	45	180	88	
ALABAMA	9	246	243	2	22	31	4	15	16	4	
ARKANSAS	5	77	75	0	1	27	0	0	0	1	
ARIZONA	13	126	125	0	28	37	0	12	14	3	
CALIFORNIA	100	1207	1156	34	326	507	34	9	286	264	
COLORADO	10	275	273	0	142	48	5	1	170	20	
CONNECTICUT	4	13	11	1	1	4	0	0	1	0	
DISTRICT OF COLUMBIA	12	17	14	0	1	4	2	1	1	1	
DELAWARE	6	32	31	0	1	23	0	0	4	10	
FLORIDA	33	330	321	1	91	173	8	2	44	51	
GEORGIA	13	185	180	3	29	36	7	0	15	12	
GUAM	11	80	62	17	12	47	10	0	2	26	
HAWAII	32	133	81	40	23	63	6	1	17	36	
IOWA	3	49	49	0	3	7	0	0	1	5	
IDAHO	15	34	34	0	2	10	0	0	1	5	
ILLINOIS	14	140	131	6	12	34	1	1	10	15	
INDIANA	12	122	119	0	4	39	3	0	3	7	
KANSAS	8	84	83	0	6	37	0	0	2	8	
KENTUCKY	6	70	70	0	2	6	0	0	1	2	
LOUISIANA	8	131	128	2	6	40	8	0	6	7	
MASSACHUSETTS	15	135	133	0	56	54	1	1	61	13	
MARYLAND	34	319	311	3	10	61	1	1	7	32	
MAINE	11	41	34	5	1	21	2	0	1	7	
MICHIGAN	16	132	128	0	13	43	1	0	17	18	
MINNESOTA	5	47	46	1	11	32	0	3	10	14	
MISSOURI	14	163	149	10	18	16	1	37	17	6	
MISSISSIPPI	11	84	63	18	27	29	0	0	17	8	
MONTANA	5	31	30	0	0	20	0	0	0	0	
NORTH CAROLINA	10	91	87	0	9	58	0	0	11	30	
NORTH DAKOTA	14	25	16	0	1	12	0	0	0	6	
NEBRASKA	11	194	192	2	3	23	0	59	2	10	
NEW HAMPSHIRE	5	31	31	0	16	8	0	0	3	5	
NEW JERSEY	11	241	237	1	28	112	17	0	29	18	
NEW MEXICO	13	154	153	1	11	46	2	1	9	16	
NEVADA	7	92	86	5	11	47	0	0	2	31	
NEW YORK	39	197	178	4	23	61	5	0	19	27	
OHIO	16	128	108	17	48	45	0	0	48	12	
OKLAHOMA	22	153	147	6	17	52	6	2	11	15	
OREGON	8	47	42	4	2	16	1	0	2	16	
PENNSYLVANIA	29	219	201	11	26	49	3	5	28	25	
PUERTO RICO	10	40	37	0	4	16	0	1	1	3	
RHODE ISLAND	15	45	38	0	3	27	0	0	3	4	
SOUTH CAROLINA	14	140	120	15	53	47	2	0	41	20	
SOUTH DAKOTA	8	33	27	0	2	14	3	0	2	3	
TENNESSEE	13	122	119	2	12	25	3	1	6	4	
TRUST TERRITORIES	2	21	21	0	1	15	3	0	0	0	
TEXAS	43	560	551	1	85	159	5	10	62	36	
UTAH	11	186	181	0	22	39	1	1	21	2	
VIRGINIA	51	312	302	1	28	111	1	3	17	22	
VERMONT	2	5	5	0	2	0	0	0	0	2	
WASHINGTON	21	161	155	2	28	81	10	1	33	20	
WISCONSIN	18	71	63	0	10	15	1	0	5	7	
WEST VIRGINIA	8	33	28	5	7	14	0	3	5	5	
WYOMING	6	28	28	0	1	21	0	0	2	2	
GRAND TOTAL	897	8139	7711	221	1485	2788	162	216	1266	1004	

NUMBER OF SITES BY STATE

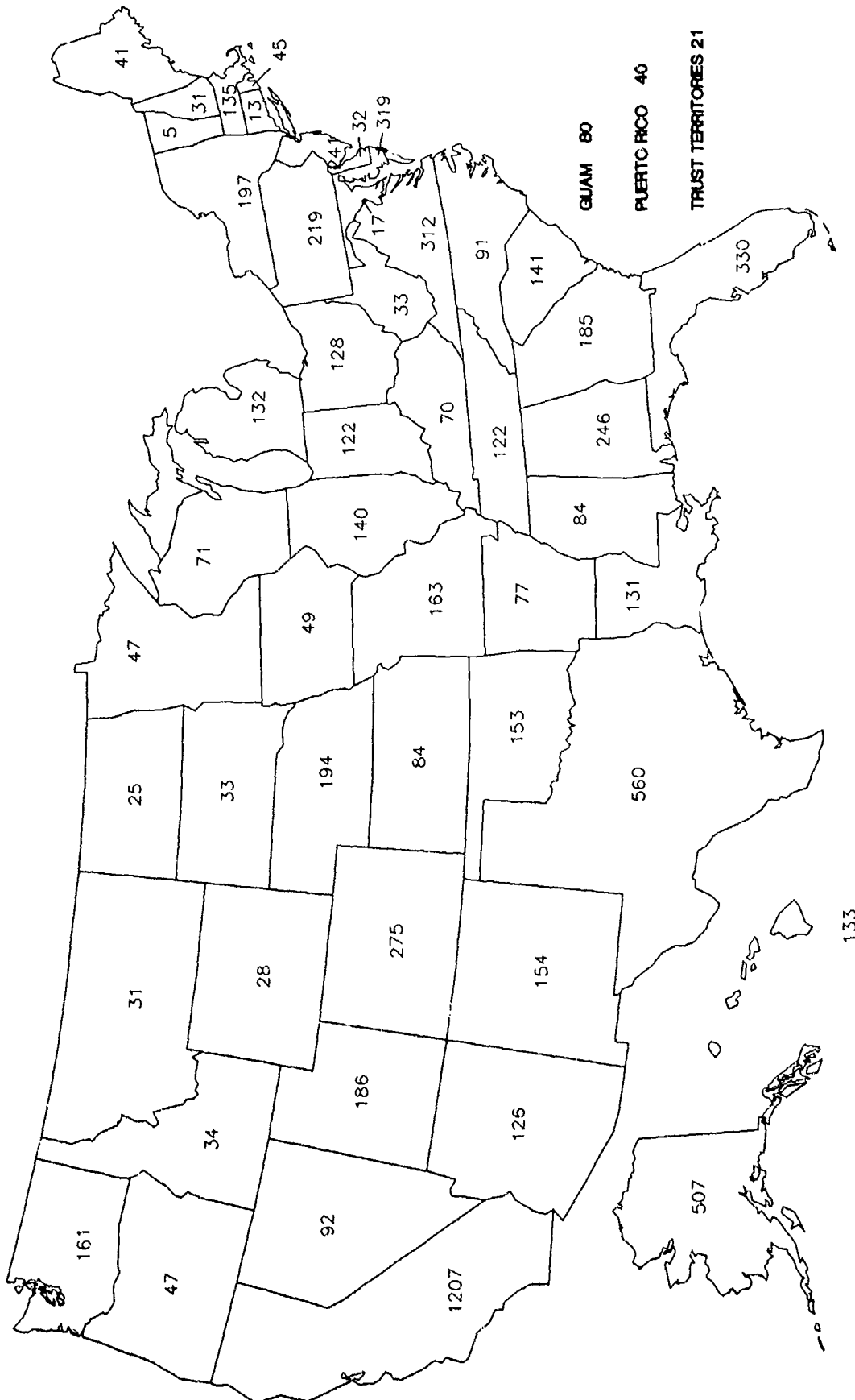


Table B-2
DEPARTMENT OF DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
State by State Installation Status Listing
(As of 30 September, 1988)
Number of Sites

ALASKA

ARMY

	PA/SI		RI/FS			RD/RA		
	C	U	C	U	F	C	U	F
FORT GREELY		5						
FORT RICHARDSON		10			6	4		1
FORT WAINWRIGHT		12			4			
GERSTLE RIVER TEST SITE								
ANG 5TH SCT BN HQ, ANCHORAGE								
ANG ALASKA CSMS, ANCHORAGE								
ANG 1ST BN SCT HQ, NOME								
ANG 2ND BN SCT HQ, BETHAL								
ANG 4TH SCT BN HQ, JUNEAU								
USA COE AMCHITRA ISLAND								
USA WHITTIER OIL STORAGE TANK								

NAVY

NAS ADAK		21			21				1
NAVARCLAB BARROW		2		1				1	

AIR FORCE

ALASKAN DEWLINE		24			24				24
ANCHORAGE ANG									
ANIAK		1							
ANVIL MOUNTAIN									
BARTER ISLAND		7		7					7
BEAR CREEK RRS		2							
BETHEL RRS					1				1
BOSWELL BAY									
CAMPION AFS		7		2	5			2	5
CANYON CREEK RRS				1				1	
CAPE LISBURNE AFS		7		1	5				
CAPE NEWENHAM AFS		7		1	5		7		
CAPE ROMANZOF AFS		12	1	3				2	
CLEAR AFB		14		9	3			12	
COLD BAY AFS		5		2	3			2	3
DRIFTWOOD BAY									
DUNCAN CANAL RRS				1				1	
EIELSON AFB		52		2	37			4	36
ELMENDORF AFB		43		6	29			6	5
FIRE ISLAND				1				1	
FORT YUKON AFS		6			6				6
GALENA AIRPORT		6			6				6
GOLD KING CREEK RRS				1				1	
GRANITE MOUNTAIN RRS				1				1	
HOONAH RRS									
INDIAN MOUNTAIN RESEARCH SITE		13		3	9			3	7
KING SALMON AFS		25			20				
KOTZEBUE		9			4				1
KULIS ANG BASE									
LONELY DEW STATION POW 1		5		5				5	

Table B-2
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(As of 30 September, 1988)
Number of Sites

	PA/SI		RI/FS			RD/RA		
	C	U	C	U	F	C	U	F
MURPHY DOME AFS	8			8				6
NIKOLSKI RRS	2		1	1			1	
NOME AIRFIELD	1				1			
NORTH RIVER RRS	2							
OCEAN CAPE RRS			1				1	
OLIKTOK DEW STATION POW 2	3		3				3	
PEDRO DOME RRS								
PILLAR MOUNTAIN RRS	1			1				
POINT BARROW DEW STATION POW	2		2				2	
POINT LAY DEW STATION LIZ 2	3		3				3	
PORT HEIDEN RRS			1				1	
PORT MOLLER RRS								
SHEMYA AFB	117		92	21		25	89	3
SMUGGLERS COVE RRS			1				1	
SOLDOTNA RRS			1				1	
SPARREVOHN AFS	9		2	7			2	7
TATALINA AFS	13		2	11		13		
TIN CITY AFS	16		1	11				
UNALAKALEET RRS	2			1				
WAINWRIGHT DEW STATION LIZ	3		3				3	
WHITE ALICE	1			1				
YAKATAGA RRS								
ALASKA TOTALS	478	1	184	226	5	45	180	88

ALABAMA

ARMY

ALABAMA AAP	78		6	2		10	5	
ANNISTON AD	16		6			3	5	
FORT MCCLELLAN	27		1	9				
FORT RUCKER	14		1	2	2			
PHOSPHATE DEV WORKS			1				1	
REDSTONE ARSENAL	75	1	1		2	1	1	

AIR FORCE

BIRMINGHAM MUNICIPAL AIRPORT	8		1	3			1	
DANNELLY FIELD ANG	11			11				1
MAXWELL AFB	14	1	5	4		1	3	3

ALABAMA TOTALS	243	2	22	31	4	15	16	4
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ARKANSAS

ARMY

FORT CHAFFEE								
MILLWOOD RESERVOIR, ASHDOWN								
PINE BLUFF ARSENAL	37							

Table B-2
DEPARTMENT OF DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
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(As of 30 September, 1988)
Number of Sites

	PA/SI		RI/FS			RD/RA			
	C	U	C	U	F	C	U	F	
AIR FORCE									
BLYTHEVILLE AFB	13		1	8					
LITTLE ROCK AFB	25			19					1
ARKANSAS TOTALS	75	0	1	27	0	0	0	0	1
ARIZONA									
ARMY									
BUCKEYE	1								
FLORENCE	1								
FORT HUACHUCA	5								
NAVAJO ADA	46		1						1
POPAGO			1						1
YUMA PROVING GROUND	3		2						2
NAVY									
MCAS YUMA	3			3					1
AIR FORCE									
AFP NO. 44, TUCSON	12		12				12		
DAVIS MONTHAN AFB	22		2	18					2
LUKE AFB	9		7	2					7
PHOENIX ANG	5			5					
TUCSON IAP (ARIZONA ANG)	8			2					
WILLIAMS AFB	10		3	7					1 2
ARIZONA TOTALS	125	0	28	37	0	12	14	3	
CALIFORNIA									
ARMY									
AFRC	1								
CAMP ELLIOTT	1								
CAMP ROBERTS									
CHINESE CAMP	1								
EAST FORT BAKER									
FORT CRONKITE	1								
FORT HUNTER LIGGETT	9		4	2	3				4
FORT IRWIN	27		4						4
FORT MACARTHUR									
FORT ORD	20		6	2					3 2
HAMILTON ARMY AIR FIELD	7		1						1
LAWRENCE LIVERMORE NAT'L LABORATORY	1								
OAKLAND ARMY BASE			1						1
PARKS RESERVE FORCES TRAINING AREA									
PRESIDIO OF MONTEREY	1		1						1
PRESIDIO OF SAN FRANCISCO	2		1						1
RIO VISTA RESERVE TRAINING ACTIVITY									

Table B-2
DEPARTMENT OF DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
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(As of 30 September, 1988)
Number of Sites

	PA/SI		RIFS			RD/RA		
	C	U	C	U	F	C	U	F
RIVERBANK AAP	20		3		3	2	2	
SACRAMENTO AD	49		5	2			5	1
SHARPE AD	16		3	2			4	
SIERRA AD	30		3		3		1	
SLOUGHOUSE	1							
NAVY								
CBC PORT HUENEME	12	13	2	22			2	21
DOD HOUSING FACILITY, NAVATO	1							
MCAGCC 29 PALMS	12			9				
MCAS EL TORO	18			16				2
MCAS TUSTIN	13		2	11		1	1	1
MCB CAMP PENDLETON	8			7				3
MCLB BARSTOW	14		3	10				6
MCMWTC BRIDGEPORT	6			5		1	4	
MCRD SAN DIEGO	2			2				
NAB CORONADO	4			3				
NAF EL CENTRO	6		1				1	5
NALF CROWS LANDING	3		1	1			1	1
NALF SAN CLEMENTE ISLAND		12		12				12
NALF SAN DIEGO	1							
NAS ALAMEDA	22			21				13
NAS LEMOORE	14		6	8		1	1	
NAS MIRAMAR	7			5		1		2
NAS MOFFETT FIELD	23		1	20			1	20
NAS NORTH ISLAND	7		2	5			2	5
NAVAL FACILITY PT. SUR	1							
NAVALF IMPERIAL BEACH								
NAVMEDCOMNWREG OAKLAND	1							
NCS SAN DIEGO	2							
NCS STOCKTON	7		2	5			2	5
NF CENTERVILLE								
NFEC SAN BRUNO								
NH SAN DIEGO	1							
NIROP SUNNYVALE	3							
NOSC MORRIS DAM FACILITY AZUSA		1						
NOSC SAN DIEGO	9		7	2			5	1
NPGS MONTEREY	1		1	2			1	2
NRTF DIXON	1	2						1
NS LONG BEACH								
NS SAN DIEGO	5			3				
NS TREASURE ISLAND	22		1	15	5		1	15
NSB SAN DIEGO	8			8				2
NSC OAKLAND	6		1	4			1	4
NSC OAKLAND, FUEL DEPOT, PT. MOLATE								
NSC RICHMOND	2			2				2
NSC SAN DIEGO	3			2				2
NSC STOCKTON				1				
NSGA SKAGGS ISLAND	1							
NSY HUNTER'S POINT	15	2	1	16			2	13

Table B-2
DEPARTMENT OF DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
State by State Installation Status Listing
(As of 30 September, 1988)
Number of Sites

	PA/SI		RI/FS			RD/RA		
	C	U	C	U	F	C	U	F
NSY LONG BEACH	5		1				1	
NSY MARE ISLAND	24		1	21		1		23
NTC SAN DIEGO	6			3				
NTTC SAN FRANCISCO	1			1				
NWC CHINA LAKE	19			17		1		15
NWS CONCORD	24		1	22		1		19
NWS SEAL BEACH	13		1	11		1		11
OLF IMPERIAL BEACH	2			2				
PMTC POINT MUGU	12			9	1			4
PWC SAN DIEGO	2			1				
SINGER EDUCATION DIV., IMPERIAL BCH	1							
SUPSHIP SAN FRANCISCO								
AIR FORCE								
AFP NO. 19, SAN DIEGO	6		6				6	
AFP NO. 42, PALMDALE	25			25				
AFP NO. 70, FOLSOM	2				2	1		
BEALE AFB	23		2	19			1	2
CASTLE AFB	36	1	8	26			8	8
EDWARDS AFB	37		13	13	6		15	3
FORT MACARTHUR FAMILY HOUSING ANNEX								
FRESNO ANG	3			3				
GEORGE AFB	31		7	17			13	6
LOS ANGELES AFS	9		4	5			3	2
MARCH AFB	35		5	29			2	3
MATHER AFB	40		25	2	6		11	14
MCCLELLAN AFB	167	3	162	4		2	161	2
NORTON AFB	51		7	21			6	1
ONIZUKA AFS	7			5	1			
SUNNYVALE AFS (CA ANG)	5							
TRAVIS AFB	26		18	3	3		2	1
VANDENBERG AFB	59			17				5
DEFENSE LOGISTICS AGENCY								
DDTC TRACY	25			3				1
DFSP ESTERO BAY								
DFSP NORWALK	2			1				1
DFSP OZOL	2		1	1			1	1
DFSP SAN PEDRO	8		1	1				2
CALIFORNIA TOTALS	1156	34	326	507	34	9	286	264

COLORADO

ARMY

FITZSIMMONS ARMY MED CENTER								
FORT CARSON	12		3		4			
PUEBLO DEPOT ACTIVITY	30			1	1			2
ROCKY MOUNTAIN ARSENAL	152		122	1		1	150	

Table B-2
DEPARTMENT OF DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
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(As of 30 September, 1988)
Number of Sites

	PA/SI		RI/FS			RD/RA		
	C	U	C	U	F	C	U	F
NAVY								
NAVPETRES ANVIL POINTS FACILITY								
AIR FORCE								
AFP PJKS	17		11	5		16		
BUCKLEY ANG	17		1	9		1	7	
LOWRY AFB	26		5	14		3	11	
PETERSON	9			8				
USAF ACADEMY	10			10				
COLORADO TOTALS	273	0	142	48	5	1	170	20
CONNECTICUT								
ARMY								
STRATFORD ARMY ENGINE PLANT								
NAVY								
NSB NEW LONDON	5		1	4		1		
NUSC NEW LONDON	1							
AIR FORCE								
BRADLEY ANG	5	1						
CONNECTICUT TOTALS	11	1	1	4	0	0	1	0
DISTRICT OF COLUMBIA								
ARMY								
CAMP SIMMS						1		
FORT MCNAIR	1							
U.S. SOLDIER'S AND AIRMEN'S HOME								
WALTER REED ARMY MEDICAL CENTER	1							
NAVY								
CND WASHINGTON	1			1				
NAF WASHINGTON DC	1							
NAVAL OBSERVATORY								
NAVAL RESEARCH LAB	1				1			
NAVAL SECURITY STATION	1							
NAVCOMMU! CHELTANHAM	1							
NDW WASHINGTON NAVY YARD	2		1				1	
AIR FORCE								
BOLLING AFB	5			3	1			1
DISTRICT OF COLUMBIA TOTALS	14	0	1	4	2	1	1	1

Table B-2
DEPARTMENT OF DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
State by State Installation Status Listing
(As of 30 September, 1988)
Number of Sites

	PA/SI		RI/FS			RD/RA		
	C	U	C	U	F	C	U	F
DELAWARE								
ARMY								
NEW CASTLE		1						
NIKE SITE, REHOBOTH		1						
PEA PATCH ISLAND								
NAVY								
NAVRESFAC LEWES		1						
AIR FORCE								
DOVER AFB	23		1	19		4	7	
GREATER WILMINGTON APT (DE ANG)	5			4			3	
DELAWARE TOTALS	31	0	1	23	0	0	4	10
FLORIDA								
ARMY								
ARRCOM ORLANDO FACILITY								
CAMP BLANDING		1						
USA AFA 49-A, ORLANDO								
USA AMSA 47G/MIAMI								
USA AMSA 53G/TAMPA								
USA PALATKA AMSA 55-M								
WEST PALM BEACH	1			1		2		
NAVY								
NAS CECIL FIELD	15			12				14
NAS JACKSONVILLE	32		29	1		12		
NAS KEY WEST	16			12				
NAS PENSACOLA	22		13	9		4		10
NAS RICHMOND, PERRINE	1							
NAS WHITING FIELD	17		2	15		1		
NAVAL FUEL DEPOT JACKSONVILLE		1						
NCSC PANAMA CITY	7			7				
NS MAYPORT	12			7	5			1
NSC PENSACOLA	1							1
NTC ORLANDO	6		5	1		2		2
NTTC PENSACOLA	1			1				
NUSC AUTEC WEST PALM BEACH	1							
NUSC TEST AND EVAL., FT. LAUDERDALE	1							
PWC PENSACOLA	2		1	1			1	

Table B-2
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(As of 30 September, 1988)
Number of Sites

	PA/SI		RI/FS			RD/RA		
	C	U	C	U	F	C	U	F
AIR FORCE								
CAPE CANAVERAL	12		1	11				
EGLIN AFB	41		9	22	8	9	7	
HOMESTEAD AFB	15		5	8		4		
HURLBURT AFB	19			11				1
JACKSONVILLE ANG	6			6				5
MACDILL AFB	32		4	16		3	7	
PATRICK AFB	30		3	26		3	1	
TYNDALL AFB	29		4	15		4	2	
DEFENSE LOGISTICS AGENCY								
DFSP LYNN HAVEN								
DFSP TAMPA								
DRMS	1		1			1		
FLORIDA TOTALS	321	1	91	173	8	2	44	51
GEORGIA								
ARMY								
FORT BENNING	36		7		2	7		
FORT GILLEM	49							
FORT GORDON	16		2					1
FORT MCPHERSON	3		1					
FORT STEWART					1			1
HUNTER ARMY AIRFIELD								
NAVY								
MCLB ALBANY	14		9	4		1		
NSB KINGS BAY	1							
AIR FORCE								
AFP NO. 6 MARIETTA	14	1	1					
DOBBINS AFB	7	1	2	5				5
MOODY AFB	14		2	6	5	4		
ROBINS AFB	19	1	5	13		3	5	
SAVANNAH IAP ANG	7			7				
GEORGIA TOTALS	180	3	29	36	7	0	15	12

Table B-2
DEPARTMENT OF DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
State by State Installation Status Listing
(As of 30 September, 1988)
Number of Sites

	PA/SI		RI/FS			RD/RA		
	C	U	C	U	F	C	U	F
GUAM								
NAVY								
NAS AGANA	14	1	10	2	1			
NAVCAMS WESTPAC GUAM	1	6			6			
NAVDENCLINIC GUAM		1		1				1
NAVMAG GUAM	2	3			3			
NAVSHIPREPFAC GUAM	5			5				5
NAVSTA GUAM	10			9				9
NPPSO GUAM								
NS GUAM	1							
NSD GUAM	1	4		4				4
PWC GUAM	5	2	1	4		1		3
AIR FORCE								
ANDERSEN AFB	23		1	22		1		4
GUAM TOTALS	62	17	12	47	10	0	2	26
HAWAII								
ARMY								
ARMY AVIATION SUPP. FACIL. #3, HILO								
DIAMOND HEAD CRATER	1							
FORT KAMEHAMEHA								
FORT SHAFTER								
KAPALAMA MIL RES								
KILAUEA MIL RES								
MAKUA MILITARY RESERVATION								
NIKE SITE 3 AND 4	1							
POHAKULA TRAINING AREA								
SCHOFIELD BARRACKS								
TRIPLER ARMY MEDICAL CENTER								
WAIAWA GULCH	1							
NAVY								
ISMD PEARL HARBOR	1			1				
MCAS KANEHOE BAY	5	15		6				6
NAF MIDWAY	1				1			
NAS BARBERS POINT	3		3				1	
NAVCAMS EASTPAC		14		14				14
NAVMAG LUALUALEI	6			3				3
NS PEARL HARBOR	1			1				
NSC PEARL HARBOR	3	4		7				7
NSY PEARL HARBOR	5			5		1		
PACIFIC MISSILE RANGE FAC., KEKAHA	4				3			
PWC PEARL HARBOR	5	1	1	5			1	5

Table B-2
DEPARTMENT OF DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
State by State Installation Status Listing
(As of 30 September, 1988)
Number of Sites

	PA/SI		RI/FS			RD/RA		
	C	U	C	U	F	C	U	F
AIR FORCE								
BELLOWS AFS	3	1	1	1				
HICKAM AFB	17		10	7			9	
HICKAM POL	13			13				
KAALA AFS	4				3			
KAENA PT STATION	1	1	1					
KOKEE AFS	2							
MAUI AFS		1						
PALEHUA SOLAR OBS								
PUNAMANO AFS								
WHEELER AFB	5	3	7				6	1
HAWAII TOTALS	82	40	23	63	7	1	17	36
IOWA								
ARMY								
FORT DES MOINES	11		1					
IOWA AAP	27		1	3			1	1
AIR FORCE								
DES MOINES ANG	11		1	4				4
IOWA TOTALS	49	0	3	7	0	0	1	5
IDAHO								
ARMY								
ARCO AEC SITE	1							
BONNEVILLE	1							
BROKEN KETTLE TRAINING AREA	1							
BUHL	1							
GOODING	1							
GOWEN FIELD	1							
HAILEY	1							
IDAHO FALLS	1							
KELLY CANYON	1							
KIMANA	1							
ORCHARD RANGE	1							
SAINT ANTHONY	1							
TWIN FALLS CITY	1							
AIR FORCE								
GOWEN FIELD, BOISE ANG	8			6				2
MOUNTAIN HOME AFB	13		2	4			1	3
IDAHO TOTALS	34	0	2	10	0	0	1	5

Table B-2
DEPARTMENT OF DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
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(As of 30 September, 1988)
Number of Sites

	PA/SI		RI/FS			RD/RA		
	C	U	C	U	F	C	U	F
ILLINOIS								
ARMY								
FORT SHERIDAN								
JOLIET AAP	25		1	1	1		1	
MAINTENANCE CENTER, N. RIVERSIDE	1							
O'HARE IAP	1							
ROCK ISLAND ARSENAL								
SAVANNA ADA	47		6	2			6	1
ST. LOUIS SUPPORT CENTER	8							
USA TRAINING AREA JOLIET	1							
NAVY								
NAS GLENVIEW		6		6				6
NTC GREAT LAKES	7							
AIR FORCE								
CHANUTE AFB	15		2	13			1	8
GREATER PEORIA ANG	7			1			1	
O'HARE AIR RESERVE	11		3	3			2	
SCOTT AFB	8			8				
ILLINOIS TOTALS	131	6	12	34	1	1	10	15
INDIANA								
ARMY								
AFRTA	1							
CRANE ARMY AMMUNITION ACTIVITY								
FORT BENJAMIN HARRISON								
INDIANA AAP	11							
JEFFERSON PROVING GROUND	27			4				
NEWPORT AAP	39		1	1	3		1	1
NAVY								
NAC INDIANAPOLIS	1							
NMCRG GARY								
NWSC CRANE	17			16				
AIR FORCE								
FORT WAYNE ANG	5			5				
GRISSOM AFB	12			7			2	2
HULMAN ANG	6			6				4
INDIANA TOTALS	119	0	4	39	3	0	3	7

Table B-2
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(As of 30 September, 1988)
Number of Sites

	PA/SI		RI/FS			RD/RA		
	C	U	C	U	F	C	U	F
KANSAS								
ARMY								
FORT LEAVENWORTH	14		1					2
FORT RILEY	17		3			2		1
KANSAS AAP	1			1				
NAT'L GUARD ARMORY/PARKING LOT - KC								
SMOKEY HILL	1							
SUNFLOWER AAP	28			16				1
AIR FORCE								
FORBES FIELD	9			9				3
MCCONNELL AFB	13		2	11				1
KANSAS TOTALS	83	0	6	37	0	0	2	8
KENTUCKY								
ARMY								
FORT CAMPBELL	18		1	1				1
FORT KNOX	1		1			1		
GREENVILLE	1							
LEXINGTON-BLUEGRASS ADA	47			3				
SOMERSET	1							
NAVY								
NOS LOUISVILLE	2			2				1
KENTUCKY TOTALS	70	0	2	6	0	0	1	2
LOUISIANA								
ARMY								
FORMER NAAS-NEW IBERIA	1							
FORT POLK	15			1	7			1
LOUISIANA AAP	57		1	4		4		
PEARSON RIDGE								
NAVY								
NAS NEW ORLEANS	9			5	1			4
NSA NEW ORLEANS	4		3	1				1
AIR FORCE								
BARKSDALE AFB	23			22				1
ENGLAND AFB	19	2	2	7			2	
LOUISIANA TOTALS	128	2	6	40	8	0	6	7

Table B-2
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(As of 30 September, 1988)
Number of Sites

	PA/SI		RI/FS			RD/RA		
	C	U	C	U	F	C	U	F
MASSACHUSETTS								
ARMY								
AUBURN	1							
CAMP EDWARDS	1		1					
FORT DEVENS	2		1					1
MATERIALS TECHNOLOGY LABORATORY	19			19				
US ARMY RESEARCH & DEV & ENG CENTER								
USW ARMY NATICK R&D LABS SUDBURY AX			1				1	
NAVY								
NAS SOUTH WEYMOUTH	5							
NSY BOSTON	1							
NWIRP BEDFORD	2			2				2
AIR FORCE								
AFP NO. 28, EVERETT	4							
AFP NO. 29, LYNN	3							
BARNES ANG	8			1				
HANSCOM AFB	16		7	8	1		7	6
OTIS ANG	57		35	21			43	4
WESTOVER AFB	14		11	3		1	10	
MASSACHUSETTS TOTALS	133	0	56	54	1	1	61	13
MARYLAND								
ARMY								
ABERDEEN PRVG GRND	178		3	7	1			5
BLOSSOM POINT FIELD TEST ACTIVITY	20		1	6				
FORT DETRICK	1							
FORT MEADE	19		1					
FORT RITCHIE								
GAITHERSBURG RES FACILITY	1							
HARRY DIAMOND LABORATORY	1							
JACHMAN RESERVE CENTER			1					
LAUDERICK CREEK TRAINING AREA	1							
NIKE SITE 79, FOSTER	1							
NIKE SITE, PHOENIX	1			1			1	
NIKE SITE, WAYLAND	1							

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(As of 30 September, 1988)
Number of Sites

	PA/SI		RI/FS			RD/RA		
	C	U	C	U	F	C	U	F
NAVY								
BLOODSWORTH ARCHIPELAGO	1							
DAVID TAYLOR RSC—ANNAPOLIS	1							
DTRESCEN BETHESDA		1						
NAS PATUXENT RIVER	20				17		3	1
NAS SOLOMON'S ANNEX								
NAVAL ELECTRONICS SYSTEMS	1							
NAVAL RESEARCH LAB WALDORF ANNEX								
NAVEOTECEN INDIAN HEAD		1						
NAVMEDCOM BETHESDA	5		1				1	4
NAVSUPFAC THURMONT	1							
NOS INDIAN HEAD	6				3			1
NRL CHESAPEAKE BAY DETACHMENT		1						
NS ANNAPOLIS								
NSRDC ANNAPOLIS	1							
NSWC WHITE OAK	7				7			7
NTC BAINBRIDGE	3				3			2
U.S. NAVAL ACADEMY	1							
AIR FORCE								
AF SATELLITE CONTROL NETWORK	12							
ANDREWS AFB	15		3	12			3	12
BRANDYWINE RHA (AT ANDREWS AFB)	1							
DAVIDSONVILLE RDV (AT ANDREWS AFB)	1							
MARTIN AIRPORT ANG	11				5			
MARYLAND TOTALS	311	3	10	61	1	1	7	32
MAINE								
ARMY								
BANGOR IAP	1							
CASWELL	1							
RILEY-BOG BROOK	1							
NAVY								
NAS BRUNSWICK	8				7			3
NAVCOMMU CUTLER	2					2		
NSGA COREA								
NSGA WINTER HARBOR	1							
AIR FORCE								
BANGOR ANG		5						
LORING AFB	19				14			4

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Number of Sites

	PA/SI		RI/FS			RD/RA		
	C	U	C	U	F	C	U	F
DEFENSE LOGISTICS AGENCY								
DFSP CASCO BAY								
DFSP SEARSPORT	1		1				1	
MAINE TOTALS	34	5	1	21	2	0	1	7
MICHIGAN								
ARMY								
CAMP GRAYLING AIRFIELD	1		1				1	
CUSTER RFTA	1							
DETROIT ARSENAL	39		1					
FORT CUSTER RECREATION AREA	1							
KEWEENAW FIELD STATION								
MICHIGAN ARMY MISSILE PLANT	10							
NIKE SITE 58	1							
PONTIAC STORAGE FACILITY								
TANK-AUTOMOTIVE COMMAND SUPPORT ACT								
AIR FORCE								
BATTLE CREEK ANG								
K.I. SAWYER	19			14	1			3
PHELPS COLLINS ANG	9		8				2	
SELFRIDGE ANG	11			9				10
W.K. KELLOGG REGIONAL AIRPORT	12			6				2
WURTSMITH AFB	23		3	14			14	3
DEFENSE LOGISTICS AGENCY								
DFSP ESCANABA	1							
MICHIGAN TOTALS	128	0	13	43	1	0	17	18
MINNESOTA								
ARMY								
TWIN CITIES AAP	18		3	13		3	1	12
NAVY								
ASTROGRPDET BRAVO	1							
NIROP MINNEAPOLIS	4		4				4	
AIR FORCE								
DULUTH IAP	16	1	1	15				
MINN ST. PAUL IAP	7		3	4			5	2
MINNESOTA TOTALS	46	1	11	32	0	3	10	14

Table B-2
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Number of Sites

	PA/SI		RI/FS			RD/RA		
	C	U	C	U	F	C	U	F
MISSOURI								
ARMY								
CAMP CLARK	1							
FORT LEONARD WOOD	7		1	1	1		1	
GATEWAY AAP	17					18		
JEFFERSON BARRACKS LDF., ST. LOUIS								
LAKE CITY AAP	75		3	2		19	3	1
MO—AVCRAD, SPRINGFIELD								
NIKE SITE 30	1							
ST. LOUIS AAP	4							
U.S. CORPS OF ENGINEERS, PIEDMONT								
WELDON SPRING TRAINING AREA	12			1				1
AIR FORCE								
LAMBERT FIELD (ST. LOUIS)	1	5						
RICHARDS GEBEUR	8	5	13				13	
ROSENCRANS MEMORIAL AIRPORT	4							
WHITEMAN AFB	19		1	12				4
MISSOURI TOTALS	149	10	18	16	1	37	17	6
MISSISSIPPI								
ARMY								
CAMP MCCAIN	1							
MISSISSIPPI AAP								
WATERWAYS EXPERIMENT STATION			1				1	
NAVY								
CBC GULFPORT	10			8				
NAS MERIDIAN	5			5				
AIR FORCE								
A.C. THOMPSON		5						
COLUMBUS AFB	26		14	12			12	
GULFPORT NCBC	5	5	1				1	
JACKSON BARRACKS ANG STATION								
KEESLER AFB	16		11	4			3	8
KEY FIELD ANG		8						
MISSISSIPPI TOTALS	63	18	27	29	0	0	17	8
MONTANA								
ARMY								
FORT MISSOULA	1							
LIMESTONE HILLS	1							
MT ANG OMS #5, BELGRANDE								

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Number of Sites

	PA/SI		RI/FS			RD/RA		
	C	U	C	U	F	C	U	F
AIR FORCE								
GREAT FALLS ANG (MONTANA ANG)	8							
MALMSTROM	20			20				
MONTANA TOTALS	30	0	0	20	0	0	0	0
NORTH CAROLINA								
ARMY								
CAMP MACKALL								
FORT BRAGG				1				
MILITARY OCEAN TERMINAL, SUNNY POINT								
OMS 17	1							
TARHEEL ARMY MISSILE PLANT								
NAVY								
MCAS CHERRY POINT	17				16		1	13
MCB CAMP LEJEUNE	28				26			14
AIR FORCE								
DOUGLAS MAP	2				2			
POPE AFB	22		4	5		4		1
SEYMOUR-JOHNSON AFB	17		4	9		6		2
NORTH CAROLINA TOTALS	87	0	9	58	0	0	11	30
NORTH DAKOTA								
ARMY								
GARRISON	1							
ND ANG ARMY AV. SUP. FAC., BISMARK								
ND ANG CMB.SUP.MNT.SHP, DEVILS LAKE								
ND ANG ORGAN.MAINT.SHOP 4, BISMARK								
ND ANG ORGAN.MAINT.SHOP 7, MOTT								
ND ANG ORGAN.MNT.SHOP 3, GRND FORKS								
ND ANG ORGAN.MNT.SHOP 5, JAMESTOWN								
ND ANG ORGAN.MNT.SHP 6, VALLEY CITY								
ND ANG UNIT TRN.EQ.SHP, DEVILS LAKE								
WILLISTON	1							
AIR FORCE								
GRAND FORKS AFB	4				3			1
HECTOR ANG (ND ANG)	7				7			4
MINOT AFB	3		1	2				1

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Number of Sites

	PA/SI		RI/FS			RD/RA		
	C	U	C	U	F	C	U	F
DEFENSE LOGISTICS AGENCY								
DFSP GRAND FORKS								
NORTH DAKOTA TOTALS	16	0	1	12	0	0	0	6
NEBRASKA								
ARMY								
CAMP ASHLAND	1							
CORNHUSKER AAP	161		1			59	1	
HASTING	1							
LINCOLN	1							
MEAD	1							
STANTON	1							
STAPLETON	1							
NAVY								
FNRC LINCOLN		2		2				2
NAVSUPPACT OMAHA	1							
AIR FORCE								
LINCOLN ANG	7			6				6
OFFUTT AFB	17		2	15			1	2
NEBRASKA TOTALS	192	2	3	23	0	59	2	10
NEW HAMPSHIRE								
ARMY								
HOPINGTON WEST	1							
NAVY								
NSY PORTSMOUTH	2			2				
AIR FORCE								
NEW BOSTON AFS	5			3				1
PEASE AFB	22		16	2			3	3
DEFENSE LOGISTICS AGENCY								
DFSP NEWINGTON	1			1				1
NEW HAMPSHIRE TOTALS	31	0	16	8	0	0	3	5

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Number of Sites

	PA/SI		RI/FS			RD/RA			
	C	U	C	U	F	C	U	F	
NEW JERSEY									
ARMY									
ERADCOM FLIGHT TEST ACTIVITY									
FORT DIX	44		4	16			3		
FORT MONMOUTH	1		1						
MILITARY OCEAN TERMINAL, BAYONNE	35		1	2	13		1		
PICATINNY ARSENAL	53		2	21	3		2	1	
UNIT TRAIN & EQ SITE, PLUMSTEAD TWP									
NAVY									
NAEC LAKEHURST	51		1	43			1	3	
NAPC TRENTON	9			9				8	
NWS EARLE COLTS NECK	18			17				5	
AIR FORCE									
COYLE ANG TRAINING ANNEX									
MCGUIRE AFB	26	1	19	4	1		22	1	
NEW JERSEY TOTALS	237	1	28	112	17	0	29	18	
NEW MEXICO									
ARMY									
CARLSBAD	1								
DEMMING	1								
DONA ANA RANGE	1								
FORT WINGATE ADA	30								
SANTE FE	1								
TAOS	1								
TUCUMCARI	1								
WALKER ANNEX	1								
WHITE SANDS MISSILE RANGE	4		2	1			2		
AIR FORCE									
AFP NO. 83, ALBURQUERQUE	11			11					
CANNON AFB	21		3	15			3	4	
HOLLOMAN AFB	40	1	3	10			3	4	
KIRTLAND AFB	40		3	9	2	1	1	8	
NEW MEXICO TOTALS	153	1	11	46	2	1	9	16	
NEVADA									
ARMY									
HAWTHORNE AAP	21		2	2			1		
INDIAN SPRINGS RANGE	1								
RENO	1								
U.S. PROP FISCAL OFFICE, CARSON CITY									

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Number of Sites

	PA/SI		RI/FS			RD/RA			
	C	U	C	U	F	C	U	F	
NAVY									
NAS FALLON	36		8	21				21	
AIR FORCE									
CANNON ANG	1	5							
NELLIS	26		1	24			1	10	
NEVADA TOTALS	86	5	11	47	0	0	2	31	
NEW YORK									
ARMY									
AIR FORCE PLANT NO. 68, MODEL CITY									1
AMSA 9 USA RESERVE, MATTYDALE									
FARMINGDALE NG				1					1
FORT DRUM	11		5	1	1		4	2	
FORT HAMILTON			1						
FORT TOTTEN									
FORT WADSWORTH									
MALONE	1								
MCDONALD USARC, JAMAICA									
NIAGARA FALLS AFRC	1								
NIKE SITE 24	1								
OLEAN	1								
ORGANIZATNL MAINT. SHP #45, BAYSHORE									
ROCHESTER	1								
ROOSEVELT USARC, HEMPSTEAD									
SENECA AD	45		1	1			1	1	
STEWART ARMY SUBPOST									
TICONDEROGA	1								
USA—BELLMORE MAINT. FACILITY									
USA ENGINEER DISTRICT, BUFFALO									
USMA WEST POINT									
WATERVLIET ARSENAL	1								
YOUNGSTOWN TRAINING	1								
NAVY									
CAMP HERO MILITARY RES. MONTAUK									
NAS FLOYD BENNETT FIELD	1								
NWIRP BETHPAGE	3								
NWIRP CALVERTON	4								
SUPSHIP BROOKLYN	1								
AIR FORCE									
AFP NO. 38, LEWISTON	11				10				
AFP NO. 59, JOHNSON CITY	4		1	3					
GRIFFISS AFB	36	1	7	9			6	2	
HANCOCK FIELD	9		2	7			3		
NIAGARA FALLS IAP	13	1	1	13					13

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Number of Sites

	PA/SI		RI/FS			RD/RA		
	C	U	C	U	F	C	U	F
PLATTSBURGH AFB	20	1	3	9	4		2	
RADC								
STEWART ANG	3		1	2		2		1
SUFFOLK ANG	8		1	4		1		6
YOUNGSTOWN		1						
DEFENSE LOGISTICS AGENCY								
DFSP VERONA	1			1				1
NEW YORK TOTALS	178	4	23	61	5	0	19	27

OHIO

ARMY

BLUE ROCK	1							
CAMP SHERMAN	1							
LIMA ARMY TANK CENTER								
NIKE SITE 78	1							
RAVENNA AAP	12			2				
USA ENGINEER DISTRICT, PITTSBURGH								

AIR FORCE

AFP NO. 36, EVANDALE	4		2	1			2	
AFP NO. 85, COLUMBUS	8		1	7				
MANSFIELD LAHM AIRPORT ANG		5						
NEWARK AFS	7			7				
RICKENBACKER ANG	27			22				10
TOLEDO EXPRESS AIRPORT ANG	1			1				
WRIGHT-PATTERSON AFB	41	12	40	5			41	2
YOUNGSTOWN	4		4				4	

DEFENSE LOGISTICS AGENCY

DCSC COLUMBUS	1		1				1	
DFSP CINCINNATI								

OHIO TOTALS	108	17	48	45	0	0	48	12
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OKLAHOMA

ARMY

ARMY AVIATION SUPPORT FACILITY	1							
CAMP GRUBER	1							
COMBINED SUPPORT MAINTENANCE SHOP	1							
FORT SILL	7		1			4		
HUGO	1							
KEGLEMAN AUX FIELD	1							
MCALESTER AAP	51			2				
OMS 1	1							

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	PA/ST		RI/FS			RD/RA		
	C	U	C	U	F	C	U	F
OMS 10	1							
OMS 11	1							
OMS 14	1							
OMS 15	1							
OMS 2	1							
OMS 5	1							
OMS 6	1							
OMS 8	1							
PERRY	1							
AIR FORCE								
AFP NO. 3, TULSA	8		2	6				3
ALTUS AFB	10			10			1	8
TINKER AFB	33		6	20	2	2	3	4
VANCE AFB	23		8	14			7	
WILL ROGERS WORLD AIRPORT		6						
OKLAHOMA TOTALS	147	6	17	52	6	2	11	15
OREGON								
ARMY								
CAMP ADAIR	1							
REDMOND	1							
UMATILLA ADA	21	4	1	1			1	1
USA COE WILLAMETTE, WEST LINN								
NAVY								
LSC MARINE, INC/USNS WILKES	1							
AIR FORCE								
KINGSLEY FIELD	8			7				8
MOUNT HEBO AFS	2		1		1		1	
PORTLAND ANG	8			8				7
OREGON TOTALS	42	4	2	16	1	0	2	16
PENNSYLVANIA								
ARMY								
AJCC—FORT RITCHIE, BLUE RIDGE SUM								
ANG MAINT SHOP, HARRISBURG								
ANG MAINT. SHOP #10, PHILADELPHIA								
ANG MAINT. SHOP #28, WILLIAMSPORT								
CARLISLE ARMY BARRACKS	1							
EAST JADWIN DAM	1							
FORT INDIANTOWN GAP	15							3

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Number of Sites

	PA/SI		RI/FS			RD/RA		
	C	U	C	U	F	C	U	F
FORT MIFFLAN	1							
FRANKFORD ARSENAL	4					4		
HAYES AAP								
LETTERKENNY ARMY DEPOT	69		5	1		1	5	
LOCK HAVEN	1							
NEW CUMBERLAND AD	32	1	4		1		3	
NIKE SITE 93	1							
NIKE SITE, FINLEYVILLE	1							
NIKE SITE, GASTONVILLE	1							
OAKDALE SUPPORT CENTER								
SCRANTON AAP								
TOBYHANNA AD	15		5	1			5	1
NAVY								
NADC WARMINSTER	9				8	1		8
NAS WILLOW GROVE	4	6			10			10
NASO PHILADELPHIA	1							
NAVHOSP PHILADELPHIA	1							
NSY PHILADELPHIA	10				10		3	2
SPCC MECHANICSBURG	6	1			6			
AIR FORCE								
GREATER PITTSBURGH IAP	12				8			
OLMSTED FIELD	8	2	9	1			9	
WILLOW GROVE ARF	7		3	4			3	1
DEFENSE LOGISTICS AGENCY								
DPSC PHILADELPHIA	1	1				1		
PENNSYLVANIA TOTALS	201	11	26	49	3	5	28	25
PUERTO RICO								
ARMY								
CAMP SANTIAGO	1							
FORT ALLEN	1							
FORT BUCHANAN					1			1
USCG AIR STATION (FORMER RAMEY AFB)								
NAVY								
NAF VIEQUES	3				3			
NS ROOSEVELT ROADS	13		3	10		1		
NSGA SABANA SECA	3		1	2			1	2
SUPSHIP SAN JUAN	3							
AIR FORCE								
MUNIZ ANG	13							
PUERTO RICO IAP								
PUERTO RICO TOTALS	37	0	4	16	0	1	1	3

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(As of 30 September, 1988)
Number of Sites

	PA/SI		RI/FS			RD/RA		
	C	U	C	U	F	C	U	F
RHODE ISLAND								
ARMY								
ANG, NORTH SMITHFIELD								
CAMP FOGARTY	1							
U.S. ARMY BRISTOL NIKE SITE								
U.S. ARMY COVENTRY NIKE SITE								
U.S. ARMY FOSTER NIKE SITE								
U.S. ARMY RESERVE CENTER					1			1
US ARMY N. SMITHFIELD NIKE SITE 99	1							
NAVY								
ARMED FORCES RES. CNTR, PROVIDENCE	1							
CBC DAVISVILLE	18		1	12			1	
NAS CHARLESTOWN								
NAS QUONSET POINT								
NETC NEWPORT	13		1	12			1	1
NUWSC NEWPORT—EAST LYME	1			1				1
NUWSC NEWPORT—FISHER'S ISLAND	1			1				1
DEFENSE LOGISTICS AGENCY								
DFSP MELVILLE	2			1				1
RHODE ISLAND TOTALS	38	0	3	27	0	0	3	4
SOUTH CAROLINA								
ARMY								
CHARLESTON ARMY DEPOT								
CLARKS HILL RESERVATION	1							
FORT JACKSON								
NAVY								
MCAS BEAUFORT	14		12	2				
MCRD PARRIS ISLAND	9		6	3				
NS CHARLESTON			1				1	
NSC CHARLESTON			1				1	
NSY CHARLESTON	15		3	12			3	1
NWS CHARLESTON	9	11	8					
AIR FORCE								
CHARLESTON AFB	27	2	8	12	2		8	17
MCENTIRE ANG	12		8	1			8	2
MYRTLE BEACH AFB	19	1	3	11			13	
SHAW AFB	14	1	2	6			6	

Table B-2
DEPARTMENT OF DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
State by State Installation Status Listing
(As of 30 September, 1988)
Number of Sites

	PA/SI		RI/FS			RD/RA		
	C	U	C	U	F	C	U	F
DEFENSE LOGISTICS AGENCY								
DFSP CHARLESTON				1			1	
SOUTH CAROLINA TOTALS	120	15	53	47	2	0	41	20
SOUTH DAKOTA								
ARMY								
ANG OMS 10, SIOUX FALLS								
ANG OMS 2, RAPID CITY								
ANG OMS 3, LEMMON								
ANG OMS 4, WEBSTER								
ANG OMS 7, PIERRE								
ANG OMS 8, BROOKINGS								
AIR FORCE								
ELLSWORTH AFB	24		2	11	3		1	2
JOE FOSS	3			3			1	1
SOUTH DAKOTA TOTALS	27	0	2	14	3	0	2	3
TENNESSEE								
ARMY								
AEDC TULLAHOMA	1							
CATOOSA RANGE	1							
HOLSTON AAP	5							
JOHN SEVIER	1							
MILAN AAP	37		1	2	1	1		
SMYRNA AIRPORT	1							
VOLUNTEER AAP	27	1	2		1		2	
NAVY								
NAS MEMPHIS	9		7	1			1	1
NWIRP BRISTOL	5			5				
AIR FORCE								
ARNOLD AFB	17		1	16			2	2
KNOXVILLE ANG								
MCGHEE TYSON AIRPORT	11	1						
DEFENSE LOGISTICS AGENCY								
DDMT MEMPHIS	4		1	1	1		1	1
TENNESSEE TOTALS	119	2	12	25	3	1	6	4

Table B-2
DEPARTMENT OF DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
State by State Installation Status Listing
(As of 30 September, 1988)
Number of Sites

	PA/SI		RI/ES			RD/RA			
	C	U	C	U	F	C	U	F	
TRUST TERRITORIES									
NAVY									
NAF MIDWAY	4					2			
AIR FORCE									
WAKE ISLAND AIRFIELD	16		1	15					
TRUST TERRITORIES TOTALS	20	0	1	15	2	0	0	0	
TEXAS									
ARMY									
ADDICKS RESERVOIR	1								
BARKER DAM DZ	1								
CAMP BARKELEY	1								
CAMP BULLIS	1								
CAMP STANLEY STORAGE, SAN ANTONIO	1								
CAMP SWIFT	1								
CANYON LAKE RECREATION AREA									
CORPUS CHRISTI AD			1					1	
DECATUR	1								
FORT BLISS	18		1	1	1			1	
FORT HOOD (NORTH)	6								3
FORT SAM HOUSTON				1					1
FORT WOLTERS	1								
FUELS AND LUBRICANT RESEARCH LAB									
HOUSTON ARMED FORCES CENTER									
LAKE LAVON, NORTH GULLY, WYLIE									
LONE STAR AAP	41		3	4				1	2
LONGHORN AAP	187		2		1			1	1
NIKE SITE 80	1								
PANHANDLE TRAINING AREA	1								
RED RIVER ARMY DEPOT	20		1		2			1	
RESERVOIR TEXARCANA	1								
SAGINAW AAP									
WEST CLEVELAND	1								
NAVY									
NAS CHASE FIELD	4		1	3					1
NAS CORPUS CHRISTI	8		4	2				1	2
NAS DALLAS	6		5	1				2	
NAS KINGSVILLE	8			7					
NWIRP DALLAS	10		9			1			
NWIRP MCGREGOR	7		7				2		

Table B-2
DEPARTMENT OF DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
State by State Installation Status Listing
(As of 30 September, 1988)
Number of Sites

	PA/SI		RI/FS			RD/RA		
	C	U	C	U	F	C	U	F
AIR FORCE								
AFP NO. 4, FT. WORTH	22		16	6		22		
BERGSTROM AFB	22		1	10				5
BROOKS AFB	10		2	8		1		
CARSWELL AFB	15	1	1	12				2
DYESS AFB	10		2	7		2		1
ELLINGTON ANG	3			3				
GOODFELLOW AFB	5		1	4		3		
KELLY AFB	41		3	34		5		1
LACKLAND	24		9	13		9		
LAUGHLIN	23		5	8		5		8
RANDOLPH AFB	16		3	11		7		
REESE AFB	18		3	13		1	2	
SHEPPARD AFB	16		5	11		5		9
TEXAS TOTALS	551	1	85	159	5	10	62	36
UTAH								
ARMY								
BLANDING LAUNCH AREA								
DALE REX HALL								
DUGWAY PROVING GROUND	4		1	2	1		1	
FORT DOUGLAS								
GREEN RIVER TEST SITE								
TOOELE AD	121		4	9			3	1
WIG MOUNTAIN AREA								
NAVY								
NIROP MAGNA	7			7				
AIR FORCE								
AFP NO. 78, CORINNE	7		6	1		6		
HILL AFB	38		10	20		10		1
DEFENSE LOGISTICS AGENCY								
DDOU OGDEN	4		1			1	1	
UTAH TOTALS	181	0	22	39	1	1	21	2
VIRGINIA								
ARMY								
ARLINGTON HALL STATION								
ARLINGTON NATIONAL CEMETERY								
BYRD FIELD	1							
CALLAGHAN	1							
CAMERON STATION	1							

Table B-2
DEPARTMENT OF DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
State by State Installation Status Listing
(As of 30 September, 1988)
Number of Sites

	PA/SI		RI/FS			RD/RA		
	C	U	C	U	F	C	U	F
CAPE CHARLES AFS								
DEFENSE PRINTING SERVICE OFFICE								
FORT A.P. HILL	4		2	2			2	
FORT BELVOIR	42		1					
FORT EUSTIS	21		1	1	1			1
FORT LEE	1							
FORT MONROE	5							
FORT MYER	1							
FORT PICKETT								
FORT STORY	1		1					
NG VA BEACH	1							
OYSTER PT DEVEL. CORP.,NEWPORT NEWS								
RADFORD AAP	53		1	2			1	
RICHLANDS	1							
US ARMY ENGINEER DIST. BO, BOYDTON								
VINT HILL FARMS STATION	4		1					
WARRENTON TRAINING CENTER								
WOODBIDGE RESEARCH FACILITY	2		1			1	1	
NAVY								
AFEXTA CAMP PERRY, WILLIAMSBURG	1							
FCTC DAM NECK	4			4				
HEADQUARTERS BATTALION, ARLINGTON	1							
MCDEC QUANTICO	9		2	7		1	2	
NADEP NORFOLK	2		1					1
NALF FENTRESS	2			2				
NAS NORFOLK	2		1				1	
NAS OCEANA	12		2	10			1	1
NAVAL BASE NORFOLK	7		1	2				6
NAVHOSP PORTSMOUTH	2			2				
NAVPHIBASE LITTLE CREEK	11			11				5
NFD/NSC CRANEY ISLAND	5			5				
NFEC ALEXANDRIA	6		6				6	
NMCRC ROANOKE	1							
NRL CHESAPEAKE BEACH	1							
NRS DRIVER VA	3			3				3
NSC CHEATHAM ANNEX WILLIAMSBURG	4			4				
NSC NORFOLK	6		5					
NSC YORKTOWN - FUELS DIVISION	16			16				
NSWC DAHLGREN	8			8				
NSY (NORFOLK) PORTSMOUTH	10			8				1
NSY ST. JULIEN'S CREEK ANNEX NORFOLK	1							
NWS YORKTOWN	16			16				1
PWC NORFOLK						1		
AIR FORCE								
BYRD ANG (RICHMOND IAP)	1			1				
LANGLEY AFB	23	1	1	2			2	
RADAR SITES	3							1

Table B-2
DEPARTMENT OF DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
State by State Installation Status Listing
(As of 30 September, 1988)
Number of Sites

	PA/SI		RI/FS			RD/RA		
	C	U	C	U	F	C	U	F
DEFENSE LOGISTICS AGENCY								
DGSC RICHMOND	6		1	5		1	2	
VIRGINIA TOTALS	302	1	28	111	1	3	17	22
VERMONT								
ARMY								
ETHAN ALLEN FIRING RANGE	2							
AIR FORCE								
BURLINGTON IAP (VERMONT ANG)	3		2					2
VERMONT TOTALS	5	0	2	0	0	0	0	2
WASHINGTON								
ARMY								
CAMP MURRAY	1		1				1	
CAMP SEVEN MILE	1							
FORT LEWIS	9		2	2		1	3	
NIKE SITE 13-14	1							
NIKE SITE 43	1							
USA COE LAKE WASHINGTON, SEATTLE								
WASHINGTON ANG, CENTRALIA								
WASHINGTON ANG, EPHRATA								
WASHINGTON ANG, MONTESANO								
YAKIMA FIRING CENTER	1							
NAVY								
NAS WHIDBEY ISLAND	37			36				
NAVAL STATION SEATTLE	2							
NH BREMERTON	1			1				1
NSB BANGOR	13		1	11			1	7
NSC PUGET SOUND	2		1	1			1	1
NSC PUGET SOUND MANCHESTER		2						
NSY PUGET SOUND	7				7			
NUWES KEYPORT	9			9				8
AIR FORCE								
FAIRCHILD AFB	14		7	7			11	
MCCHORD AFB	54		16	13	3		16	2
DEFENSE LOGISTICS AGENCY								
DFSP MUKILTEO	2			1				1
WASHINGTON TOTALS	155	2	28	81	10	1	33	20

Table B-2
DEPARTMENT OF DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
State by State Installation Status Listing
(As of 30 September, 1988)
Number of Sites

	PA/SI		RI/FS			RD/RA		
	C	U	C	U	F	C	U	F ^o
WISCONSIN								
ARMY								
ANG 13, WASSAU								
ANG AASF 1, WEST BEND								
ANG AASF 2, MADISON								
ANG OMS 11, GREEN BAY								
ANG OMS 14, WISCONSIN RAPIDS								
ANG OMS 5, WHITEFISH BAY								
ANG OMS 6, KENOSHA								
ANG OMS 8, JANESVILLE								
BADGER AAP	20		5	4			5	
CAMP WILLIAMS	1							
CAMP WISMER	2							
FORT MCCOY	6				1			
INC RANGE	1							
RACINE	1							
TRUAX FIELD (ARMY)	1							
AIR FORCE								
GEN. MITCHELL FIELD	5		4					
TRUAX FIELD (AIR FORCE)	4							
VOLK FIELD ANG	22		1	11				7
WISCONSIN TOTALS	63	0	10	15	1	0	5	7
WEST VIRGINIA								
ARMY								
HINTON	1							
VOLCANO RANGE	1							
WEST VIRGINIA ORDNANCE WORKS	11		7			3	4	
NAVY								
ABL MINERAL COUNTY	10			10				4
NRS SUGAR GROVE	1							
AIR FORCE								
EWVRA SHEPHERD FIELD	3			3			1	1
KANAWHA COUNTY AIRPORT	1			1				
YEAGER		5						
WEST VIRGINIA TOTALS	28	5	7	14	0	3	5	5

Table B-2
DEPARTMENT OF DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
State by State Installation Status Listing
(As of 30 September, 1988)
Number of Sites

	PA/SI		RI/FS			RD/RA		
	C	U	C	U	F	C	U	F
WYOMING								
ARMY								
AASF, CHEYENNE		1						
LANDEL		1						
LOVELL		1						
SHERIDAN		1						
AIR FORCE								
CHEYENNE ANG (WYOMING ANG)		6			5			1
F.E. WARREN AFB		18	1		16			1 2
WYOMING TOTALS		28	0	1	21	0	0	2 2

Table B-3
DEPARTMENT OF DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
Cumulative IRP Response Actions Status
(as of September 1988)

PA/SI

SERVICE	Number of Sites			
	C	S	U	F
ARMY	3054	6	7	2
NAVY	1344	172	113	2
AIR FORCE	3251	108	100	2
DLA	62	2	1	0
GRAND TOTAL	7711	288	221	6

RI/FS

SERVICE	Number of Sites			
	C	S	U	F
ARMY	300	356	205	68
NAVY	233	345	963	36
AIR FORCE	943	262	1604	56
DLA	9	7	16	2
GRAND TOTAL	1485	970	2788	162

RD/RA

SERVICE	Number of Sites			
	C	S	U	F
ARMY	132	77	281	57
NAVY	10	110	94	463
AIR FORCE	73	293	883	472
DLA	1	5	8	12
GRAND TOTAL	216	485	1266	1004

C = Total number of sites completed by end of FY88
S = Number of new starts in FY88
U = Number of sites underway at end of FY88
F = Number of sites scheduled for new study/action (FY89 or beyond)

APPENDIX C

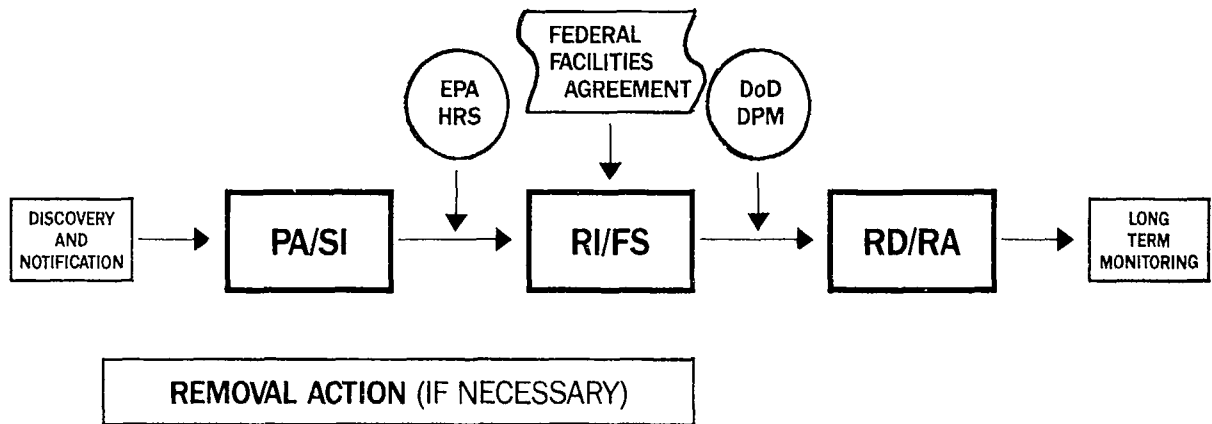
NATIONAL CONTINGENCY PLAN PROCEDURES

All sites go through the steps of Discovery and Notification, Preliminary Assessment/Site Inspection and, when deemed necessary by the EPA, scoring by the Hazard Ranking System (HRS). If the HRS score is high enough (28.5 or above) to qualify the site for placement on the NPL, then SARA/CERCLA, NCP, and FPA guidelines are applied in carrying out the investigatory and remediation phases of the program. The NCP procedures for cleaning up hazardous waste sites are described below and shown graphically in Figure C-1.

- **Discovery and Notification**—If a release of a hazardous substance(s) is found, appropriate Federal, State and local officials are notified.
- **Preliminary Assessment/Site Inspection (PA/SI)**—A PA/SI is an installation-wide study to determine whether there are sites on the installation that may pose hazards to the public health or environment. Available information is collected on the source, nature, extent and magnitude of a hazardous substance release or threat of release at sites on the installation. These site data, plus samples collected by DoD are assembled into a package of information describing which facilities (or sites) have the potential to endanger human health and/or the environment.
- **Hazard Ranking**—Using data collected during the PA/SI, EPA applies the Hazard Ranking System (HRS) to assess the potential relative risk to human health and the environment. If the HRS score exceeds 28.5, the site is eligible for inclusion on the NPL.
- **Imminent Threats**—In cases where an existing danger to the public is discovered at an installation, immediate action is taken to remove the threat. The Service then proceeds to study how best to address the risk expected to occur in the future. This will often mean, for example, removal of poorly stored, or leaking drums, but it can entail other actions, such as placement of people on alternative water supplies if their drinking water is now contaminated. The DoD takes all necessary measures to minimize the exposure of people on or around installations to contaminants while studies are done to determine how best to accomplish long-term solutions.
- **Remedial Investigation/Feasibility Study (RI/FS)**—An RI/FS is a comprehensive investigation of individual sites identified in the PA/SI as potential threats. All contaminants and their migration pathways are defined, potential risks to public health and the environment are assessed, and a comprehensive, quantitative risk assessment is carried out. Remedial action alternatives are evaluated in terms of their cost and effectiveness; and in coordination with regulatory agencies and the public, the DoD identifies the remedial action plan chosen for implementation at the site in the form of a Record of Decision.
- **Interagency Agreement**—If a site qualifies for placement on the NPL, SARA mandates DoD and EPA enter into an agreement as to the execution and timing of remedial action(s) at that site. An agreement may be entered into during the Remedial Investigation phase of the Program to fulfill the statutory mandate and to establish a sound working relationship with the EPA and the State.
- **Remedial Design/Remedial Action (RD/RA)**—The RD/RA includes design and implementation of the chosen alternatives to address problems at the site. Contaminant treatment processes are constructed, operated, maintained and monitored to observe the effects of the remedial action to be sure the hazardous waste site is no longer a threat.

Figure C-1

DEFENSE ENVIRONMENTAL RESTORATION PROGRAM NPL SITE CLEANUP PROCEDURE



- NPL = National Priorities List
- HRS = Hazard Ranking System
- DPM = Defense Priority Model
- PA/SI = Preliminary Assessment/Site Inspection
- RI/FS = Remedial Investigation/Feasibility Studies
- RD/RA = Remedial Design/Remedial Action